

REGULATIONS FOR
FOUR YEAR INTEGRATED B.Sc.,B.Ed.&
B.A.,B.Ed. DEGREE PROGRAMME
(SEMESTER)

[With effect from 2018-19]



PONDICHERRY UNIVERSITY
PUDUCHERRY - 605 014



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REGULATION

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PONDICHERRY UNIVERSITY
FOUR YEAR INTEGRATED PROGRAMME LEADING TO
B.Sc., B.Ed. / B.A., B.Ed. DEGREE
REGULATIONS (2018 – 19 onwards)

0.PREAMBLE:

The Four year integrated programme in Education – B.Sc., B.Ed. and B.A., B.Ed. aims at integrating the general studies comprising three year Liberal Science - B.Sc. and Liberal Arts - B.A. on the one hand and the Professional Studies B.Ed. comprising foundation of education, pedagogy of school subjects and practicum related to tasks and functions of a school teacher on other hand. It maintains a balance between theory and practice, and coherence and integration among the components of the programme, representing a wide knowledge base of a secondary school teacher. During the programme, the student-teacher shall be prepared for teaching up to class ten only but they shall automatically become eligible for teaching at senior/higher secondary stage after they acquire post-graduation degree in a relevant subject. The Students who pass this programme will be eligible to pursue Masters' Degree in the respective subject in Pondicherry University and in any other University recognised by UGC.

1. Duration and Working Days:

1.1 Duration

The B.Sc., B.Ed. and B.A., B.Ed. programmes shall be of four years (Eight Semesters) including school Based experiences and internship in teaching. Student teachers shall, however, be permitted to complete the programme within a maximum period of six years from the date of admission to the programme.

1.2 Working Days

- a) There shall be at least two hundred and fifty (250) working days per year (120 – 130 days in each semester) excluding the period of admission and examination.
- b) A working day will be of a minimum of 6 hours and 6 days in a week and adding up to a minimum of 36 hours per week. The institution shall ensure the availability of teachers and students for consultation and mentoring-providing group of individual guidance.
- c) The minimum attendance of student teachers shall have to be 80% for all course work and practicum, and 90% for school internship.

2. Intake, Eligibility and Admission Procedures

2.1 Intake

There shall be a basic unit of (50) students. Initially two units (one unit each in B.Sc., B.Ed. and B.A., B.Ed. or Two units each either in B.Sc., B.Ed. or B.A., B.Ed.) may be permitted. The university may prescribe the distribution of students for different subjects based on the facilities available from the subjects listed below as per NCTE Regulations 2014

| Course | Subject of specialisation (Major / Main) |
|---------------|--|
| B.Sc., B.Ed. | Mathematics, Physics, Chemistry, Botany, Zoology, Computer Science |
| B.A., B.Ed. | English, Indian Language, History, Geography |

2.2 Eligibility

- (a) The candidates with at least 50% marks in the +2 or its equivalent are eligible for admission
- (b) The reservation and relaxation in marks for SC/ST/OBC/PWD and other category shall be as per the rules of the Central Government / UT of Puducherry/UT of Andaman & Nicobar Islands.
- (c) The choice of subject is based on the eligibility conditions as prescribed for the UG courses of the respective subject of specialisation by this university.

2.3 Admission Procedure

- (a) Admission will be made on merit on the basis of marks obtained in the qualifying examination and in the entrance examination or any other selection process as per the policy of respective Government.
- (b) At the time of admission to the programme, the students will need to indicate their selection of the subject to be pursued for the discipline options and accompanying pedagogic specialisation for which they are applying and these may be assigned on the basis of order of merit and availability

3. Eligibility for Admission to Examination

The university examination for the B.Sc., B.Ed. and B.A., B.Ed. programmes shall be of eight semesters (a minimum of 120 days to a maximum of 130 days per semester) including school based experiences and internship in teaching. A student teacher shall be admitted to the examination only if (i) he/she has undergone the prescribed course of study – both theory and practicum including school internship satisfactorily; and (ii) having put in not less than 80% of attendance for all course work and practicum and 90% of attendance for school internship in each year.

4. Course Structure

The four year integrated programme aims at integrating the general studies comprising B.Sc. in Mathematics, Physics, Chemistry, Botany, Zoology, Computer Science and B.A. in English, Indian Language, History, Geography disciplines on one hand and the Professional Studies B.Ed., comprising foundation of education, pedagogy of school subjects and practicum on the other hand relating to the task and functions of a school teacher. Hence the students shall have to study the content of the graduation level of their choice. In the professional segment, students shall study basics of education, different educational specializations having a direct bearing on teacher tasks, pedagogy of school subjects, undertake school experience, and conduct other practical activities.

The curriculum of the programme has been organized under the following four components:

| | | | |
|---|----------|----------------------------------|--------------------------|
| 1 | Part I | Modern Indian Languages / French | Liberal Options (LO) |
| | Part II | English | |
| | Part III | Main + Supportive | |
| 2 | Part IV | Theory | Educational Studies (ES) |
| | | | Pedagogical Studies (PS) |
| | | Practical | Practicum (PR) |
| 3 | AECC | Courses approved by UGC and MHRD | |

As stated earlier, the curriculum of the programme has been organized under two broad components, namely the professional component and the liberal component. The professional component is further divided into three categories, namely educational studies, pedagogical studies and practicum. The semester-wise detailed scheme of studies along with weightage for different courses are given below:

SEMESTER WISE COURSE STRUCTURE

FIRST YEAR - SEMESTER I

| Title of the Course | | Name of the course | Credits | CCE* | UE** | Total |
|---------------------|----------------------------------|-------------------------------------|---------|------|------|------------|
| Part I | Lang I-1 | Tamil/French/Malayalam/Telugu/Hindi | 4 | 30 | 70 | 100 |
| Part II | Lang II-1 | English | 4 | 30 | 70 | 100 |
| Part III | Core 1 | Core: B.Sc/B.A..... | 4 | 30 | 70 | 100 |
| | Core 2 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| | Core 3 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| | Core 4 ^(Supportive 1) | Supportive: B.Sc/B.A | 4 | 30 | 70 | 100 |
| Part IV | Edn: EPC 1 | Yoga, Health and Physical Edn I | 2 | 50 | - | 50 |
| AECC | A 1 | Environmental Studies | 4 | 30 | 70 | 100 |
| Total | | | | | | 750 |

FIRST YEAR - SEMESTER II

| Title of the Course | | Name of the course | Credits | CCE* | UE** | Total |
|---------------------|----------------------------------|-------------------------------------|---------|------|------|------------|
| Part I | Lang I-2 | Tamil/French/Malayalam/Telugu/Hindi | 4 | 30 | 70 | 100 |
| Part II | Lang II-2 | English | 4 | 30 | 70 | 100 |
| Part III | Core 5 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| | Core 6 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| | Core 7 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| | Core 8 ^(Supportive 2) | Supportive: B.Sc/B.A | 4 | 30 | 70 | 100 |
| Part IV | Edn 1: C&PS | Language across the Curriculum | 4 | 30 | 70 | 100 |
| | Edn: EPC 2 | Reading and Reflecting on Texts | 2 | 50 | - | 50 |
| Total | | | | | | 750 |

SECOND YEAR - SEMESTER III

| Title of the Course | | Name of the course | Credits | CCE* | UE** | Total |
|---------------------|-----------------------------------|-------------------------------------|---------|------|------|------------|
| Part I | Lang I-3 | Tamil/French/Malayalam/Telugu/Hindi | 4 | 30 | 70 | 100 |
| Part II | Lang II-3 | English | 4 | 30 | 70 | 100 |
| Part III | Core 9 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| | Core 10 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| | Core 11 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| | Core 12 ^(Supportive 3) | Supportive: B.Sc/B.A | 4 | 30 | 70 | 100 |
| Part IV | Edn 2: PE | Childhood and Growing up – I | 4 | 30 | 70 | 100 |
| | Edn 3: C&PS | Knowledge and Curriculum | 4 | 30 | 70 | 100 |
| | Edn: EPC 3 | Drama and Art in Education | 2 | 50 | - | 50 |
| Total | | | | | | 850 |

SECOND YEAR - SEMESTER IV

| Title of the Course | | Name of the course | Credits | CCE* | UE** | Total |
|---------------------|-----------------------------------|-------------------------------------|---------|------|------|------------|
| Part I | Lang I-4 | Tamil/French/Malayalam/Telugu/Hindi | 4 | 30 | 70 | 100 |
| Part II | Lang II-4 | English | 4 | 30 | 70 | 100 |
| Part III | Core 13 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| | Core 14 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| | Core 15 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| | Core 16 ^(Supportive 4) | Supportive: B.Sc/B.A | 4 | 30 | 70 | 100 |
| Part IV | Edn 4: PE | Childhood and Growing up – II | 4 | 30 | 70 | 100 |
| | Edn 5: PE | Gender School and Society | 4 | 30 | 70 | 100 |
| | Edn: EPC 4 | Critical Understanding of ICT | 2 | 50 | - | 50 |
| Total | | | | | | 850 |

THIRD YEAR - SEMESTER V

| Title of the Course | | Name of the course | Credits | CCE* | UE** | Total |
|---------------------|-------------|-------------------------------------|---------|------|------|------------|
| Part III | Core 17 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| | Core 18 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| Part IV | Edn 6: PE | Contemporary India and Education -I | 4 | 30 | 70 | 100 |
| | Edn 7: PE | Learning and Teaching-1 | 4 | 30 | 70 | 100 |
| | Edn 8: C&PS | Pedagogy of School Subject I | 4 | 30 | 70 | 100 |
| | Edn 9: C&PS | Pedagogy of School Subject II | 4 | 30 | 70 | 100 |
| | Edn : Int 1 | School Internship | 4 | 100 | - | 100 |
| | Edn : Int 2 | Community Living Camp | 2 | 50 | - | 50 |
| | Edn: EPC 5 | Soft Skill | 2 | 50 | - | 50 |
| Total | | | | | | 800 |

THIRD YEAR - SEMESTER VI

| Title of the Course | | Name of the course | Credits | CCE* | UE** | Total |
|---------------------|--------------|--------------------------------------|---------|------|------|------------|
| Part III | Core 19 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| | Core 20 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| Part IV | Edn 10: PE | Learning and Teaching – II | 4 | 30 | 70 | 100 |
| | Edn 11: PE | Contemporary India and Education -II | 4 | 30 | 70 | 100 |
| | Edn 12: PE | School Management – I | 4 | 30 | 70 | 100 |
| | Edn 13: C&PS | Pedagogy of School Subject I | 4 | 30 | 70 | 100 |
| | Edn 14: C&PS | Pedagogy of School Subject II | 4 | 30 | 70 | 100 |
| Total | | | | | | 700 |

FOURTH YEAR - SEMESTER VII

| Title of the Course | | Name of the course | Credits | CCE* | UE** | Total |
|---------------------|--------------|----------------------------------|---------|------|------|------------|
| Part III | Core 21 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| Part IV | Edn 15: PE | Creating an Inclusive School | 4 | 30 | 70 | 100 |
| | Edn 16: C&PS | Assessment for learning – I | 4 | 30 | 70 | 100 |
| | Edn 17: PE | School Management – II | 4 | 30 | 70 | 100 |
| | Edn 18: C&PS | Pedagogy of School Subject I | 4 | 30 | 70 | 100 |
| | Edn 19: C&PS | Pedagogy of School Subject II | 4 | 30 | 70 | 100 |
| | Edn: EPC 6 | Yoga, Health and Physical Edn II | 2 | 50 | - | 50 |
| | Edn: EPC 7 | Understanding Self | 2 | 50 | - | 50 |
| Total | | | | | | 700 |

FOURTH YEAR - SEMESTER VIII

| Title of the Course | | Name of the course | Credits | CCE* | UE** | Total |
|---------------------|-----------------------------------|---------------------------------------|---------|------|------|------------|
| Part III | Core 22 | Core: B.Sc/B.A | 4 | 30 | 70 | 100 |
| Part IV | Edn 20: C&PS | Pedagogy of School Subject I | 4 | 30 | 70 | 100 |
| | Edn 21: C&PS | Pedagogy of School Subject II | 4 | 30 | 70 | 100 |
| | Edn 22: C&PS | Assessment for learning – II | 4 | 30 | 70 | 100 |
| | Practicum: Teaching Competency | Pedagogy of School Subject I | 8 | 100 | 100 | 200 |
| | | Pedagogy of School Subject II | 8 | 100 | 100 | 200 |
| AECC | A2 | Introduction to Public Administration | 4 | 30 | 70 | 100 |
| Total | | | | | | 900 |

5. Choice of Pedagogical School Subjects I & II

B.Sc., B.Ed.

| No. | Subject Majored | Pedagogical Subject I | Pedagogical Subject II |
|-----|------------------|-----------------------|--|
| 1 | Mathematics | Mathematics | Physical Science or Computer Science or Language II |
| 2 | Physics | Physical Science | Mathematics or Biological Science or Computer Science or Language II |
| 3 | Chemistry | | |
| 4 | Botany | Biological Science | Physical Science or Language II |
| 5 | Zoology | | |
| 6 | Computer Science | Computer Science | Mathematics or Physical Science or Language II |

B.A., B.Ed.

| No. | Subject Majored | Pedagogical Subject I | Pedagogical Subject II |
|-----|---------------------|-----------------------|------------------------|
| 1 | English | English I | English II |
| 2 | History | Social Science | Language II |
| 3 | Geography | | |
| 4 | Any Indian Language | Language I | Language II |

6. Curriculum, Programme Implementation and Assessment

The programme comprises two broad curricular areas: **General studies** comprising science stream (B.Sc.) / social sciences or Humanities (B.A.) and **Professional studies (Education component)** comprising foundations of education, pedagogy of school subjects, and practicum related to the tasks and functions of a school teacher. The transaction of the courses, apart from lecture cum discussion may comprise of variety of approaches, case studies, reading of original writings, discussion on reflective journals, observations of children, and interaction with the community in different socio-cultural environments.

7. a. Task and Assignment related to theory courses in General studies (Courses in Liberal options)

Distribution of Marks for Liberal Courses

i. THEORY

Total: 100 Marks, Duration : 3 hours

University Examination (UE) : 70 marks

Continuous Comprehensive Evaluation (CCE) : 30 marks

Continuous Comprehensive Evaluation Structure:

- Test - 15 marks (3 tests – 3x5)
- Assignment / Practicals in Supportive courses - Science Subjects - 10 marks (the list of the practicals - attached under the respective syllabi)
- Attendance - 5 marks

Passing minimum for Continuous comprehensive evaluation - 12 marks (40%)

Passing minimum for University Examination - 28 marks (40 %)

The following weightage shall be given to attendance:

- 95% - 100% (5 marks)
- 90% - 94% (4 marks)
- 85% - 89% (3 marks)
- 80% - 84% (2 marks)
- 75% - 79% (1 mark)

ii. PRACTICALS

(Choose at least 5 experiment for each semester given in the LIST OF EXPERIMENTS in respective syllabus without overlap)

Practical in main subjects - 50 marks

University Examination (UE) – 60 %

Continuous Comprehensive Evaluation (CCE) – 40 %

(Record notebook, Test, Regularity in record submission, Practical attendance)

b. Task and Assignment related to theory courses in professional studies

The curricular areas of ‘Perspectives in Education’ and ‘Curriculum and Pedagogic Studies’ shall offer field engagement through different tasks and projects with the community, the school, and the child in school and out-of-school, based on the practical activities listed in the respective syllabus for the theory courses. Continuous and Comprehensive Evaluation will be made based on submission of documentary evidences either by individual student or group work for each of the theory courses.

However, for each of the theory courses of the curricular area of ‘Curriculum and Pedagogic Studies’, the practical activities shall include practicing at least three teaching skills relevant to the pedagogical subject in Micro-teaching context during 5th or 6th semester. Similarly, for the course on “Assessment for Learning”, the practical activities shall include preparation, administration and interpretation of results of tests and different evaluation techniques in the 8th semester.

8. School Internship

i. School internship would be a part of the broad curricular area of ‘engagement with the field’ and shall be designed to lead to the development of a broad repertoire of perspectives, professional capacities, teacher sensibilities and skills.

ii. During internship in the **fifth semester**, student teacher shall spend 4 weeks, spread over several days throughout 5th Semester. This will include one week of school engagement making observation in the school and three weeks of other engagements as explained in the syllabus. The observation record and/or project report of the student teacher should be the base for awarding CCE marks by the faculty.

iii. During the **sixth and seventh semester**, out of 16 weeks of internship, student teachers will devote one week for observation of classes taken by regular school teachers (at least 5 lessons in each pedagogical subject). The student teachers will devote 15 weeks for classroom teaching which may be in one block or in two blocks, (in one or two different schools). However, the classroom teaching during internship shall be done at any two levels/stages of school. The internship must be both at upper primary (classes VI- VIII) and secondary (classes IX and X) levels. During the internship student teachers will also be engaged in making observation of classes taught by regular teacher (whenever possible) and the peer teachers.

iv. The internship should be in government-recognized schools under Government or private managements, situated within the radius of 40 km of the College of Education concerned for supervision by the faculty members of the college. The schools under CBSE or State / UT patterns can be the schools for internship.

v. The student teacher during internship in a school should perform the roles of a regular teacher at the respective level under the direct guidance and supervision of the mentoring teacher (Supervising / Guide Teacher) of the school. While at school, the student teacher shall prepare the necessary teaching resources and records for teaching lessons (duration of 45 minutes each).

vi. The total 60 lessons of classroom teaching in 15 weeks may be divided as 30 at level one (15 lessons for Pedagogical Subject I and 15 lessons for Pedagogical Subject II) and 30 at level two (15 lessons for Pedagogical Subject I and 15 lessons for Pedagogical Subject II). A few lessons may be ICT based depending on resources available in the practicing schools.

vii. During this period, (i) classroom teaching (ii) evaluation at the end of 15 lessons and (iii) diagnosis based feedback to the students should be completed by every student teacher.

9. Other practical activities related to community based engagement

A minimum of 5 days shall be spent for Community Living Camp to foster social skills and values among student teachers during the 5th semester.

10. Scheme of examination

FIRST YEAR - SEMESTER I

| Title of the Course | | Name of the course | Hours | CCE* | UE** | Total |
|---------------------|----------------------------------|-------------------------------------|-------|------|------|------------|
| Part I | Lang I-1 | Tamil/French/Malayalam/Telugu/Hindi | 3 | 30 | 70 | 100 |
| Part II | Lang II-1 | English | 3 | 30 | 70 | 100 |
| Part III | Core 1 | Core: B.Sc/B.A..... | 3 | 30 | 70 | 100 |
| | Core 2 | Core: B.Sc/B.A | 3 | 30 | 70 | 100 |
| | Core 3 | Core: B.Sc/B.A | 3 | 30 | 70 | 100 |
| | Core 4 ^(Supportive 1) | Supportive: B.Sc/B.A | 3 | 30 | 70 | 100 |
| Part IV | Edn: EPC 1 | Yoga, Health and Physical Edn I | - | 50 | - | 50 |
| AECC | A 1 | Environmental Studies | 3 | 30 | 70 | 100 |
| Total | | | | | | 750 |

FIRST YEAR - SEMESTER II

| Title of the Course | | Name of the course | Hours | CCE* | UE** | Total |
|---------------------|----------------------------------|-------------------------------------|-------|------|------|------------|
| Part I | Lang I-2 | Tamil/French/Malayalam/Telugu/Hindi | 3 | 30 | 70 | 100 |
| Part II | Lang II-2 | English | 3 | 30 | 70 | 100 |
| Part III | Core 5 | Core: B.Sc/B.A | 3 | 30 | 70 | 100 |
| | Core 6 | Core: B.Sc/B.A | 3 | 30 | 70 | 100 |
| | Core 7 | Core: B.Sc/B.A | 3 | 30 | 70 | 100 |
| | Core 8 ^(Supportive 2) | Supportive: B.Sc/B.A | 3 | 30 | 70 | 100 |
| Part IV | Edn 1: C&PS | Language across the Curriculum | 3 | 30 | 70 | 100 |
| | Edn: EPC 2 | Reading and Reflecting on Texts | - | 50 | - | 50 |
| Total | | | | | | 750 |

SECOND YEAR - SEMESTER III

| Title of the Course | | Name of the course | Hours | CCE* | UE** | Total |
|---------------------|-----------------------------------|-------------------------------------|-------|------|------|------------|
| Part I | Lang I-3 | Tamil/French/Malayalam/Telugu/Hindi | 3 | 30 | 70 | 100 |
| Part II | Lang II-3 | English | 3 | 30 | 70 | 100 |
| Part III | Core 9 | Core: B.Sc/B.A | 3 | 30 | 70 | 100 |
| | Core 10 | Core: B.Sc/B.A | 3 | 30 | 70 | 100 |
| | Core 11 | Core: B.Sc/B.A | 3 | 30 | 70 | 100 |
| | Core 12 ^(Supportive 3) | Supportive: B.Sc/B.A | 3 | 30 | 70 | 100 |
| Part IV | Edn 2: PE | Childhood and Growing up – I | 3 | 30 | 70 | 100 |
| | Edn 3: C&PS | Knowledge and Curriculum | 3 | 30 | 70 | 100 |
| | Edn: EPC 3 | Drama and Art in Education | - | 50 | - | 50 |
| Total | | | | | | 850 |

SECOND YEAR - SEMESTER IV

| Title of the Course | | Name of the course | Hours | CCE* | UE** | Total |
|---------------------|------------------------|-------------------------------------|-------|------|------|------------|
| Part I | Lang I-4 | Tamil/French/Malayalam/Telugu/Hindi | 3 | 30 | 70 | 100 |
| Part II | Lang II-4 | English | 3 | 30 | 70 | 100 |
| Part III | Core 13 | Core: B.Sc/B.A | 3 | 30 | 70 | 100 |
| | Core 14 | Core: B.Sc/B.A | 3 | 30 | 70 | 100 |
| | Core 15 | Core: B.Sc/B.A | 3 | 30 | 70 | 100 |
| | Core 16 (Supportive 4) | Supportive: B.Sc/B.A | 3 | 30 | 70 | 100 |
| Part IV | Edn 4: PE | Childhood and Growing up – II | 3 | 30 | 70 | 100 |
| | Edn 5: PE | Gender School and Society | 3 | 30 | 70 | 100 |
| | Edn: EPC 4 | Critical Understanding of ICT | - | 50 | - | 50 |
| Total | | | | | | 850 |

THIRD YEAR - SEMESTER V

| Title of the Course | | Name of the course | Hours | CCE* | UE** | Total |
|---------------------|-------------|-------------------------------------|-------|------|------|------------|
| Part III | Core 17 | Core: B.Sc/B.A | 3 | 30 | 70 | 100 |
| | Core 18 | Core: B.Sc/B.A | 3 | 30 | 70 | 100 |
| Part IV | Edn 6: PE | Contemporary India and Education -I | 3 | 30 | 70 | 100 |
| | Edn 7: PE | Learning and Teaching-1 | 3 | 30 | 70 | 100 |
| | Edn 8: C&PS | Pedagogy of School Subject I | 3 | 30 | 70 | 100 |
| | Edn 9: C&PS | Pedagogy of School Subject II | 3 | 30 | 70 | 100 |
| | Edn : Int 1 | School Internship | - | 100 | - | 100 |
| | Edn : Int 2 | Community Living Camp | - | 50 | - | 50 |
| | Edn: EPC 5 | Soft Skill | - | 50 | - | 50 |
| Total | | | | | | 800 |

THIRD YEAR - SEMESTER VI

| Title of the Course | | Name of the course | Hours | CCE* | UE** | Total |
|---------------------|--------------|--------------------------------------|-------|------|------|------------|
| Part III | Core 19 | Core: B.Sc/B.A | 3 | 30 | 70 | 100 |
| | Core 20 | Core: B.Sc/B.A | 3 | 30 | 70 | 100 |
| Part IV | Edn 10: PE | Learning and Teaching – II | 3 | 30 | 70 | 100 |
| | Edn 11: PE | Contemporary India and Education -II | 3 | 30 | 70 | 100 |
| | Edn 12: PE | School Management – I | 3 | 30 | 70 | 100 |
| | Edn 13: C&PS | Pedagogy of School Subject I | 3 | 30 | 70 | 100 |
| | Edn 14: C&PS | Pedagogy of School Subject II | 3 | 30 | 70 | 100 |
| Total | | | | | | 700 |

FOURTH YEAR - SEMESTER VII

| Title of the Course | | Name of the course | Hours | CCE* | UE** | Total |
|---------------------|--------------|----------------------------------|-------|------|------|------------|
| Part III | Core 21 | Core: B.Sc/B.A | 3 | 30 | 70 | 100 |
| Part IV | Edn 15: PE | Creating an Inclusive School | 3 | 30 | 70 | 100 |
| | Edn 16: C&PS | Assessment for learning – I | 3 | 30 | 70 | 100 |
| | Edn 17: PE | School Management – II | 3 | 30 | 70 | 100 |
| | Edn 18: C&PS | Pedagogy of School Subject I | 3 | 30 | 70 | 100 |
| | Edn 19: C&PS | Pedagogy of School Subject II | 3 | 30 | 70 | 100 |
| | Edn: EPC 6 | Yoga, Health and Physical Edn II | - | 50 | - | 50 |
| | Edn: EPC 7 | Understanding Self | - | 50 | - | 50 |
| Total | | | | | | 700 |

FOURTH YEAR - SEMESTER VIII

| Title of the Course | | Name of the course | Hours | CCE* | UE** | Total |
|---------------------|-----------------------------------|---------------------------------------|-------|------|------|------------|
| Part III | Core 22 | Core:B.Sc/B.A | 3 | 30 | 70 | 100 |
| Part IV | Edn 20: C&PS | Pedagogy of School Subject I | 3 | 30 | 70 | 100 |
| | Edn 21: C&PS | Pedagogy of School Subject II | 3 | 30 | 70 | 100 |
| | Edn 22: C&PS | Assessment for learning – II | 3 | 30 | 70 | 100 |
| | Practicum: Teaching Competency | Pedagogy of School Subject I | - | 100 | 100 | 200 |
| | | Pedagogy of School Subject II | - | 100 | 100 | 200 |
| AECC | A2 | Introduction to Public Administration | 3 | 30 | 70 | 100 |
| Total | | | | | | 900 |

11. Pattern of question paper for University Examination

Maximum Marks in the University Examination and duration: 70 marks – 3 hours

- 2 questions of 10 marks each =20 (Answer 2 Questions out of 4 with internal choice)
- 6 questions of 5 marks each = 30 (Answer 6 Questions out of 10)
- 10 questions of 2 marks each = 20 (Answer 10 Questions out of 10)

12. Distribution of marks for Continuous and Comprehensive Evaluation (CCE) for both general and professional studies.**(i) For theory courses:**

The CCE weightage for continuous internal assessment tests and task & assignment projects should be equal i.e. 5 marks for a periodical test and 5 marks for a project. There should be at least three tests and three projects for a course.

(ii) For Courses on Enhancing Professional Capacities (EPC):

The following specialised courses are offered to enhance the professional capacities of student teachers.

Course EPC 1: Yoga, Health & Physical Education

Course EPC 2: Reading and Reflecting on Texts

Course EPC 3: Drama and Art in Education

Course EPC 4: Critical Understanding of ICT

Course EPC 5: Understanding the Self

Course EPC 6: Yoga, Health & Physical Education

Course EPC 7: Soft skill

The evaluation of student teachers for these courses shall be totally internal. The total of 50 marks allotted to each of the courses is assigned as follows.

- Periodical tests based on the prescribed syllabus (at least two) - 10 Marks
- Assessment based on at least 4 of the tasks and assignments listed under the course outline – 10 x4 = 40.

(iii) For Teaching Competency (During School Internship):

The different aspects of practicum and weightage marks for each of the Pedagogical Subjects I and II. The total of 100 marks allotted is as follows

- Teaching Competency (Planning and Performance) 50 Marks
- Preparation of Teaching Resources, (Including ICT based) 20 Marks
- Lesson observation record (Peer and Regular teacher) 10 Marks
- Evaluation, Diagnosis and Remedial programme (Record) 20 Marks

13 a. Conducting of practical examination for general studies in science (B.Sc.)

As stated in 7.a.

13 b. Conducting of practical examination for professional studies

i. Based on the periodical assessment of the teaching competency and other practical aspects of the student teachers, the internal assessment marks will be assigned by the faculty of the concerned pedagogical subject. The consolidated CCE marks in the prescribed format will be sent to the university by the Principal of the college concerned before the commencement of the practical examination.

ii. On receipt of the CCE marks from any college of education, the University will make arrangement for conducting the practical examination by appointing the Board of Examiners.

iii. Board of examiners for practical examination consisting of one Convener and three examiners for one unit (50 student teachers) and one Convener and seven examiners for two units (100 student teachers) will be chosen from among the faculty members of the Colleges of Education/ University Department of Education from within and outside university jurisdiction who possess a minimum of five years of teaching experience at B.Ed. /M.Ed. level. The Convener must be from among the Principals / Associate Professors of the Colleges of Education. The Principal of the respective College of Education will be the ex-officio member of the panel.

iv. The practical examination will be conducted for two to three days after the completion of internship in the 8th semester.

v. The practical examination should be conducted by two examiners acting as a pair and to assess the student teachers on following aspects of both pedagogical subjects:

| Sl. No. | Aspects for Assessment | Marks |
|-----------|---|------------|
| A. | Assessment during practical examination: Teaching Competencies (Planning and Performance) | 50 |
| B. | Assessment of record maintained during internship: | |
| | i. Preparation of Teaching Resources (Including ICT based) | 10 |
| | ii. Lesson Observation Record (Peer and Regular teacher) | 10 |
| | iii. Lesson plans | 10 |
| | iv. Evaluation and Remediation Record | 10 |
| C. | Viva – Voce | 10 |
| | Total | 100 |

vi. The examiners should submit the marks separately to the convener and the board of examiners should consolidate the marks.

vii. The practical examination marks awarded by the individual examiners and the consolidated marks list should be submitted to the Controller of Examinations, Pondicherry University on the final day of the practical examination itself with the signatures of all the members.

viii. The faculty observer of the Pondicherry University shall be present during the practical examination.

ix. The practical examination for all student teachers shall be conducted in a recognised high / higher / senior secondary school and the verification of records in the concerned college.

14. Passing Minimum in Professional studies (Education Component)

- i. Every student teacher should register for all the courses in the theory examination and practical examination in the first attempt.
- ii. A student teacher shall be declared to have passed in the B.Sc.,B.Ed./B.A.,B.Ed Degree examination only if he/ she has passed both the theory and practical examination.
- iii. A student teacher shall be declared to have passed in the theory examination if he/ she obtains a minimum of 45% marks both in External Examination (32 out of 70) and CCE (14 out of 30) and a total of 50 marks by combining both external (UE) and internal (CCE) examination in each course
- iv. A student teacher shall be declared to have passed the practical examination if he/she obtains a minimum of 45% marks in the pedagogical subject and in each of other aspects of practical examination mentioned above and 50% marks by combining all the aspects taken together.
- v. A student teacher who fails in one or more courses in the theory examination in general studies and professional studies shall reappear in those course(s). But the one who fails in any one of the aspects of the practical examination shall reappear for all aspects.
- vi. The integrated B.Sc., B.Ed./B.A., B.Ed. degree programme should be completed by the student teachers in not more than 6 years from the date of admission to the programme.

15. Classification of successful candidates

The successful student teachers shall be classified in Part I, Part II, Part III and Part IV separately as follows.

| SUBJECTS | FIRST CLASS | SECOND CLASS | THIRD CLASS |
|---------------------------------------|---------------|---------------------------------|------------------------|
| Part I – Any Indian Language / French | 60% and above | 50% and above but less than 60% | Pass but less than 50% |
| Part II – English | 60% and above | 50% and above but less than 60% | Pass but less than 50% |
| Part III – Main + Supportive subjects | 60% and above | 50% and above but less than 60% | Pass but less than 50% |
| Part IV – Education Component | 60% and above | 50% and above but less than 60% | Not Applicable |

The same should be mentioned in the Degree certificate awarded by the University as detailed below

| | | |
|-------------------------|---|-------------|
| Part I – Language | - | Class |
| Part II – English | - |Class |
| Part III – Main subject | - |Class |
| Part IV – Education | - |Class |

B.Sc.,B.Ed.
&
B.A.,B.Ed.

DEGREE PROGRAMME

SYLLABUS

PART I

MODERN INDIAN LANGUAGE

(Tamil, French, Malayalam, Telugu, Hindi)

PONDICHERRY UNIVERSITY

Part I - TAMIL

(4 Semesters – Tamil-I, Tamil-II, Tamil-III & Tamil-IV),

LANGUAGE COURSE FOR B.Sc.B.Ed.& B.A.B.Ed.

1st YEAR

Ist SEMESTER

தாள்: தமிழ் - I

Title of the Paper: TAMIL I

பாடத்திட்டம் (Syllabus)

கவிதை இலக்கியம்

- | | | |
|-------------------------|---|------------------------------|
| 1. தமிழ் | - | மகாகவி பாரதியார் |
| 2. கோவில் வழிபாடு | - | கவிமணி தேசிக விநாயகம் பிள்ளை |
| 3. நீங்களே சொல்லுங்கள் | - | பாவேந்தர் பாரதிதாசன் |
| 4. ஆக்கம் சேர்ப்போம் | - | கவிஞரேறு வாணிதாசன் |
| 5. கழைக் கூத்தாடி | - | கவிஞர் தமிழொளி |
| 6. தமிழக நிலை | - | கவிஞர் புதுவைச்சிவம் |
| 7. தமிழில் பெயரிடுங்கள் | - | உவமைக் கவிஞர் சுரதா |
| 8. பெரியார் | - | கவிஞர் வாலி |
| 9. ஒரு வண்டி சென்றியூ | - | ஈரோடு தமிழன்பன் |
| 10. ஒவ்வொரு புல்லையும் | - | இன்குலாப் |

சிறுகதை இலக்கியம்

- | | | |
|---------------------|---|----------------------|
| 1. பாதுகை | - | பிரபஞ்சன் |
| 2. பூ | - | பாவண்ணன் |
| 3. அன்பளிப்பு | - | கு. அழகிரிசாமி |
| 4. அற்றது பற்றெனில் | - | இந்திரா பார்த்தசாரதி |
| 5. நிலை நிறுத்தல் | - | கி. ராஜநாராயணன் |

நாடக இலக்கியம்

- | | | |
|--------------------------|---|------------------|
| 1. அனார்கலி | - | கவிஞர் கண்ணதாசன் |
| 2. ஒநாயும் வீட்டு நாயும் | - | பாரதியார் |

இலக்கிய வரலாறு

மரபுகவிதை, புதுக்கவிதை, ஹைக்கூ, சிறுகதை, நாடகம் ஆகியவற்றின் தோற்றம் வளர்ச்சி குறித்த வரலாறு

பாடத்திட்டத் தொகுப்பு நூல்:

பொதுத் தமிழ் - முதலாண்டு - தமிழ் (முதல் மற்றும் இரண்டாம் பருவப் பாடங்கள்)
புதுவைப் பல்கலைக்கழகம், புதுச்சேரி - 2015

IInd SEMESTER

தாள்: தமிழ் - II

Title of the Paper: TAMIL II

பாடத்திட்டம் (Syllabus)

அற இலக்கியம்

1. திருக்குறள் (30 குறட்பாக்கள்)

ஒழுக்கமுடைமை

செய்ந்நன்றியறிதல்

நட்பு

2. நாலடியார் (10 பாடல்கள்)

பெரியாரைப் பிழையாமை

3. பழமொழி (9 பாடல்கள்)

வெகுளாமை

4. ஆசாரக்கோவை (5 பாடல்கள்)

பாடல் எண்கள் 1, 2, 4, 95, 26

5. மூதுரை (5 பாடல்கள்)

பாடல் எண்கள் 1, 4, 17, 26, 27

காப்பியங்கள்

6. சிலப்பதிகாரம் - வழக்குரை காதை முழுவதும்

7. சீவகசிந்தாமணி - குணமாலையார் இலம்பகம்

(தேர்ந்தெடுத்த பாடல்கள்)

8. கம்பராமாயணம் - மந்தரை சூழ்ச்சிப்பாடலம் - வசிட்டர்
கூறிய அரசர் இலக்கணம் பாடல்
எண்கள் 103-112 வரை 10 பாடல்கள்
9. பெரியபுராணம் - மங்கையர்க்கரசியார் புராணம்
10. சீறாப்புராணம் - நபி அவதாரப் படலம்
11. இயேசு காவியம் - மலைப்பொழிவு

உரைநடைப் பகுதி

12. கல்வி - திரு.வி.க
13. நமது தாய்மொழி - நாவலர் ந.மு. வேங்கடசாமி நாட்டார்
14. பல நாட்டுத் தொடர்பு - தெ.பொ. மீனாட்சிசுந்தரனார்
15. வாழ்க்கை ஈடுபாடு - ம.இ.லெ.தங்கப்பா
16. முத்தமிழா? அப்படி என்றால்? - திருமுருகனார்

இலக்கிய வரலாறு

அற இலக்கியங்கள் , காப்பியங்கள் , உரைநடை ஆகியவற்றின் தோற்றம், வளர்ச்சி

குறித்த வரலாறு

பாடத்திட்டத் தொகுப்பு நூல்:

பொதுத் தமிழ் - முதலாண்டு - தமிழ் (முதல் மற்றும் இரண்டாம் பருவப் பாடங்கள்
புதுவைப் பல்கலைக்கழகம், புதுச்சேரி (2015)

2nd YEAR

IIIrd SEMESTER

தாள்: தமிழ் - III

Title of the Paper: TAMIL III

பாடத்திட்டம் (Syllabus)

1. திருஞானசம்பந்தர் – திருநள்ளாற்றுப் பச்சைப்பதிகம் (முதல் 10 பாடல்கள்)
2. காரைக்காலம்மையார் – திருவிரட்டை மணிமாலை (முதல் 10 பாடல்கள்)
3. பெரியாழ்வார் திருமொழி – கண்ணன் திருவவதாரம் (முதல் 10 பாடல்கள்)
4. ஆண்டாள் – திருப்பாவை (முதல் 10 பாடல்கள்)
5. திருமூலர் – திருமந்திரம் (பக்தியுடைமை 10 பாடல்கள்)
6. சிவவாக்கியர் – அறிவுநிலை (10 பாடல்கள்)
7. வேதநாயக சாஸ்திரியார் – பெத்லேங் குறவஞ்சி (வாசல் வளம் 12 பாடல்கள்)
8. குணகுடி மஸ்தான் சாகிபு – பராபரக்கண்ணி (10 கண்ணிகள்)
9. முக்கூடற்பள்ளு (பள்ளன் வரவு 10 பாடல்கள்)
10. தமிழ் விடு தூது – 71 முதல் 90 வரை (20 கண்ணிகள்)

இலக்கிய வரலாறு

பக்தி மற்றும் சிற்றிலக்கியம் குறித்த வரலாறு

பாடத்திட்டத் தொகுப்பு நூல்:

பொதுத் தமிழ் - இரண்டாமாண்டு - தமிழ் (மூன்றாம் மற்றும் நான்காம் பருவப் பாடங்கள் புதுவைப் பல்கலைக்கழகம், புதுச்சேரி (2014-2015 முதல்)

IVth SEMESTER

தாள்: தமிழ் - IV

Title of the Paper: TAMIL IV

பாடத்திட்டம் (Syllabus)

1. சங்க இலக்கியங்கள்

1.1 நற்றிணை

நெய்தல் திணை

பாடல் எண்கள் : 35, 155, 191, 215, 263

1.2 குறுந்தொகை

குறிஞ்சித் திணை

பாடல் எண்கள்: 2, 17, 18, 360, 379

1.3 ஐங்குறுநூறு

மருதத்திணை – தோழிக்கு உரைத்த

பத்து பாடல்கள் (31 – 40)

1.4 பதிற்றுப்பத்து

இரண்டாம் பத்து - 20 ஆம் பாடல்

ஏழாம் பத்து - 61 ஆம் பாடல்

எட்டாம் பத்து - 72 ஆம் பாடல்

1.5 பரிப்பாடல்

குன்றம்பூதனார் - 9 ஆம் பாடல்

களவு – கற்பு உரையாடல், 1 – 26 அடிகள்

1.6 கலித்தொகை

பாலைக்கலி - 1, 8, 10

1.7 சிறுபாணாற்றுப்படை

கடையெழு வள்ளல்கள், அடி 84 - 111

1.8 புறநானூறு

பாடல் எண்கள் : 74, 95, 106, 107, 188, 189, 192, 204, 212, 312

1.9 முல்லைப்பாட்டு முழுவதும்

1.10 சங்க இலக்கிய வரலாறும்

படைப்பிலக்கிய பயிற்சியும்

கவிதைப் பயிற்சியும்

1. அசை, சீர், தளை, அடி, தொடை ஆகியவற்றை விளக்குதல்
2. நேரிசை ஆசிரியப்பா பற்றி விளக்குதல் – எழுதப் பயிற்சி அளித்தல்
3. குறள் வெண்பா, நேரிசை வெண்பா, இன்னிசை வெண்பா பற்றி விளக்குதல் - எழுதப் பயிற்சி அளித்தல்
4. விருத்தப்பா – வஞ்சி விருத்தம், கலிவிருத்தம் ஆசிரியவிருத்தம், கலித்துறை, வெளிவிருத்தம் பற்றி விளக்குதல்

அறுசீர் ஆசிரியவிருத்தம்

காய்- காய் – காய்- மா- தேமா என்னும் ஒலிநயத்திலும்

எண்சீர் ஆசிரியவிருத்தம்

காய் – காய் – மா- மா என்னும் ஒலிநயத்திலும் வரும் படல்களை அறிமுகப்படுத்தல் – பாடல் எழுதப் பயிற்றுவித்தல்

பாடத்திட்டத் தொகுப்பு நூல்:

பொதுத் தமிழ் - இரண்டாமாண்டு - தமிழ் (மூன்றாம் மற்றும் நான்காம் பருவப் பாடங்கள் புதுவைப் பல்கலைக்கழகம், புதுச்சேரி (2014-2015 முதல்)

PONDICHERRY UNIVERSITY

Part I - FRENCH

(4 Semesters – French-I, French-II, French-III & French-IV),

LANGUAGE COURSE FOR B.Sc.B.Ed.& B.A.B.Ed.

FIRST YEAR -- I SEMESTER

Language French – I :

Prescribed Textbook : *FESTIVAL 1* - Méthode de Français

Authors : Sylvie POISSON-QUINTON

Michèle MAHEO-LE COADIC

Anne VERGNE-SIRIEYS

Edition : CLE International, Nouvelle Édition révisée : 2009.

Portions : Unités : 1, 2, 3.

FIRST YEAR -- II SEMESTER

Language French – II :

Prescribed Textbook : *FESTIVAL 1* - Méthode de Français

Authors : Sylvie POISSON-QUINTON

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Edition : CLE International, Nouvelle Édition révisée : 2009.

Portions : Unités : 4,5,6.

SECOND YEAR – III SEMESTER

Language French – III :

Prescribed Textbook : *FESTIVAL 2* – Méthode de Français

Authors : Sylvie POISSON-QUINTON

Michèle MAHEO-LE COADIC

Anne VERGNE-SIRIEYS

Edition : CLE International, Nouvelle Édition révisée : 2009.

Portions : Unités : 1,2,3.

SECOND YEAR – IV SEMESTER

Language French – IV :

Prescribed Textbook : *FESTIVAL 2* – Méthode de Français

Authors : Sylvie POISSON-QUINTON

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Edition : CLE International, Nouvelle Édition révisée : 2009.

Portions : Unités : 4,5,6.

PONDICHERRY UNIVERSITY**Part I - MALAYALAM****(4 Semesters – Malayalam-I, Malayalam-II, Malayalam-III & Malayalam-IV),****LANGUAGE COURSE FOR B.Sc.B.Ed.& B.A.B.Ed.**

| Semester | Title of the Paper |
|----------|---------------------|
| 1 | MalayalaKavitha |
| 2 | Katha Sahithyam |
| 3 | GadyaSahithyam |
| 4 | DrisyakalaSahithyam |

Part I - MALAYALAM for B.Sc.B.Ed.& B.A.B.Ed.

Semester-1

മലയാളകവിത

കാല്പനികത മുതൽ ആധുനികതവര മലയാളകവിതയിൽ ഉണ്ടായ ഭാവുകത്വപരിണാമം പരിചയപ്പെടുക. കവിതയുടെ രൂപപരവും ഭാവപരവുമായ വൈവിധ്യം തിരിച്ചറിയുവാനും ആസ്വദിക്കുവാനുമുള്ള ശേഷി കൈവരിക്കുകയാണ് പഠനത്തിന്റെ ഉദ്ദേശ്യം

പാഠഭാഗങ്ങൾ വിശദപഠനത്തിനുള്ളവയാണ്. ഒരു ഖണ്ഡകാവ്യവും ഒരതരഞ്ഞടുത്ത പത്തു കവിതകളുമാണ് വിശദപഠനത്തിനായി നിർദ്ദേശിക്കുന്നത്. പാഠ്യഭാഗം അഞ്ച് യൂണിറ്റുകളായി തിരിച്ചിരിക്കുന്നു. എല്ലാ യൂണിറ്റുകളിൽനിന്നും ചോദ്യങ്ങൾ ചോദിക്കണം.

യൂനിറ്റ് 1. ഖണ്ഡകാവ്യം. കുമാരനാശാൻ - ചിന്താവിഷ്കൃതയായ സീത

യൂനിറ്റ് 2. പി. കുഞ്ഞിരാമൻനായർ - സൗന്ദര്യപൂജ
ഇടേശ്ശേരി ഗോവിന്ദൻനായർ - വിവാഹസമ്മാനം
വൈലോപ്പിള്ളി ശ്രീധരമേനോൻ - യുഗപരിവർത്തനം

യൂനിറ്റ് 3. എൻ.വി.കൃഷ്ണവാര്യർ - എലികൾ
അക്കിത്തം അച്യുതൻനമ്പൂതിരി - പണ്ടത്തെ മേശാന്തി
സുഗതകുമാരി - ബീഹാർ

യൂനിറ്റ് 4. കടമ്മനിട്ട രാമകൃഷ്ണൻ - ശാന്ത
വിജയലക്ഷ്മി - മൃഗശിക്ഷകൻ

യൂനിറ്റ് 5. പി. പി. രാമചന്ദ്രൻ - ലളിതം
കെ.ആർ. ടോണി - അന്ധകാണ്ടം

അധികവായനയ്ക്ക് നിർദ്ദേശിക്കുന്ന പുസ്തകങ്ങൾ:

മലയാളകവിതാസാഹിത്യചരിത്രം- ഡോ എം.ലീലാവതി.

മലയാളകവിതാപഠനങ്ങൾ- സച്ചിദാനന്ദൻ

Semester 2

കഥാസാഹിത്യം

ആധുനികതയ്ക്കുശേഷം മലയാളത്തിലെ കഥാസാഹിത്യത്തിൽ ഉണ്ടായ രചകളുടെ വൈവിധ്യം പരിചയപ്പെടുത്തുകയും ആസ്വാദനം പരിശീലിപ്പിക്കുകയുമാണ് പഠനോദ്ദേശ്യം. പാഠഭാഗങ്ങൾ വിശദപഠനത്തിനുള്ളവയാണ്. ഒരു നോവലും പത്തു കഥകളുമാണ് വിശദപഠനത്തിനായി നിർദ്ദേശിക്കുന്നത്. പാഠ്യഭാഗം അഞ്ച് യൂണിറ്റുകളായി തിരിച്ചിരിക്കുന്നു. എല്ലാ യൂണിറ്റുകളിൽനിന്നും ചോദ്യങ്ങൾ ചോദിക്കണം.

യൂനിറ്റ് 1. നോവൽ. മയ്യഴിപ്പഴയുടെ തീരങ്ങളിൽ- എം. മുക്തൻ

യൂനിറ്റ് 2. എൻ. എസ്. മാധവൻ - ഹിഗ്വിറ്റ

ടി. വി. കൊച്ചുബാവ - ജലമാളിക

യൂനിറ്റ് 3. അശോകൻ ചരവിൽ - പുഴവക്കത്തെ കവുങ്ങിൻതോട്ടങ്ങൾ

പി. കെ. നാണ - ഒറ്റപ്പെട്ട മനുഷ്യൻ

യൂനിറ്റ് 4. അഷിത - അമ്മ എനോട് പറഞ്ഞ നാണകൾ

കെ. ആർ. മീര - ഓർമ്മയുടെ ഞരമ്പ്

ഇ. സന്തോഷ് കുമാർ - മൂന്ന് വിരലുകൾ

യൂനിറ്റ് 5. സന്തോഷ് ഏച്ചിക്കാനം - ബിരിയാണി

പി. വി. ഷാജികുമാർ - ഉള്ളാൾ

ജി. ആർ. ഇന്ദുഗോപൻ - ചട്ടമ്പിസദ്യ

അധികവായനയ്ക്ക് നിർദ്ദേശിക്കുന്ന പുസ്തകങ്ങൾ:

എൻ. ശശിധരൻ - കഥ കാലം പോലെ

എൻ. പ്രഭാകരൻ - കഥ തേടുന്ന കഥ

കെ.എസ്.രവികുമാർ - ആഖ്യാനത്തിന്റെ അടങ്കൽ

Semester 3

ഗദ്യസാഹിത്യം

മലയാളഗദ്യസാഹിത്യത്തിന്റെ വികാസവും ആശയപരമായ സംവാദങ്ങളുടെ ചരിത്രവും പരിചയപ്പെടുത്തുക, ആശയസംവാദങ്ങൾ മനസ്സിലാക്കുക എന്നിവയാണ് പഠനലക്ഷ്യം. സംസ്കാരം, ജനാധിപത്യമൂല്യങ്ങൾ, മാനവികത എന്നിവയെക്കുറിച്ച് മലയാളത്തിൽ അവതരിപ്പിക്കപ്പെട്ട ആശയങ്ങളെ മുൻനിറുത്തി ഈ പഠനം നിർവ്വഹിക്കാവുന്ന വിധത്തിൽ പത്തു ഉപന്യാസങ്ങളാണ് വിശദപഠനത്തിനായി നിർദ്ദേശിക്കുന്നത്. രണ്ട് ലേഖനങ്ങൾ ഒരു യൂനിറ്റ് എന്ന രീതിയിൽ അഞ്ച് യൂനിറ്റുകൾ.

1. എം. ഗോവിന്ദൻ - അറിവിന്റെ ഫലങ്ങൾ
2. എൻ. പി. മുഹമ്മദ് - മഹത്തായ നോവൽ
3. സി. ജെ. തോമസ് - ധിക്കാരിയുടെ കാതൽ
4. പി. കെ. ബാലകൃഷ്ണൻ - കുട്ടികൃഷ്ണമാരാറെപ്പറ്റി
5. എം. എൻ. വിജയൻ - ചങ്ങമ്പുഴയുടെ ആന്തരവൈരുദ്ധ്യങ്ങൾ
6. സുകുമാർ അഴീക്കോട് - മനസ്സ് വിഷമയമാകുന്നു, ആകാശം നഷ്ടപ്പെടുന്ന ഇന്ത്യ, പി.കെ.ബ്രദേഴ്സ്, 1996.
7. കെ. പി. അപ്പൻ - എഴുത്തുകാരനും കക്ഷിരാഷ്ട്രീയവും
8. വി. സി. ശ്രീജൻ - ഒ.വി.വിജയന്റെ രാഷ്ട്രീയം, രാഹുലാലം, സൈൻ ബുക്സ്, 2007.
9. മിനി സുകുമാർ, ജെ.ദേവിക - കേരളീയ പൊതുമണ്ഡലത്തിൽ സ്ത്രീവാദരാഷ്ട്രീയത്തിന്റെ സാധ്യതകൾ, ആണരശ്രുനാട്ടിലെ കാഴ്ചകൾ, വിമൻസ് ഇംപ്രിന്റ്, കറന്റ് ബുക്സ്, 2006
10. വത്സലൻ വാതുശ്ശേരി, മിത്ത് : അധികാരം, പ്രത്യയശാസ്ത്രം, പരീക്ഷിച്ച് എന്ന വാസ്തോധഗാമ, കൈരളി ബുക്സ്. 2015

അധികവായനയ്ക്ക് നിർദ്ദേശിക്കുന്ന പുസ്തകങ്ങൾ:

പഠിക്കാൻ നിർദ്ദേശിക്കപ്പെട്ട എഴുത്തുകാരുടെ മറ്റ് കൃതികൾ അധികവായനയ്ക്കായി നിർദ്ദേശിക്കുന്നു.

Semester 4

ദൃശ്യകലാസാഹിത്യം

കേരളത്തിന്റെ സമ്പന്നമായ ദൃശ്യകലാപൈതൃകത്തെക്കുറിച്ച് അവബോധം സൃഷ്ടിക്കുകയെന്നതാണ് പഠനോദ്ദേശ്യം. ഒരു ആട്ടക്കഥയും നാടകവുമാണ് വിശദപഠനത്തിനായി നിർദ്ദേശിക്കുന്നത്.

1. ഉണ്ണായി വാരിയർ - നളചരിതം രണ്ടാം ദിവസം
2. സി. ജെ. തോമസ് - ആ മനുഷ്യൻ നീ തന്നെ

അധികവായനയ്ക്ക് നിർദ്ദേശിക്കുന്ന പുസ്തകങ്ങൾ:

അയ്യനം കൃഷ്ണക്കൈമൾ- ആട്ടക്കഥാസാഹിത്യം

ജി.ശങ്കരപിള്ള- മലയാളനാടകസാഹിത്യചരിത്രം

PONDICHERRY UNIVERSITY**Part I - TELUGU****(4 Semesters – Telugu -I, Telugu -II, Telugu -III & Telugu -IV),****LANGUAGE COURSE FOR B.Sc.B.Ed.& B.A.B.Ed.**

| Semester | Title of the Paper |
|-----------------|---|
| 1 | Telugu-1 Old Poetry, Modern Poetry, Short Stories & Grammar |
| 2 | Telugu-2 Old Poetry, Modern Poetry, Short Stories & Novel |
| 3 | Telugu-3 Old Poetry, Modern Poetry, Prose & Grammar |
| 4 | Telugu-4 Classical Drama & Non - Detail |

I Semester**TELUGU - I****Old Poetry, Modern Poetry, Short Stories & Grammar****ప్రాచీన కవిత్వం (Old Poetry)**

1. గంగా శంతనుల కథ - నన్నయ

(ఆంధ్ర మహాభారతం - ఆదిపర్వం - చతుర్థాశ్వాసం 121వ పద్యం నుండి 125 వ పద్యం వరకు)

2. ద్రౌపది పరిదేవనం - తిక్కన

(ఆంధ్ర మహాభారతం - ఉద్యోగ పర్వం - తృతీయాశ్వాసం 100వ పద్యం నుండి 125వ పద్యం వరకు)

ఆధునిక కవిత్వం (Modern Poetry)

3. కన్యక - గురజాడ అప్పారావు

4. దేశచరిత్రలు - శ్రీశ్రీ

కథానికలు

5. చింతల తోపు - పాపినేని శివశంకర్

6. సావుకూడు - బండి నారాయణస్వామి

వ్యాకరణం

7. సంధులు

సవర్ణదీర్ఘ, గుణ, వృద్ధి, యణాదేశ, త్రిక, గసడదవాదేశ, రుగాగమ టుగాగమ,

ఆమ్రేడిత, అత్వ, ఇత్వసంధులు

8. సమాసాలు

తత్పురుష, కర్మధారయ, ద్వంద్వ, ద్విగు, బహువ్రీహి

9. అక్షర దోషాలు

దోషాలు సరిదిద్ది సాధు రూపాలు రాయాలి.

II Semester

TELUGU - II

Old Poetry, Modern Poetry, Short Stories & Novel

ప్రాచీన కవిత్వం

1. సాయుజ్యము - ధూర్జటి

(శ్రీకాళహస్తి మహాత్మ్యం ద్వితీయశ్వాసం - 109వ పద్యం నుండి 139వ పద్యం వరకు)

2. సుభద్రా పరిణయం - చేమకూర వేంకట కవి

(విజయ విలాసం - 3వ ఆశ్వాసం - 93వ పద్యం నుండి 139వ పద్యం వరకు)

ఆధునిక కవిత్వం

3. ఫిరదౌసి లేఖ - గుర్రం జాషువ

(ప్రథమాశ్వాసం నుండి “ఆసులతాను నోలగము నట్టులొకానొక రాజరీవి ము” పద్యం నుండి “అనుచు విలిఖించె నొక పద్మియము మసీదు” వరకు)

4. చెట్టు - గెడ్డాపు సత్యం

(కవితా వైజయంతి పద్యసంకలనం నుండి)

కథానికలు

5. నమ్ముకున్న నేల - కేతు విశ్వనాథరెడ్డి

6. అమ్మకి ఆదివారం లేదా ? - రంగనాయకమ్మ

నవల

7. “బతుకాట” - డా॥ వి. ఆర్. రాసాని

III Semester**TELUGU - III****Old Poetry, Modern Poetry, Prose & Grammar****ప్రాచీన కవిత్వం**

1. వామనావతారం - పోతన

(ఆంధ్రమహాభాగవతం - అష్టమ స్కంధం 582వ పద్యం నుండి 621వ పద్యం వరకు)

2. శాలివాహన విజయం - కొఱవి గోపరాజు

(ప్రథమాశ్వాసం 115వ పద్యం నుండి 165వ పద్యం వరకు)

ఆధునిక కవిత్వం

3. హరిజన శతకం - కుసుమ ధర్మన్న

(1వ పద్యం నుండి 20వ పద్యం వరకు)

4. సంక్రాంతి సంబరము - రాయప్రోలు సుబ్బారావు

(మిశ్రమంజరి సంకలనం నుండి)

గద్యభాగం (వ్యాసములు)

5. తెలుగు భాష - ఆచార్య గుజ్జర్లమూడి కృపాచారి

6. వ్యక్తిత్వ వికాసం - ఆచార్య రాచపాళెం చంద్రశేఖరరెడ్డి

ఛందస్సు - అలంకారాలు

7. ఛందస్సు - ఉత్పలమాల, చంపకమాల, శార్దూలం, మత్తేభం, కందం, తేటగీతి, ఆటవెలది

8. అలంకారాలు - ఉపమ, రూపక, ఉత్పేక్ష, స్వభావోక్తి, అతిశయోక్తి, అర్థంతరన్యాసం, దృష్టాంతం.

విద్యార్థి కృత్యాలు

1. తెలుగు వారాలు, తిథులు, నక్షత్రాలు, సంవత్సరాల పేర్లు తెలుసుకోవడం

2. వ్యక్తిత్వాన్ని మీరు ఏ విధంగా మెరుగు పరుచుకుంటున్నారో వ్యాసం రాయడం

3. అంత్యానుప్రాసాలంకారంలో సొంతంగా కవితారచన

IV Semester**TELUGU - IV****Classical Drama & Non - Detail**

1. పాండవోద్యోగము - తిరుపతి వెంకటకవులు (పూర్తి నాటకం).

2. కాలాతీత వ్యక్తులు - డా॥ పి. శ్రీదేవి

Prescribed Text Books and Reference Books

Prescribed Text Books and Reference Books for the above Syllabus

I Semester

సాహితీ నందనం,

Publisher : మారుతీ పబ్లికేషన్స్, 9-4-95, రైల్వేపేట్, గుంటూరు, ఆంధ్రప్రదేశ్,

II Semester

సాహితీ కౌముది,

Publisher : మారుతీ పబ్లికేషన్స్, 9-4-95, రైల్వేపేట్, గుంటూరు, ఆంధ్రప్రదేశ్,

III Semester

సాహితీ సౌరభం,

Publisher : మారుతీ పబ్లికేషన్స్, 9-4-95, రైల్వేపేట్, గుంటూరు, ఆంధ్రప్రదేశ్,

IV Semester

పాండవోద్యోగం - తిరుపతి వెంకటకవులు

Publisher : క్లాసిక్ బుక్స్, 32-13/2 - 3ఎ, అట్లూరి పరమాత్మ స్ట్రీట్, మొగల్రాజపురం, విజయవాడ - 520 010

కాలాతీతవ్యక్తులు - డా॥ పి. శ్రీదేవి

Publisher : విశాలాంధ్ర పబ్లిషింగ్ హౌస్, విజ్ఞాన భవన్, 4-1-435, బ్యాంక్ స్ట్రీట్, హైదరాబాద్ - 500001

Reference books :

కథాశిల్పం - వల్లంపాటి వెంకటసుబ్బయ్య, 2008, విశాలాంధ్ర పబ్లిషింగ్ హౌస్, హైదరాబాద్

తెలుగు సాహిత్య విమర్శ సిద్ధాంతాలు - ప్రొ॥ వెలమల సిమ్మన్న, 2012, దశిత సాహిత్య పీఠం, విశాఖపట్నం

తెలుగు సాహిత్య ప్రక్రియలు, ధోరణులు - ఆచార్య బూదాటి వేంకటేశ్వర్లు, 2014, పసిడి ప్రచురణలు, హైదరాబాద్

పూర్వగాఢా కల్పతరువు - ఆర్వీయార్, 2008, విశాలాంధ్ర పబ్లిషింగ్ హౌస్, హైదరాబాద్

బాల వ్యాకరణ ఘంటాపథము - పరవస్తు చిన్నయసూరి, 2011, విశాలాంధ్ర పబ్లిషింగ్ హౌస్, హైదరాబాద్

సాహిత్య శిల్ప సమీక్ష - పింగళి లక్ష్మీకాంతం, విశాలాంధ్ర పబ్లిషింగ్ హౌస్, హైదరాబాద్

తెలుగు సాహిత్య చరిత్ర - డా॥ దాస్ నా శాస్త్రి, 2013, విశాలాంధ్ర పబ్లిషింగ్ హౌస్, హైదరాబాద్

తెలుగు సాహిత్య సమీక్ష - జి. నాగయ్య, 2004, నవ్య పరిశోధక ప్రచురణలు, తిరుపతి

ఆధునిక భాషాశాస్త్ర సిద్ధాంతాలు - పి.ఎస్. సుబ్రహ్మణ్యం, 2017, తెలుగు విశ్వవిద్యాలయం, హైదరాబాద్.

PONDICHERRY UNIVERSITY

Part I - HINDI

(4 Semesters – Hindi-I, Hindi-II, Hindi-III & Hindi-IV),

LANGUAGE COURSE FOR B.Sc.B.Ed.& B.A.B.Ed.

| | |
|----------------------------|----------------------|
| I SEMESTER – PAPER-I | सामान्य हिन्दी - I |
| II SEMESTER – PAPER – II | सामान्य हिन्दी – II |
| III SEMESTER – PAPER – III | सामान्य हिन्दी – III |
| IV SEMESTER – PAPER – IV | सामान्य हिन्दी – IV |

1st Semester**Paper-I सामान्य हिन्दी-I****पाठ्य विषय**

- उपन्यास
‘निर्मला’ - प्रेमचन्द, राजकमल प्रकाशन, दरियागंज दिल्ली
- हिन्दी अपठित
पल्लवन
पत्राचार
अनुवाद : अनुवाद की परिभाषा, अनुवाद का महत्व, अनुवादक की योग्यताएँ, अनुवाद के प्रकार और प्रक्रिया
पारिभाषिक शब्दावली (कार्यालयी शब्दावली)
हिन्दी में पदनाम
कंप्यूटर में हिन्दी का अनुप्रयोग : प्रारम्भिक परिचय

अंकविभाजन : पूर्णांक 100

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|-------------------------------------|--------------|-----------------------------------|
| व्याख्याएँ (निर्मला उपन्यास) | 4 में से 2 | $2 \times 7 \frac{1}{2} = 15$ अंक |
| आलोचनात्मक प्रश्न (निर्मला उपन्यास) | 2 में से 1 | $1 \times 15 = 15$ अंक |
| लघुत्तरी प्रश्न (निर्मला उपन्यास) | 4 में से 2 | $2 \times 5 = 10$ अंक |
| पल्लवन | 2 में से 1 | $1 \times 10 = 10$ अंक |
| पत्रालेखन | 2 में से 1 | $1 \times 15 = 15$ अंक |
| लघुत्तरी प्रश्न (अनुवाद) | 5 में से 3 | $3 \times 5 = 15$ अंक |
| लघुत्तरी प्रश्न (कंप्यूटर) | 4 में से 2 | $2 \times 5 = 10$ अंक |
| पारिभाषिक शब्दावली | 15 में से 10 | $10 \times 1 = 10$ अंक |

अध्ययन के लिए सहायक पुस्तकें

- सामान्य हिन्दी, डॉ. विजयपाल सिंह, हिन्दी प्रचार संस्थान, वाराणसी
- व्यावहारिक हिन्दी, डॉ. महेन्द्र मित्तल, शबरी संस्थान, दिल्ली
- हिन्दी संक्षेपण, पल्लवन और पाठ बोधन, डॉ. हरदेव बाहरी, अभिव्यक्ति प्रकाशन, इलाहाबाद
- प्रयोजन मूलक हिन्दी, विनोद गोदरे, वाणी प्रकाशन, दिल्ली
- प्रेमचन्द और उनका युग, रामविलास शर्मा, राजकमल प्रकाशन, दिल्ली
- प्रेमचन्द के उपन्यासों का शिल्प विधान, कमलकिशोर गोयनका, सरस्वती प्रेस, दिल्ली
- संक्षेपण कैसे करें, डॉ. शैलेन्द्रनाथ श्रीवास्तव, भारतीभवन, पटना

II Semester

Paper-II - सामान्य हिन्दी- II

पाठ्य विषय

नाटक

अंधेर नगरी - भारतेन्दु हरिश्चंद्र
 मुहावरे - लोकोक्तियाँ
 शब्दशुद्धि, वाक्य शुद्धि
 शब्दज्ञान : पर्याय, विलोम, अनेकार्थी, समश्रुत
 अनेक शब्दों के लिए एक शब्द
 देवनागरी लिपि की विशेषताएँ
 देवनागरी लिपि एवं वर्तनी का मानक रूप
 संक्षेपण
 हिन्दी में संक्षिप्तीकरण

अंकविभाजन : पूर्णांक 100

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| व्याख्याएँ (अंधेर नगरी) | 4 में से 2 | 2 x 7 ½ = 15 अंक |
| आलोचनात्मक प्रश्न (अंधेर नगरी) | 2 में से 1 | 1 x 15 = 15 अंक |
| लघुत्तरी प्रश्न (अंधेर नगरी) | 4 में से 2 | 2 x 5 = 10 अंक |
| मुहावरे लोकोक्तियाँ | 10 में से 5 | 5 x 2 = 10 अंक |
| शब्द शुद्धि (10 शब्द) | | 10 x ½ = 5 अंक |
| वाक्य शुद्धि (5 वाक्य) | | 5 x 1 = 5 अंक |
| अनेक शब्द के लिए एक शब्द | 8 में से 5 | 5 x 1 = 5 अंक |
| शब्द ज्ञान (पर्याय, विलोम, अनेकार्थी, समश्रुत) | | 15 x 1 = 15 अंक |
| लघुत्तरी प्रश्न (देवनागरी लिपि) | 4 में से 2 | 2 x 5 = 10 अंक |
| संक्षेपण | | 1 x 10 = 10 अंक |

अध्ययन के लिए सहायक पुस्तकें

- व्यावहारिक हिन्दी व्याकरण, तनसुखराम गुप्त, हिन्दी पुस्तक भवन, दिल्ली
- हिन्दी संक्षेपण, पल्लवन और पाठ बोधन, डॉ. हरदेव बाहरी, अभिव्यक्ति प्रकाशन, इलाहाबाद
- हिन्दी भाषा और देवनागरी लिपि - धीरेन्द्र वर्मा, हिन्दुस्तानी एकेडमी, इलाहाबाद
- सामान्य हिन्दी, डॉ. विजयपाल सिंह, हिन्दी प्रचारक संस्थान, वाराणसी
- समकालीन हिन्दी नाटक और रंगमंच सकृपा विनय, भारती भाषा प्रकाशन, दिल्ली
- आधुनिक नाटकों का मसीहा, मोहन राकेश, डॉ. गोविन्द चातक, इन्द्रप्रस्थ प्रकाशन, दिल्ली
- शुद्ध हिन्दी कैसे लिखें - राजेन्द्र प्रसाद, भारजी भवन, पाडना

3rd Semester

Paper-III

पाठ्य विषय :-

1. गद्य गाथा (संपादक वीणा अग्रवाल, अरूणोदय प्रकाशन, दरियागंज, नई दिल्ली)

- ममता – जयशंकर प्रसाद,
- युवकों का समाज में स्थान – आचार्य नरेंद्र देव
- नेता नहीं, नागरिक चाहिए – रामधारी सिंह 'दिनकर'
- मेरी जन्मभूमि- हजारी प्रसाद द्विवेदी
- होली और ओणम – डॉ. एन.ई.विश्वनाथ अय्यर
- सरयू भैया – रामवृक्ष बेनीपुरी
- सदाचार का तावीज़ – हरिशंकर परसाई
- स्वामी दयानंद – मोहन राकेश
- पहाड़ी रिक्शा – कन्हैयालाल मिश्र 'प्रभाकर'
- इलाहाबाद – डॉ. लक्ष्मण सिंह बिष्ट 'बटरोही'
- शनि : सबसे सुन्दर ग्रह – गुणाकर मुले

2. हिन्दी भाषा और उसके विविध रूप

- राजभाषा
- राष्ट्रभाषा
- सम्पर्क भाषा
- मीडिया की भाषा

अंकविभाजन : पूर्णांक 100

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|---|------------|-----------------|
| व्याख्याएँ (गद्य गाथा) | 6 में से 3 | 3 x 10 = 30 अंक |
| आलोचनात्मक प्रश्न (गद्य गाथा) | 4 में से 2 | 2 x 15 = 30 अंक |
| लघुत्तरी प्रश्न (गद्य गाथा) | 8 में से 4 | 4 x 5 = 20 अंक |
| लघुत्तरी प्रश्न (हिन्दी भाषा और उसके विविध रूप) | 8 में से 4 | 4 x 5 = 20 अंक |

अध्ययन के लिए सहायक पुस्तकें

- काव्य के रूप, गुलाब राय, आत्माराम एण्ड संस कश्मीरी गेट, दिल्ली
- साहित्य रूप, रामअवध द्विवेदी, भारती भण्डार, इलाहाबाद
- प्रयोजनमूलक हिन्दी:सिद्धान्त और प्रयोग, दंगल झाल्टे, वाणी प्रकाशन, दिल्ली
- कामकाजी हिन्दी, डॉ. कैलाशचन्द्र भाटिया, तक्षशिला प्रकाशन, दिल्ली
- व्यावसायिक हिन्दी, दिलीप सिंह, नेशनल पब्लिशिंग हाउस, दिल्ली

4th Semester

Paper-IV

पाठ्य विषय

‘काव्य सुषमा’ - सम्पा. सत्यकाम विद्यालंकार, प्रकाशक नया साहित्य, कश्मीरी गेट, दिल्ली
(केवल निम्नलिखित कवियों / कविताओं पर ही व्याख्यात्मक/आलोचनात्मक एवं लघुत्तरी प्रश्न पूछे जायेंगे)

| | |
|------------------------------|----------------------------------|
| कबीर | - प्रथम 5 दोहे तथा पद संख्या 1 |
| सूरदास | - पद संख्या 2 तथा 4 |
| तुलसीदास - | पद संख्या 1 एवं 2 तथा 4 |
| बिहारी | - दोहा संख्या 1, 3, 6, 10 तथा 11 |
| मैथिलीशरण गुप्त - | ‘धन्यलाल की माई’ |
| जयशंकर प्रसाद | - ‘आँसू’ |
| सुमित्रानंदन पंत | - ‘बसंत’ |
| सूर्यकान्त त्रिपाठी निराला - | ‘जागो फिर एक बार’ |
| रामधारी सिंह दिनकर - | हिमालय के प्रति’ |
| अज्ञेय - | नदी के द्वीप |

अनुवाद व्यवहार (अंग्रेजी से हिन्दी में अनुवाद)

अंकविभाजन : पूर्णांक 100

| | | |
|---------------------------------|------------|-----------------|
| व्याख्याएँ (काव्य सुषमा) | 6 में से 3 | 3 x 10 = 30 अंक |
| आलोचनात्मक प्रश्न (काव्य सुषमा) | 4 में से 2 | 2 x 15 = 30 अंक |
| लघुत्तरी प्रश्न (काव्य सुषमा) | 8 में से 5 | 5 x 4 = 20 अंक |
| अनुवाद (अंग्रेजी से हिन्दी) | 2 में से 1 | 1 x 20 = 20 अंक |

अध्ययन के लिए सहायक पुस्तकें

- प्राचीन हिन्दी काव्य, डॉ. ओमप्रकाश, राधाकृष्ण प्रकाशन, दिल्ली
- हिन्दी के प्रतिनिधि कवि, डॉ. द्वारिका प्रसाद सक्सेना, विनोद पुस्तक मन्दिर, आगरा
- आधुनिक हिन्दी कविता की प्रवृत्तियाँ, डॉ. नामवर सिंह, लोकभारती प्रकाशन, इलाहाबाद
- अनुवाद : सिद्धान्त और प्रयोग, जी. गोपीनाथ, लोकभारती प्रकाशन, इलाहाबाद
- अनुवाद कला : सिद्धान्त और प्रयोग, डॉ. कैलाशचन्द्र भाटिया, तक्षशिला प्रकाशन, नई दिल्ली

PART II

ENGLISH

PONDICHERRY UNIVERSITY
Part II - ENGLISH (for 4 Semesters),
LANGUAGE COURSE FOR B.Sc.B.Ed.& B.A.B.Ed.

SEMESTER-I

English-1

Text Prescribed : *SUNBEAMS-1*, Usha Mahadevan, Emerald Publishers, Chennai 2014.

- UNIT-1 POETRY
- UNIT-2 PROSE
- UNIT-3 GRAMMAR (units from the text)
- UNIT-4 VOCABULARY (from the text)
- UNIT-5 WRITTEN COMMUNICATION (units from the text)

SEMESTER-II

Text Prescribed : *SUNBEAMS -II*, Shoba Rao.B, Emerald Publishers, Chennai 2015.

- UNIT-1 PROSE
- UNIT-2 SHORT STORIES
- UNIT-3 GRAMMAR (units from the text)
- UNIT-4 VOCABULARY (units from the text)
- UNIT-5 WRITTEN COMMUNICATION (units from the text)

SEMESTER-III

Text Prescribed : *LITERARY MUSINGS: An Anthology of prose, poetry and Drama*, CUP, New Delhi 2014.

- UNIT-1 PROSE
- UNIT-2 POETRY
- UNIT-3 DRAMA
- UNIT-4 GRAMMAR & VOCABULARY (Chapters 23-32, on Sentence Structure from Contemporary *English Grammar; Structure and composition* by David Green, Trinity publication, 2015)
- UNIT-5 WRITTEN COMMUNICATION
 - (i) Letter writing [formal and informal]
 - (ii) Resume writing

SEMESTER-IV

Text Prescribed : *LITERARY MUSINGS: An Anthology of prose, poetry and Drama*, CUP, New Delhi 2014.

- UNIT-1 PROSE
- UNIT-2 POETRY
- UNIT-3 DRAMA
- UNIT-4 GRAMMAR & VOCABULARY (Chapters 33-36, on verb patterns and structures from Contemporary *English Grammar; Structure and composition* by David Green, Trinity publication, 2015)
- UNIT-5 WRITTEN COMMUNICATION
 - (i) Note Making
 - (ii) Essay writing

B.Sc.,B.Ed.,

PART III
SPECIALIZATION OF THE SUBJECTS
(MAIN)

MATHEMATICS
PHYSICS
CHEMISTRY
BOTANY
ZOOLOGY
COMPUTER SCIENCE

PART III
MATHEMATICS

B.Sc., B.Ed. LIBERAL OPTIONS
PART III: B.SC.B.ED.
Branch: MATHEMATICS

| SEM | No. | CODE | Sub | Name of the course | CCE | UE | Total |
|------|---------------------------|------|----------|---|-----|----|-------|
| I | Core 1 | | Main 1 | Theory of Equations & Trigonometry | 30 | 70 | 100 |
| | Core 2 | | Main 2 | Differential Calculus | 30 | 70 | 100 |
| | Core 3 | | Main 3 | Analytical Geometry 3D | 30 | 70 | 100 |
| | Core 4 (Supportive 1) | | Anci 1-1 | Physics I / Fundamentals of Computers | 30 | 70 | 100 |
| II | Core 5 | | Main 4 | Integral Calculus | 30 | 70 | 100 |
| | Core 6 | | Main 5 | Abstract Algebra | 30 | 70 | 100 |
| | Core 7 | | Main 6 | Real Analysis I | 30 | 70 | 100 |
| | Core 8 (Supportive 2) | | Anci 1-2 | Physics II/ Principles of Programming and "C" | 30 | 70 | 100 |
| III | Core 9 | | Main 7 | Linear Algebra | 30 | 70 | 100 |
| | Core 10 | | Main 8 | Ordinary Differential Equations | 30 | 70 | 100 |
| | Core 11 | | Main 9 | Operations Research I | 30 | 70 | 100 |
| | Core 12 (Supportive 3) | | Anci 2-1 | Chemistry I/Object Oriented Programming | 30 | 70 | 100 |
| IV | Core 13 | | Main 10 | Real Analysis II | 30 | 70 | 100 |
| | Core 14 | | Main 11 | Complex Analysis I | 30 | 70 | 100 |
| | Core 15 | | Main 12 | Mathematical Statistics I | 30 | 70 | 100 |
| | Core 16 (Supportive 4) | | Anci 2-2 | Chemistry II/ Visual Programming | 30 | 70 | 100 |
| V | Core 17 | | Main 13 | Partial Differential Equations | 30 | 70 | 100 |
| | Core 18 | | Main 14 | Vector Calculus | 30 | 70 | 100 |
| VI | Core 19 | | Main 15 | Operations Research II | 30 | 70 | 100 |
| | Core 20 | | Main 16 | Complex Analysis II | 30 | 70 | 100 |
| VII | Core 21 | | Main 17 | Mathematical Statistics II | 30 | 70 | 100 |
| VIII | Core 22 | | Main 18 | Numerical Methods & Programming Lab | 30 | 70 | 100 |

*note: Stream for Supportive Papers should be chosen in the first semester, same stream should be chosen in the successive semesters

Stream A: Science related papers (Physics I, II and Chemistry I, II) or

Stream B: Computer related papers

B.SC., B.ED. MATHEMATICS
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CORE 1: THEORY OF EQUATIONS & TRIGONOMETRY

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| UNIT I | Relations between the roots and the coefficients of a general polynomial equations in one variable – Transformation of equations – Descarte’s rule of signs. |
| UNIT II | Solution of cubic equations :Cardon's Method - Trigonometrical method – Horner’s Method, Bi-quadratic equation – Ferrari method. |
| UNIT III | De Moivre’s theorem and its applications – Direct and Inverse circular and hyperbolic functions. |
| UNIT IV | Logarithm of a complex quantity- Expansion of Trigonometrical functions. |
| UNIT V | Gregory's series- Summation of series. |
| Prescribed Text(specify sections clearly) | <ol style="list-style-type: none"> 1. <i>Algebra Volume-1</i>, T.K. Manicavachagom Pillay , T.Natarajan and K.S. Ganapathy,. Viswanathan (Printers & Publishers) Pvt. Lid, (1999) 2. <i>Trigonometry</i>, S. Narayanan and T.K. Manicavachagom Pillai, S. Viswanathan (Printers & Publishers) Pvt. Ltd, (1997) |
| Recommended books | 1. <i>Plane Trigonometry-Part-I&II(6th Edition)</i> , S.L.Loney, Arihant Publications, 2016. |
| e-Learning Source | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

CORE 2: DIFFERENTIAL CALCULUS

| | |
|--|--|
| UNIT I | n^{th} derivative – Standard results – Trigonometrical transformation – Formation of equations involving derivatives – Leibnitz formula. |
| UNIT II | Total differential coefficients – Euler’s theorem - Partial derivatives of a function of two functions -Equations of tangent and normal - Taylor expansions of single and double variables. |
| UNIT III | Maxima and Minima of two variables – Lagrange’s method of undetermined multipliers - Angle of intersection of curves – Sub tangent and Sub Normal. - |
| UNIT IV | Angle between the radius vector and tangent – Angle between the intersection of two curves – Polar sub tangent and sub normal. |
| UNIT V | Circle, radius and centre of curvature – Cartesian formula for radius of curvature – envelope. |
| <i>Prescribed Text(specify sections clearly)</i> | <i>Calculus Volume — I, T. K. Manickavachagom Pillai, Printers and Publishers (May1992 Edition)</i> <i>Unit 1 : Chapter 3</i> <i>Unit 2: Chapter 8</i> <i>Unit 3 : Chapter 8, 9</i> <i>Unit 4 : Chapter 9</i> <i>Unit 5 : Chapter 10 (Section 1)</i> |
| <i>Reference books</i> | <ol style="list-style-type: none"> 1. <i>Calculus(2nd Edition), Lipman Bers and Frank Karal, Holt McDougal, 1976.</i> 2. <i>Thomas’ Calculus 12th Edition, George B.Thomas, Maurice D.Weir and Joel Hass, Pearson Education, 2015.</i> |
| <i>e-Learning Source</i> | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

CORE 3:ANALYTICAL GEOMETRY 3D

| | |
|---|--|
| UNIT I | Angle between 2 lines-projections-direction cosines-relation between the direction cosines of a straight line-the projection of the line joining $P(x_1, y_1, z_1)$ and $Q(x_2, y_2, z_2)$ on any line with d.c.'s l, m, n -direction cosines of any line joining 2 points-angle between the lines whose direction cosines are (l_1, m_1, n_1) and (l_2, m_2, n_2) . |
| UNIT II | General equation, angle between two planes, length of perpendicular from a given point to a plane, equations of the plane bisecting the angle between two planes. |
| UNIT III | Symmetrical form, line through two points, reduction of unsymmetrical form to the symmetrical form - condition for a line to lie on a plane - plane through a line - condition for the two lines to be coplanar (Cartesian form) - equation of the plane containing two lines - To find the shortest distance between two skew lines - equation of the shortest Distance in Cartesian. |
| UNIT IV | Equation of a sphere with given centre and radius - general equation of a sphere - diameter form - and circular section. |
| UNIT V | Equation of a Cone with its vertex at the origin - equation of a quadratic cone with given vertex and given guiding curve - necessary condition for general equation of second degree to represent a cone - circular cone - equation of circular cone with given vertex - axis and semi vertical angle. |
| <i>Prescribed Text (specify sections clearly)</i> | <i>1. A Text Book of Analytical Geometry of Three dimensions by T.K.Manickavachagom Pillai and T.Natarajan S. Viswanathan Printers & Publishers) — (2008)</i> |
| <i>Reference books</i> | <i>1. Text Book of Analytic Geometry -2D, P. Durai Pandian, EMERALD Publishers (1968) 2. Simplified Course in Solid Geometry(3D) by H.K.Dasse, H.C.Saxena, M.D.Raisinghania – S.Chand & Company</i> |
| <i>e-Learning Source</i> | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

CORE 4: (SUPPORTIVE 1) PHYSICS I

UNIT-I: Moment of inertia – radius of gyration - parallel and perpendicular axis theorem, calculation of moment of inertia of (a) ring (b) disc (c) hollow and solid spheres. Angular momentum, torque and the relation between them. Simple harmonic motion, equation of SHM, composition of two SHM at right angles, Lissajous figures.

UNIT-II: Young's modulus — bulk modulus — rigidity modulus and Poisson's ratio — derivation of the expression for bending moment of a beam in terms of its curvature of neutral axis – determination of Young's modulus of a rectangular bar — non – uniform bending — pin and microscope method-with theory (mathematical derivation) – expression for couple per unit twist-determination of rigidity modulus – torsion pendulum.

UNIT-III: Surface tension and surface energy – interfacial surface tension-experimental determination of surface tension by drop weight method-variation of surface tension with temperature — Jaeger's method – streamline and turbulent motion- equation of continuity.

UNIT -IV: Newton's law of cooling – determination of specific heat of liquid-Barton's cooling correction in calorimetric experiments – specific heat capacity of gases – ratio of specific heat capacities — determination of the ratio of specific heats of gases – Clement and Desormes method. Coefficient of thermal conductivity of a bad conductor - Lee's disc method-determination of thermal conductivity by Forbes's method. Blackbody radiation-Stefan's law – determination of Stefan's constant — second law of thermodynamics –Carnot cycle – indicator diagram – derivation of efficiency-Kelvin temperature scale.

UNIT - V: Interference — method of producing coherent sources - Fresnel's biprism — Newton's rings through transmission and reflection - Interferometers - Michelson's Interferometer – wavelength determination - Jamin's refractometer. Diffraction - Fresnel's diffraction – Fraunhofer diffraction – half period zones-rectilinear propagation of light – diffraction at a straight edge. Polarization – optical activity-specific rotator power – Polarimeter – Lawrence half shade - determination of specific rotator power-double refraction – optic axis.

TEXTBOOKS:

1. Dr.Sabesan and others, A Textbook of Allied Physics Vol-I and Vol-II
2. Ponnusamy and others, Ancillary Physics.
3. Kamalakannan and others, Ancillary Physics.

REFERENCE BOOKS

1. Halliday, Resnik & Walker, Fundamentals of Physics, 5 Ed.(Asian Books Pvt. Ltd., New Delhi)

PHYSICS I – PRACTICALS

Choose any 7 experiments from the list given below for each semester without overlap

LIST OF EXPERIMENTS:

1. Young's modulus-Non-Uniform bending-Pin& Microscope
2. Rigidity modulus-Torsional oscillations without masses.
3. Comparison of coefficient of viscosity.
4. Surface tension of a liquid and interfacial surface tension by drop weight method.
5. Spectrometer –Refractive index of a liquid- Hollow prism.
6. Spectrometer -Grating-N determination by normal incidence method.
7. Spectrometer -Grating-wavelength determination by minimum deviation method.
8. Newton's Rings.
9. Thermal conductivity of a bad conductor - Lee's disc method
10. Post office box- laws of resistance and specific resistance.
11. Melde's apparatus-Determination of frequency.
12. Meter Bridge - Temperature coefficient of the material of a coil of wire
13. Potentiometer – calibration of low range voltmeter (0 -1.5 V).
14. Potentiometer - calibration of ammeter (0-1.5 amps).
15. Figure of merit of a periodic moving coil galvanometer.
16. Field along the axis of the circular coil carrying current- Determination of BH.
17. Newton's law of cooling and specific heat determination
18. Frequency measurement by forming Lissajous figures
19. Study of Half wave rectifier.
20. Transistor characteristics-CE mode- only transfer characteristics.

TEXTBOOKS:

1. Ouseph and V.Srinivasan, Practical Physics- Part-I &II.

REFERENCE BOOKS

1. Mathchan Lazarus and others-Practical Physics.

CORE 4: (SUPPORTIVE 1) FUNDAMENTALS OF COMPUTER SCIENCE**UNIT I**

Introduction of computers- Generations of Modern computers Classification of digital Computer. Memory Units: RAM, ROM, PROM, EPROM, and EEPROM Auxiliary Storage Devices: Magnetic storage devices-Floppy Diskettes, Hard disks, Removable Hard disks, Magnetic Tapes, Optical Storage-CD-ROM.

UNIT II

Input Devices: Keyboard, Mouse, Track ball, Joystick, Scanner, Digital Camera, MICR, OCR, Barcode Reader, Touch Screen, Light Pen. Output Devices: Monitor, Printer, Plotter, Sound Card and Speaker.

UNIT III

Programming Languages; Machine Language, Assembly Language, High Level Language, Types of High-Level Language - Introduction to Software Development: Defining the Problem, Program Design, Coding, Testing, Documenting, and maintaining the program.

UNIT IV

Introduction to C- Character set, Tokens, Identifiers and keywords. Data type, Declarations, Expressions, statements and symbolic constants, Input-Output: getchar, putchar, scanf, printf, gets, puts, Pre-processor commands, #include, define, preparing and running a complete C program.

UNIT V

Operators and expressions: Arithmetic, Unary, Logical, bit-wise, assignments and conditional operator, comma operator , Library functions. Control statements: While, do, for statement, jump in loops, nested loops, if-else, switch, break, continue and goto statements.

TEXT BOOK

- 1.Alexis Leon and Mathews Leon, Introduction to Computers , Leon TECHWorld, 1999.
- 2.E. Balagurusamy , Programming In ANSI C , Tata McGraw Hill , 2004

REFERENCE

- 1.Peter Norton, Introduction to Computers , Second edition, Tata McGraw Hill Publications 1998.
- 2.Byron S. Gottfried, Programming with C , Schaum s Outline Series, TMH ,2nd Edition 1998.
3. Kris A. Jamsa , Programming in C , Galgotia Publications PVT.Ltd. (1988).
- 4.Kernighan, B.W...,and Ritchie, D.M., The C Programming Language Prentice Hall of India, 1989.

PRACTICAL - COMPUTER PRACTICE LAB

MS-WORD

1. Text Manipulations and Text Formatting
2. Usage of Bookmarks, Footnotes, Columns & Hyperlink
3. Usage of Header, Footer, Bulleting and Numbering & Borders and Shading
4. Usage of Tables - Sorting & Formatting
5. Usage of Spell Check, Find and replace
6. Picture insertion and alignment
7. Creation of documents using templates
8. Mail Merge, Envelopes and Labels

MS-EXCEL

9. Cell Editing and Formatting
10. Usage of Formulae and Built-in functions
11. Data Sorting, filter, form, subtotal, validation, Goal seek
12. Inserting Clip arts, objects, pictures and Data Filter, Validation, Subtotals
13. Usage of auditing, comments
14. Graph
15. Usage of Auto Formatting, Conditional Formatting & Style

MS - POWER POINT

16. Inserting New slides, text box, object, charts, tables, pictures, movies and sound
17. Slide layout, Colour Scheme, Background and Design template
18. Preparation of organizational charts
19. Preset and custom animation, action buttons and settings, Slide Transitions and animations, view show, slide sorter view
20. Presentation using Wizards
21. Usage of Design templates

Introduction to C- PROGRAMMING

22. Check for Biggest Number ,Prime Number, Armstrong number,
23. Fibonacci Series
24. Summation of the series: Sin (x) , Cos(x), Exp(x)

CORE 5: INTEGRAL CALCULUS

| | |
|--|--|
| UNIT I | Integration of rational algebraic functions – Integration of irrational algebraic functions - Properties of definite integrals |
| UNIT II | Integration by parts – Bernoulli’s formula – Reduction formulae |
| UNIT III | Evaluation of double integral – Changing of order of integration - Double integral in Polar co-ordinates – Triple integral |
| UNIT IV | Jacobian – Change of variables in the case of two variable and three variables – Transformation from Cartesian to polar co-ordinate - Transformation from Cartesian to spherical co-ordinates - |
| UNIT V | Properties – relation between Beta and Gamma functions - Recurrence formula |
| Prescribed Text(specify sections clearly) | <i>Calculus Volume II , S.Narayanan and T.K. Manickavasagam Pillai (2008)</i> Unit I : Chapter 1 : 7.3, 7.4, 7.5, 8, 11 Unit II : Chapter 1: 12,13, Unit III: Chapter 5 : 2.1, 2.2, 3.1, 4 Unit IV : Chapter 6: 1.1, 1.2, 2.1,2.2,2.3,2.4 Unit v: Chapter 7: 2.1, 2.2, 2.3, 3, 4, 5 |
| Reference books | <ol style="list-style-type: none"> 1. <i>Integral Calculus, N. P. Bali, Laxmi Publications, Delhi, (1991)</i> 2. <i>Calculus(2nd Edition), Lipman Bers and Frank Karal, Holt McDougal, 1976.</i> 3. Thomas’ <i>Calculus 12th Edition, George B.Thomas, Maurice D.Weir and Joel Hass, Pearson Education, 2015.</i> |
| e-Learning Source | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

CORE 6: ABSTRACT ALGEBRA

| | |
|--|--|
| UNIT I | Definition of Group - examples of groups - Some preliminary lemmas - Subgroups. |
| UNIT II | A counting principle - Normal subgroups and Quotient Groups – Homomorphisms. |
| UNIT III | Automorphisms - Cayley's theorem - Permutation groups. |
| UNIT IV | Definition of Ring- examples of a rings - Some special classes of rings - Homomorphisms – Ideals and quotients rings. |
| UNIT V | More ideals and quotients rings -The field of quotients of an integral domain. |
| Prescribed Text(specify sections clearly) | <i>I.N. Herstein, Topics in Algebra (Second Edition), John Wiley & Sons (2003)</i> Unit I : Sections 2.1 to 2.4 Unit II : Sections 2.5 to 2.7(except applications 1 & 2 of 2.7) Unit III: Sections 2.8 to 2.10 Unit IV: Sections 3.1 to 3.3 Unit V : Sections 3.4,3.6 |
| Reference Books | <ol style="list-style-type: none"> 1. A First course in Algebra by J. B. Fraleigh, Addison Wesley. 2. Modern Algebra by M.L. Santiago, (TMG) 3. Abstract Algebra(3rd Edition), I.N.Herstein, John Wiley, 1996. |
| e-Learning Source | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

CORE 7: REAL ANALYSIS I

| | |
|---|---|
| UNIT I | Sets and elements — Operations on sets — Functions - Real valued functions - Equivalence — Countability — Real numbers — Least upper bound — Greatest lower bound. |
| UNIT II | Definition of sequence and subsequence — Limit of a sequence — Convergent sequence — Bounded sequence Monotone sequence - Operation on convergent sequence - Limit superior and limit inferior — Cauchy sequence |
| UNIT III | Convergence and divergence- Series with non - negative terms - Alternating series — Conditional convergence and absolute convergence- Tests for absolute convergence - Series whose terms form a non - increasing sequence — Summation by parts. |
| UNIT IV | Limit of a function on the real line - Metric spaces (Examples 4 and 5 under 4.2 c to be omitted) - Limits in metric spaces. |
| UNIT V | Functions continuous at a point on the real line Reformulation — Functions continuous on a metric space - Open sets and closed sets – Discontinuous functions on \mathbb{R} |
| Prescribed Text (specify sections clearly) | <i>Methods of Real Analysis, Treatment as in Richard R. Goldberg (1970)</i> Unit 1 : Chapter 1 Unit 2, 3: Chapter 2 and Chapter 3 (up to 3.8) Unit 4 : Chapter 4 Unit 5 : Chapter 5 |
| Reference Books | <ol style="list-style-type: none"> 1. <i>A First Course in Mathematical Analysis- D somasundaram & B Choudhyri- Narosa Publishing house New Dehli</i> 2. <i>Introduction to Calculus and Analysis, Vol.I, Richard Courant and Fritz John, Springer 1999.</i> 3. <i>Introduction to Real Analysis, 4th Edition, Robert G. Bartle and Donald R. Sherbert, Wiley-2014.</i> |
| e-Learning Source | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

CORE 8: (SUPPORTIVE 2) PHYSICS II

UNIT-I: Ultrasonics – magnetostriction – piezo electric methods – properties of ultrasonic waves and applications.

UNIT -II:Gauss's law with proof – Electric intensity and potential due to a uniformly charged hollow conductor at a point outside, on the surface and inside a spherical conductor — capacity of a parallel plate condenser with and without a dielectric slab - capacity of a spherical conductor-Biot & Savart's law — field along the axis of a circular coil carrying current – force on current carrying conductor placed in a magnetic field – theory of moving coil galvanometer.

UNIT -III: Magnetic properties of materials – relation between – the three magnetic vectors – susceptibility and permeability - para, dia and ferromagnetism (qualitative ideas) – magnetic hysteresis – superconductivity – persistent current and Meissner Effect.

UNIT-IV: Breakdown of classical mechanics — photo electric effect — Compton effect - Davison- Germer experiment - Matter waves-wave packets-de Broglie ideas- Heisenberg uncertainty principle. Radio active isotopes (production and uses) – particle accelerator – linear accelerator – particle detectors – Wilson cloud chamber – Scintillation counter – nuclear models – Liquid drop model-Fission and Fusion reaction- nuclearreactors.

UNIT-V: Rectifiers & filters (qualitative ideas) – Transistor characteristics – transistor as a RC coupled amplifier – frequency response (without derivation) – band width – basic principles of an oscillator-Hartley oscillator – working (without derivation) – elementary ideas about modulation – elementary ideas about TV transmission and reception.

TEXTBOOKS:

1. Dr.Sabesan and others, A Textbook of Allied Physics-Vol-I and Vol-II.
2. Ponnusamy and others, Ancillary Physics.
3. Kamaiakannan and others, AncillaryPhysics.

REFERENCEBOOKS

1. Halliday, Resnik, Walker, Fundamentals of Physics, 5thEd. (Asian Books Pvt. Ltd., New Delhi)

PHYSICS II – PRACTICALS

Ref: Physics Practical I

CORE 8: (SUPPORTIVE 2) PRINCIPLES OF PROGRAMMING AND C**UNIT I**

Introduction to Programming Algorithms, Flowchart, Source Program, Object Program, Compilers, Interpreters, Assemblers, Modular Programming: Structured Programming, Top-down approach.

UNIT II

Arrays: Defining and processing. One dimensional arrays- Two dimensional arrays. Initializing One and Two dimensional arrays- Multi dimensional arrays. Character Arrays and Strings- Introduction. Declaring and initializing String variables Comparison of Two Strings String - handling functions, Table of Strings

UNIT III

Functions: Defining and accessing: Passing arguments, Function prototypes, Function calls- Categories of functions- Nesting of functions- Recursion. Use of library functions, Scope, Visibility and Lifetime of variables.

UNIT IV

Structure: Defining and processing. Structure initialization Operations on individual members Arrays of structures Arrays within Structures, Structures and Functions- Passing to a function, Union.

UNIT V

Pointers: Declarations and initialization of pointer variables, Accessing pointer variables, Passing to a function. Operations on pointers, pointer and arrays. Array of pointers, Pointer to Functions. Data Files: Open, close, create, process unformatted data files.

TEXT BOOK

- 1.E.Balagurusamy, Programming in ANSC C , Tata McGraw Hill, 2004
2. Byron S. Gottfried, Programming with C , Schaum s Outline Series, TMH ,2nd Edition 1998.

REFERENCE

1. Kris A. Jamsa , Programming in C , Galgotia Publications PVT.Ltd. (1988)
2. Kernighan, B.W.,and Ritchie, D.M., The C Programming Language Prentice Hall of India, 1989.

PRACTICAL - PROGRAMMING IN C

1. Array Operations
2. String Manipulations
 - a. Counting number of vowels, consonants, words, white spaces in a string
 - b. Reversing a string and check for palindrome
 - c. Finding the number of occurrences of a sub string in a given string
 - d. Sub string replacing and removal
3. Using Functions
4. Recursion
 - a. Factorial
 - b. Reversing a string
 - c. Fibonacci Sequence
5. Matrix Manipulations using functions and Case structure
 - a. Addition & Subtraction
 - b. Multiplication
 - c. Transpose
 - d. Check if the given matrix is a Magic square
6. Searching
7. Sorting
8. Structures
9. Pointers
10. File

CORE 9: LINEAR ALGEBRA

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| UNIT I | Vector spaces - Elementary Concepts - subspaces |
| UNIT II | Linear independence - Bases - Dual spaces |
| UNIT III | Inner product spaces |
| UNIT IV | Algebra of Linear transformations - Characteristic roots. |
| UNIT V | Matrices : Canonical forms - triangular forms |
| Prescribed Text(specify sections clearly) | <i>Topics in Algebra – I.N Herstein, Wiley Eastern Limited</i> Chapter -4: Sections 4.1 – 4.4 Chapter -5; Sections 6.1–6.4 |
| Reference Books | 1. <i>First course in Algebra - John B. Fraleigh, Addison Wesley</i> 2. <i>University Algebra – N. S. Gopalakrishnan - Wiley Eastern Limited</i> 3. <i>Textbook of Algebra – R. Balakrishnan & N. Ramabadrán, Vikas Pub. Co</i> 4. <i>S. Lipschutz –Linear Algebra, TMG Hill</i> 5. <i>M.L.Santiago – Modern Algebra TMG Hill</i> |
| e-Learning Source | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

CORE 10: ORDINARY DIFFERENTIAL EQUATIONS

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| UNIT I | Exact differential equations – Equations of the First, but of higher degree – Equations solvable for dy/dx , solvable for y , solvable for x , Clairaut's form |
| UNIT II | Linear Differential equations with constant co-efficients - Linear differential equations with variable coefficients. |
| UNIT III | Method of Variation of parameters – Simultaneous Linear differential equations with constant coefficients |
| UNIT IV | Laplace transform – basic properties – transforms of derivatives and integrals functions – derivatives and integrals of transforms – transforms of step function – and impulse functions – transforms of periodic functions |
| UNIT V | Inverse Laplace transforms – convolution theorem – initial and final value theorem – solution of linear ODE of second order with constant coefficients using Laplace transform. |
| Prescribed Text(specify sections clearly) | <ol style="list-style-type: none"> 1. <i>Calculus III S.Narayanan and T.K. Manicavachagom Pillay , for Units I,II and III</i> 2. <i>Engineering Mathematics - II by Dr. M.B.K. Moorthy for Unit IV and Unit V</i> |
| Reference Books | <ol style="list-style-type: none"> 1. <i>Introductory course in Differential equations , D.A.Murray, Orient Longman (1967)</i> 2. <i>Advance Engineering Mathematics , Erwin Kreyzsig, Wiley India Edition (2010)</i> 3. <i>Engineering Mathematics , M.K.Venkataraman, National Publications , Chennai (2009)</i> 4. <i>Boyce and Di Prima, Differential Equations and Boundary Value Problems, Wiley,10th edition 2012</i> |
| e-Learning Source | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

CORE 11: OPERATIONS RESEARCH I

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| UNIT I | Mathematical formulation of LPP – Graphical Solution of LPP – Definition of LPP – Canonical and Standard forms of LPP – Ordinary Simplex Method to solve LPP (Method and problems only) – Uses of Artificial variables Method (Big – M Method) - Two Phase Method |
| UNIT II | Duality in LPP – Conversion of Primal to Dual – Duality and Simplex Method (Method and problems only) – Dual Simplex Method |
| UNIT III | General Transportation Problems – Finding IBFS for Transportation Problems – North-West corner Method – Least Cost Method – Vogel’s approximation Method – Test for Optimality – Degeneracy in Transportation Problems – MODI Method – Unbalanced Transportation Problems |
| UNIT IV | Mathematical formulation of Assignment Problems – Assignment Method – Travelling Salesman Problems |
| UNIT V | Two person zero sum game – MAXIMIN – MINIMAX Principle – Saddle Point – Games without Saddle Point – Graphical solutions of $2 \times n$ and $m \times 2$ games – Dominance Property – General solution of $m \times n$ games by LPP |
| Prescribed Text(specify sections clearly) | <i>Operations Research by KantiSwarup , P.K.Gupta and Man Mohan (2006)</i> <i>Unit I: Chapter 2: Sections 2.1 – 2.3, Chapter 3: Sections 3.1 – 3.5</i> <i>Chapter 4: Sections 4.1 – 4.4</i> <i>Unit 2: Chapter 5 : Sections 5.1 – 5.7, 5.9</i> <i>Unit3: Chapter 10: Sections 10.1 – 10.14</i> <i>Unit 4: Chapter 11: Sections 11.1 – 11.6</i> <i>Unit 5: Chapter 17: Sections 17.1 – 17.10</i> |
| Reference Books | 1. <i>Resource Management Techniques(Operations Research) by V. Sundaresan, K. S. Ganapathy Subramanian, K. Ganesan – A. R. Publications</i> 2. <i>Operations Research: An Introduction, 9th edition, Hamdy A.Taha, Pearson, 2010</i> |
| e-Learning Source | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

CORE 12: (SUPPORTIVE 3) CHEMISTRY I**Unit 1**

Intermolecular forces - Vanderwall and London forces. Liquid state theory and properties of liquids, liquid-crystal formation and applications. Solid state- forces in solids- covalent, ionic, metallic, and Vanderwall's, Lattice energy.

Unit 2

Theory of semi-conductors and its application. Bond properties- types of hybridization, bond length, bond order, bond strength. Resonance energy- resonance strength of multiple bonded species Carbon Monoxide, Nitrous Oxide, phenol, benzaldehyde, aniline.

Unit 3

Covalent bond- Orbital Overlap- hybridization, geometry of organic molecules- methane, ethylene, acetylene, benzene. Electron displacement effects, inductive, resonance, hyperconjugative and steric effects-their effect on properties of compounds. Stereoisomerism- Optical isomerism-optical activity, lactic acid, tartaric acid, racemization, resolution.

Unit 4:

Aromatic compounds-electrophilic substitution in benzene, mechanism of nitration, halogenation, Alkylation and Acylation. Preparation, properties and uses of Naphthalene, Furan, Thiophene, Pyrrole, Pyridine, Chloroform and Carbon Tetrachloride.

Unit5:

Keto-enol tautomerism. Geometric isomerization, maleic acid and fumaric acid. Rotation around single bond proffered rotations, conformers of ethane, propane, n- butane and cyclohexane. Axial and equatorial bonds.

Text books:

1. P. W. Atkins Physical Chemistry, 6th ed, 1998.
2. Wade, L.G. Organic Chemistry, Pearson Education, 5th ed, 2003.
3. M. Ladd. Introduction to Physical Chemistry, Cambridge, 1998.

CHEMISTRY I PRACTICALS

1. Estimation of sodium hydroxide using sodium carbonate standard.
2. Estimation of hydrochloric acid using oxalic acid standard.
3. Estimation of borax using sodium carbonate standard.
4. Estimation of ferrous sulphate using Mohr's salt standard.
5. Estimation of oxalic acid using ferrous sulphate standard.
6. Preparation of the following inorganic compounds: ferrous ammonium sulphate, manganous sulphate, sodium thiosulphate.

CORE 12: (SUPPORTIVE 3) OBJECT ORIENTED PROGRAMMING**UNIT I**

Introduction to Object Oriented Programming (OOP),C++ programming basic, Loops and decisions: Relational operators, loops, decision, logical operators, precedence.

UNIT II

Structures, enumerated data types. Function: simple functions, passing argument to functions, returning values from functions, reference arguments, overloaded functions, inline functions, variable and storage classes.

UNIT III

Objects and classes: Classes and Objects, Specifying the class, using the class, constructors, destructors, object as function arguments, returning object from function. Arrays: Arrays fundamentals, Array a Class member data, Array of objects, Strings. Operator overloading: unary operator, overloading binary operators, Data conversion.

UNIT IV

Inheritance: Derived Base class, derived class constructors, overloading member functions, class hierarchies, public and private inheritance, levels of inheritance multiple inheritance. Pointers: Address and pointers, pointers and arrays, pointers and functions, pointers and strings, Memory management, pointer to objects.

UNIT V

Virtual functions and other functions: Virtual functions, Friend functions, Static functions, this pointer. Files and Stream: String I/O, Object I/O with multiple objects, file pointer, disk I/O with member functions.

TEXT BOOK

1. Robert Lafore , Object Oriented Programming C++ , Galgotia Pub.

REFERENCE

1. Stephen Parta , C++ Primer Plus , Galgotia Pub.
2. E.Balagurusamy , Object Oriented Programming with C++

OOPS LAB

1. Simple functions & Inline functions
2. Function overloading & Operator Overloading
3. Usage of classes and Objects
4. Constructors and Destructors
5. Inheritance & Multiple Inheritance
6. Pointers
7. Virtual Functions, Friend functions, this pointer and Static functions
8. Files

CORE 13: REAL ANALYSIS II

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| UNIT I | More about open sets - Connected sets. Bounded sets and totally bounded sets - Complete metric spaces. |
| UNIT II | Compact metric spaces Continuous functions on compact metric Spaces - Continuity of the inverse function - Uniform continuity. |
| UNIT III | Sets of measure zero - Definition of the Riemann integral - Existence of the Riemann integral - Properties of the Riemann integral |
| UNIT IV | Derivatives - Rolle's theorem - The Law of the Mean - Fundamental theorem of Calculus - - Improper integrals. |
| UNIT V | Hyperbolic function - The exponential function - The logarithmic function - Definition of x^a - The trigonometric function - Taylor Theorem -L'Hopital's rule. |
| Prescribed Text(specify sections clearly) | <i>Methods of Real Analysis, Treatment as in Richard R. Goldberg, (1970)</i> Unit 1: 6.1 to 6.4 Unit 2: 6.5 to 6.8 Unit 3: 7.1 to 7.4 Unit 4: 7.5 to 7.10 Unit 5: 8.1 to 8.7 |
| Reference Books | 1. <i>First Course in Mathematical Analysis by Dr.Somasundaram & B Choudhyri- Narosa Publishing house New Dehli</i> 2. <i>Real Analysis- by Shanti Narayanan</i> |
| e-Learning Source | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

CORE 14: COMPLEX ANALYSIS I

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| UNIT I | Complex numbers - Definitions - Algebraic properties - Cartesian co-ordinates - Triangular inequality - Polar Form - Powers and roots - Region in the complex plane . |
| UNIT II | Analytic functions - Functions of a complex variable - Mapping - Limit - Theorems on limits - Continuity - Derivatives - Differentiation formula - Cauchy Riemann equations - Sufficient conditions. |
| UNIT III | Cauchy Riemann equations in polar form - Analytic functions - Harmonic functions. |
| UNIT IV | Elementary functions - Exponential function - Trigonometric functions and their--properties - Hyperbolic functions - Logarithmic function – Branches - properties of logarithms - Complex exponents - Inverse trigonometric & hyperbolic functions. |
| UNIT V | Mapping by elementary functions - The linear function $1/z$ - Linear fractional transformation - The function $w = \exp(z)$, $W = \sin z$, $W = \cos z$, $z^{1/2}$ - Successive transformation $W = z + 1/z$. |
| Prescribed Text(specify sections clearly) | <i>Complex Variables and Applications, James Ward Brown and Ruel V Churchill, McGraw - Hill, International Edition (2009)</i> UNIT I - chapter 1 UNIT II - chapter 2 UNIT III - chapter 2 UNIT IV - chapter 3 UNIT V - chapter 4 |
| Reference Books | <ol style="list-style-type: none"> 1. <i>Functions of a Complex variable by B. S. Tyagi – KedarNath Ram NathPublishers(P) Ltd.</i> 2. <i>Complex Analysis by P. Duraipandian and KayalalPachaiappa – S.Chand& Co.</i> 3. <i>S. Ponnusamy, Foundations of Complex analysis, (2nd Edition), Narosa, 2011.</i> 4. <i>V.Karunakaran, Complex Analysis, (2nd Edition), Narosa 2005</i> |
| e-Learning Source | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

CORE 15: MATHEMATICAL STATISTICS I

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| UNIT I | Random variables – Distribution function – Discrete random variable – Continuous random variable – Continuous distribution function – Two dimensional random variables – Joint probability function – Mathematical expectation and variance. |
| UNIT II | Moment generating function – Properties of MGF – Cumulants – Properties of Cumulants – Characteristic function – Properties of characteristic function – Tchebychev's inequality. |
| UNIT III | Binomial distribution – Moments of binomial distribution – Recurrence relation for the moments of binomial distribution – MGF of Binomial distribution – Characteristic function of Binomial distribution – Fitting a binomial distribution. |
| UNIT IV | Poisson distribution – Moments of the Poisson distribution – Recurrence relation for moments of Poisson distribution – Moment generating function of Poisson distribution – Characteristic function of Poisson distribution – Fitting a Poisson distribution. |
| UNIT V | Normal distribution – Properties of normal distribution – Mode, Median, MGF, Moments Points of inflexion, Median deviation about mean, Area property of Normal distribution – Problems using area Properties. |
| Prescribed Text(specify sections clearly) | <i>Fundamentals of Mathematical Statistics by S.C.Gupta, V.K.Kapoor, Sultan Chand and Sons , 11th edition</i> Unit I : 5.1 to 5.4, 6.1 to 6.9 Unit II : 6.10 to 6.13 Unit III : 7.2 Unit IV : 7.3 Unit V : 8.2.1 to 8.2.11 |
| Reference Books | <ol style="list-style-type: none"> 1. <i>Statistical methods by S.P.Gupta – Sultan Chand.</i> 2. <i>Statistics(Theory and Practice) by R.S.N.Pillai & V. Bagavathy - S.Chand & Co.</i> 3. <i>Robert V. Hogg and Allen T. Craig , Introduction to Mathematical Statistics (Fifth Edition) Pearson Education, 2005</i> |
| e-Learning Source | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

CORE 16: (SUPPORTIVE 4) CHEMISTRY II**Unit 1:**

Co-ordination chemistry – definition of terms, classification of ligands, nomenclature. Chelation – examples, chelate effect explanation. Werner’s theory- conductivity and precipitation studies. Sedgwick’s theory- Effective atomic number concept. Pauling’s theory-postulates, applications to octahedral, square, planar and tetrahedral complexes.

Unit 2:

Biological role of Hemoglobin and Chlorophyll. EDTA and its applications. Environmental chemistry- Green House Effect, global warming, Ozone depletion, BOD and COD – importance, rainwater harvesting-needs, methods, advantage. Pollution – types, strategies in its control.

Unit 3:

Carbohydrates-classification, preparation and properties of Glucose, Fructose and Sucrose. Discussion of ring structure and mutarotation. Properties of starch and cellulose. Interconversion of Glucose and Fructose. Amino-acids classification, preparation and properties of Glycine and Alanine, preparation of peptides by Bergman method. Classification of proteins according to composition, function and shape. Protein denaturation.

Unit 4:

Dyes and Drugs-Azo dyes-congo Red, Triphenylmethans, Malachite Green, Food colours. Sulpha drugs-sulphonamides and sulpha pyrimidine, preparation and uses. Antibiotics-penicillin and Chloromycetin-source, structure and uses. Vitamins- source and structure of vitamin A, B, C, D, E and F (structural elucidation not required).

Unit 5:

Electrochemistry- Kohlrauch law-measurement of conductance , pH determination, conductometric titrations, hydrolysis of salts, derivation of K_h . Galvanic cells, EMF standard electrode potentials, reference electrodes, electrochemical series and its application, electroplating and its application. Corrosion-methods of prevention. Bioenergetics-Chemical kinetics-order of reaction (zero and first order), half-life period. Chemical equilibrium-basic idea.

Text books:

1. P. W. Atkins Physical Chemistry, 6th edition, 1998.
2. Wade, L.G, Organic Chemistry, Pearson Education, 5th edition, 2003.
3. M. Ladd, introduction to Physical Chemistry, Cambridge, 1998.

CHEMISTRY II PRACTICAL

1. Detection of elements –nitrogen, sulphur and halogens.
2. Preliminary test and detection of carbohydrate, urea, benzamide and aromatic amines.
3. Detection of anions: carbonate, sulphide, sulphate, fluoride, chloride, bromide, nitrate, oxalate, phosphate.
4. Reaction of aldehyde (aromatic), ketone (aliphatic and aromatic), carbohydrate, carboxylic acid (mono-and dicarboxylic-), phenol, aromatic primary amine, amide and diamide.
5. Systematic analysis of organic compounds containing one functional group and characterization by confirmatory tests or derivatives.

CORE 16: (SUPPORTIVE 4) VISUAL PROGRAMMING**VISUAL PROGRAMMING****UNIT I**

Introduction to GUI - Visual Basic: Starting and Exiting Visual Basic Project Explorer Working with Forms Properties Window Using the Toolbox Toolbars Working with Projects Programming Structure of Visual Basic applications Event and Event driven procedures

UNIT II

Adding code and using events: Using literals data types - declaring and using variables using the operator subroutines and functions looping and decision control structures if then else structure select structure, for next, do.. loop and while.. wend.- Using intrinsic Visual basic Controls with methods and Properties: Label ,Text box, Command button, Frame, Checkbox, option button, List box, Combo box, Drive List box, directory List box and file list box Formatting controls control arrays, Tab order

UNIT III

Functions and Procedure - Passing arguments by value and reference Arrays, dynamic arrays User defined datatypes symbolic constants using Dialog boxes: Input box, Message box functions - String functions, date and Time function, numeric functions

UNIT IV

Menus: creating menus, adding code to menus, using MDI forms - MDI form basic building MDI form creating MDI Child Forms

UNIT V

Database object (DAO) and properties accessing Recordset objects Move first, MoveLast, MovePrevious and MoveNext methods Begin, Commit and Rollback transaction accessing Microsoft Access files. Active Data Objects (ADO) ADO and OLE DB and ADO Primer What are OLE DB and ADO? ADO object Model Converting DAO Code to Use ADO Connecting to the database Retrieving a recordset Creating a query dynamically Using a parameterized query using action queries - Adding records Editing records closing the database connection.

TEXT BOOKS

1. Gary Cornwell Visual basic 6, Tata McGraw Hill
2. Scott warner Teach yourself Visual basic 6, Tata McGraw-Hill
3. Noel Jerke The Complete Reference, Tata McGraw-Hill
4. Eric A. Smith, Valar Whisler, and Hank Marquis Visual Basic programming

PRACTICAL - VISUAL PROGRAMMING LAB

1. Building simple applications
2. Working with intrinsic controls and ActiveX controls
3. Application with multiple forms
4. Application with dialogs
5. Application with Menus
6. Application using data controls
7. Application using Common Dialogs
8. Drag and Drop Events
9. Students mark sheet processing

CORE 17: PARTIAL DIFFERENTIAL EQUATIONS

| | |
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| UNIT I | Formation of Partial differential equations – by elimination of arbitrary constants – by elimination of arbitrary functions – Singular integral – General integral. |
| UNIT II | Standard types of first order equations – Standard 1,2,3,4 - Equations reducible to standard forms. |
| UNIT III | Lagrange's equations - Charpit's Method. |
| UNIT IV | Linear Partial Differential equation of Second and higher order with constant coefficients. |
| UNIT V | One dimensional wave equations, heat equation, Laplace equation – Simple problems. |
| Prescribed Text (specify sections clearly) | <i>S.Narayanan and T.K. Manicavachagom Pillay , Calculus III Unit 1, 2, 3 : Chapter 4 Transforms and Partial differential equations by Dr. A. Singaravelu Unit 4 : Chapter 3 Unit 5 : Chapter 4</i> |
| Reference Books | <ol style="list-style-type: none"> <i>1. Introductory course in Differential equations , D.A.Murray, Orient Longman (1967)</i> <i>2. Advance Engineering Mathematics , Erwin Kreyzsig, Wiley India Edition (2010)</i> <i>3. Engineering Mathematics , M.K.Venkataraman, National Publications , Chennai (2009)</i> |
| e-Learning Source | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

CORE 18: VECTOR CALCULUS

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| UNIT I | Gradient of a scalar function –properties – directional derivatives – Divergence of a vector function – Curl of a vector function – related problems |
| UNIT II | Vector identities – Line integrals – related problems |
| UNIT III | Surface integrals – Volume integrals |
| UNIT IV | Green’s theorem – Stokes’s theorem – Verification of theorems |
| UNIT V | Gauss divergence theorem – Verification of theorem |
| Prescribed Text(specify sections clearly) | 1. <i>Vector Analysis- P.Duraipandian, LaxmiDuraipandian, Emerald Publishers pvt. Ltd. 1990</i> |
| Reference Books | 1. <i>Engineering Mathematics – II by Dr.M.B.K.Moorthy</i> 2. <i>Vector Analysis, Murray R. Spiegel, Seymour Lipschutz and Dennis Spellman, 2nd Edition, Schaum’s outline, McGraw Hill 2009.</i> |
| e-Learning Source | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

CORE 19: OPERATIONS RESEARCH II

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| UNIT I | Network and Basic Components – Logical sequence – Rules for Network Construction – Critical Path Analysis – Probability Considerations in PERT – Difference between PERT and CPM |
| UNIT II | Deterministic inventory Models <ol style="list-style-type: none"> 1. Uniform rate of demand infinite rate of production, no shortage 2. Uniform rate of demand, Finite rate of replenishment , no shortages 3. Uniform rate of demand, instantaneous Production with shortages 4. Uniform rate of demand, instantaneous Production with shortages and fixed time |
| UNIT III | Queueing Systems – Elements of Queueing systems – Characteristics of queueing Systems – Distribution of Arrivals – Distribution of Inter arrival time – Classification of queueing Models – Deriving Steady state Probabilities for M/M/1 queueing systems - System Measures - Little formula - Deriving Steady state Probabilities for M/M/1 queueing systems with finite capacity - System Measures – Related Problems. |
| UNIT IV | Multi server queueing Model - Deriving Steady state Probabilities for M/M/c queueing system - System Measures – Deriving Steady state Probabilities for M/M/c queueing system with finite capacity - System Measures – Related Problems. |
| UNIT V | Methodology of Simulation – Event type simulation – Generation of random numbers – Monte – Carlo Simulation on Inventory Problems - simulation of Queueing Systems. |
| Prescribed Text(specify sections clearly) | <i>Operations Research by KantiSwarup , P.K.Gupta and Man Mohan (2006)</i> <i>Unit 1: Chapter 21: Sections 21.1 – 21.7</i> <i>Unit 2: Chapter 19 : Sections 19.1 – 19.7</i> <i>Unit3: Chapter 20: Sections 20.1 – 20.8</i> <i>Unit 4: Chapter 20: Sections 20.8</i> <i>Unit 5: Chapter 23: Sections 23.1 – 23.9</i> |
| Reference Books | <ol style="list-style-type: none"> 1. <i>Resource Management Techniques(Operations Research) by V. Sundaresan, K. S. Ganapathy Subramanian, K. Ganesan – A. R. Publications</i> 2. <i>Operations Research: An Introduction, 9th edition, Hamdy A.Taha, Pearson, 2010</i> |
| e-Learning Source | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

CORE 20: COMPLEX ANALYSIS II

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| UNIT I | Contour integrals- - Examples - The Cauchy Goursat's theorem - A preliminary lemma - Proof of Cauchy Goursat's theorem - Simply and multiple connected domains. |
| UNIT II | The Cauchy integral formula -Derivatives of analytic functions - Morera's theorem - Maximum moduli of functions-Liouville's theorem- The fundamental theorem of algebra. |
| UNIT III | Convergence of sequences and series - Taylor series - Observations and examples – Laurent Series (statement only). |
| UNIT IV | Singularities - Definitions and examples - Residues - The residue theorem - The principal part of a function - Residues and poles – zeros and poles of order m. |
| UNIT V | <p>Type 1 : $\int_{-\infty}^{\infty} \frac{p(x)}{q(x)} dx$</p> <p>Type 2 : $\int_{-\infty}^{\infty} \frac{p(x)}{q(x)} \sin ax \, dx$ or $\int_{-\infty}^{\infty} \frac{p(x)}{q(x)} \cos ax \, dx$</p> <p>Type 3 : $\int_0^{2\pi} F(\sin \theta, \cos \theta) d\theta$</p> <p>where p(x) and q(x) are real polynomials with no factor in common and q(x) has no real zeros.</p> |
| Prescribed Text(specify sections clearly) | <p><i>Complex Variables and Applications, James Ward Brown and Ruel V Churchill, McGraw - Hill, International Edition (1990)</i></p> <p>Unit I : Chapter 4:Section 34-38</p> <p>Unit II: Chapter 4 Section 39-43</p> <p>Unit III:Chapter 5:Section 44-48</p> <p>Unit IV:Chapter 6:Section 53-57</p> <p>Unit V:Chapter 6:Section 58-60</p> |
| Reference Books | <ol style="list-style-type: none"> 1. <i>Functions of a Complex variable by B. S. Tyagi – KedarNath Ram NathPublishers(P) Ltd.</i> 2. <i>Complex Analysis by P. Duraipandian and KayalalPachaiappa – S.Chand& Co.</i> 3. <i>S. Ponnusamy, Foundations of Complex analysis, (2nd Edition), Narosa, 2011.</i> 4. <i>V.Karunakaran, Complex Analysis, (2nd Edition), Narosa 2005</i> |
| e-Learning Source | <p>http://ndl.iitkgp.ac.in</p> <p>http://ocw.mit.edu</p> <p>http://mathforum.org</p> |

CORE 21: MATHEMATICAL STATISTICS II

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| UNIT I | Correlation – Properties - Rank Correlation – Bivariate correlation |
| UNIT II | Regression – Properties – Regression equations |
| UNIT III | Sampling – Types of sampling – Parameter and statistics – Test of significance – Null hypothesis – Alternate hypothesis – Procedures in testing of hypothesis – errors in sampling critical region – level of significance |
| UNIT IV | Test of significance of large sampling – Test of significance of single mean – Test of significance of difference between two means – test of significance of proportion – test of significance of difference between two proportions – test of significance of difference between two standard deviation |
| UNIT V | Chi square test (definition) – chi square test for test of goodness of fit – independence of attributes – student's t – distribution (definition) – t-test for single mean – t- test for difference between two means – t–test for dependent sample – t-test for co-efficient of correlation |
| Prescribed Text(specify sections clearly) | <i>Fundamentals of Mathematical Statistics by S.C.Gupta, V.K.Kapoor, Sultan Chand and Sons , 11th edition</i> Unit I : 10.1 to 10.6 Unit II : 10.7 Unit III : 12.1 to 12.7 Unit IV : 12.8 – 12.15 Unit V : 13.1, 13.7, 14.1, 14.2 |
| Reference Books | <ol style="list-style-type: none"> 1. <i>Statistical methods by S.P.Gupta – Sultan Chand.</i> 2. <i>Statistics(Theory and Practice) by R.S.N.Pillai& V. Bagavathy - S.Chand& Co.</i> 3. <i>Robert V. Hogg and Allen T. Craig , Introduction to Mathematical Statistics (Fifth Edition) Pearson Education, 2005</i> |
| e-Learning Source | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

CORE 22: NUMERICAL METHODS

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| UNIT I | Numerical solution of algebraic and transcendental equations – Bolzano’s bisection method - Successive approximation method – Regula falsi method – Newton-Raphson method. |
| UNIT II | Numerical solution of simultaneous linear algebraic equations – Gauss elimination method - Gauss Jordan elimination method – Gauss Seidel iteration method. |
| UNIT III | Finite difference operator - Interpolation – Newton-Gregory forward and backward interpolation – Newton’s divided difference formula – Lagrange’s interpolation formula for uneven intervals – Gauss interpolation formula – Numerical differentiation – Numerical Integration – Trapezoidal rule – Simpson’s 1/3 rd rule. |
| UNIT IV | Numerical solutions of Ordinary differential equations of first and second order – Simultaneous equations – Taylor series method – Picard’s method. |
| UNIT V | Euler’s method – Improved Euler’s Method - Modified Euler’s Method – Runge-Kutta method of second and fourth order – Milne’s predictor corrector method. |
| Prescribed Text(specify sections clearly) | <i>Numerical Method in Science and Engineering, M.K.Venkataraman, National Publication Co, Chennai(2001)</i> Unit 1: Chapter 3 and 4 Unit 2: Chapter 5 Unit 3: Chapter 6 and 9 Unit 4: Chapter 11 (Relevant portions) Unit 5: Chapter 11 (Relevant portions) |
| Reference Books | <i>Computer oriented Numerical Methods by V. Rajaram – PHI(P) Ltd.</i> |
| e-Learning Source | http://ndl.iitkgp.ac.in http://ocw.mit.edu http://mathforum.org |

PROGRAMMING LAB IN NUMERICAL METHODS – PRACTICAL

LIST OF PRACTICALS

1. Write a program to solve algebraic and transcendental equations by Bisection method
2. Write a program to solve algebraic equation and transcendental by Newton-Raphson method
3. Write a program to solve simultaneous linear algebraic equations by Gauss jordan method
4. Write a program to find the inverse of a matrix of order n
5. Write a program to find the determinant of a matrix of order n
6. Write a program to solve simultaneous linear algebraic equations by Gauss Seidal
7. Write a program to evaluate definite integral by Trapezoidal rule
8. Write a program to evaluate definite integral by Simpson's 1/3 rule
9. Write a program to solve first order ODE by Euler's method
10. Write a program to solve the first order ODE by Runge Kutta method

Text Book:

Handmade Lab Manualfor Programming Lab

**e-Learning
Source**<http://ndl.iitkgp.ac.in><http://ocw.mit.edu><http://mathforum.org>

PART III

PHYSICS

B.Sc., B.Ed. LIBERAL OPTIONS**PART III: B.SC.B.ED.****Branch: PHYSICS**

| SEM | No. | CODE | Sub | Name of the course | CCE | UE | Total |
|------|---------------------------|------|----------|---|-----|----|-------|
| I | Core 1 | | Main 1 | Mechanics of particles, rigid bodies and continuous media | 30 | 70 | 100 |
| | Core 2 | | Main 2 | Kinetic Theory and Thermodynamics | 30 | 70 | 100 |
| | Core 3 | | Main 3 | Oscillations, waves and acoustics | 30 | 70 | 100 |
| | Core 4 (Supportive 1) | | Anci 1-1 | Mathematics-I | 30 | 70 | 100 |
| II | Core 5 | | Main 4 | Optics | 30 | 70 | 100 |
| | Core 6 | | Main 5 | Electricity and Magnetism | 30 | 70 | 100 |
| | Core 7 | | Main 6 | Physics-Laboratory-I | | 50 | 50 |
| | | | | Physics-Laboratory-II | | 50 | 50 |
| | Core 8 (Supportive 2) | | Anci 1-2 | Mathematics-II | 30 | 70 | 100 |
| III | Core 9 | | Main 7 | Modern Physics ad Relativity | 30 | 70 | 100 |
| | Core 10 | | Main 8 | Solid State Physics | 30 | 70 | 100 |
| | Core 11 | | Main 9 | Atomic and Molecular Spectroscopy | 30 | 70 | 100 |
| | Core 12 (Supportive 3) | | Anci 2-1 | Chemistry-I | 30 | 70 | 100 |
| IV | Core 13 | | Main 10 | Electronics | 30 | 70 | 100 |
| | Core 14 | | Main 11 | Numerical Methods and Computational Physics | 30 | 70 | 100 |
| | Core 15 | | Main 12 | Physics-Laboratory-III | | 50 | 50 |
| | | | | Physics-Laboratory-IV | | 50 | 50 |
| | Core 16 (Supportive 4) | | Anci 2-2 | Chemistry-II | 30 | 70 | 100 |
| V | Core 17 | | Main 13 | Nuclear Physics | 30 | 70 | 100 |
| | Core 18 | | Main 14 | Quantum Mechanics | 30 | 70 | 100 |
| VI | Core 19 | | Main 15 | Digital Electronics | 30 | 70 | 100 |
| | Core 20 | | Main 16 | Physics-Laboratory-V | | 50 | 50 |
| | | | | Physics-Laboratory-VI | | 50 | 50 |
| VII | Core 21 | | Main 17 | Renewable energy and Energy harvesting | 30 | 70 | 100 |
| VIII | Core 22 | | Main 18 | Physics-Laboratory-VII | | 50 | 50 |
| | | | | Physics-Laboratory-VIII | | 50 | 50 |

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CORE 1: MECHANICS OF PARTICLES, RIGID BODIES and CONTINUOUS MEDIA

Unit-I: Laws of Motion:

Vector algebra – Scalar and vector products – Derivatives of a vector with respect to a parameter limited to cartesian co-ordinates and plane polar co-ordinates – Ordinary differential equations: First order homogenous differential equations and second order homogenous differential equations with constant coefficients – Newton's Laws of Motion – Angular Velocity – Angular Momentum and Torque – Law of Conservation of Angular Momentum.

Unit-II : Gravitation :

Newton's Law of Gravitation – Kepler's Laws – Basic ideas of Global Positioning System (GPS). gravitational Potential and Field – Potential due to Uniform solid sphere and Spherical Shell.

Unit-III : Dynamics of Rigid Bodies:

Degrees of freedom -- Moment of Inertia – Radius of Gyration – Theorems of Moment of Inertia – Moment of Inertia of a circular disc – Solid sphere and Hollow sphere – Moment of Inertia of a Diatomic molecule – Kinetic Energy of rotations- Rotational Energy states of diatomic molecules. Precessional motion(qualitative)--Gyroscope. Rotational frames – Centrifugal and Coriolis forces – Foucault pendulum – Dynamics of system of particles – Centre of Mass – Collision: Direct impact of two smooth spheres, Determination of final velocities and Loss of kinetic energy.

UNIT-IV: ELASTICITY, VISCOSITY AND SURFACE TENSION:

Moduli of elasticity – work done in a strain – Torsional Pendulum – Determination of Rigidity Modulus – Bending of beams – bending moment - Young's Modulus – Uniform and non-uniform bending – Equation of continuity – Energy of a liquid-Euler's equation – Bernoulli's theorem – Applications. Critical velocity, Poiseuille's formulae – co-efficient of viscosity--Terminal Velocity and Stokes formula – Variation of Viscosity with temperature and pressure – Surface Tension – Molecular interpretation – Drop weight method.

Reference Books.

1. University Physics FW sears, M.W Zemansky and H.D Young 13 e, 1986, Addison Wesley
2. Mechanics : Berkeley Physics Physics course Volume 1: Charles Kittel et.al, 2007, Tata McGraw Hill.
3. Physics – Resnick, Halliday and Walker 9 e, 2010 Wiley.

Text Books:

1. D.S. Mathur, Mechanics (S. Chand & Co.)
2. D.S. Mathur, Elements of Properties of matter (S. Chand & Co.)

CORE 2: KINETIC THEORY AND THERMODYNAMICS**UNIT-I : Laws of Thermodynamics:**

Thermodynamic Description of system: Zeroth Law of thermodynamics and temperature. First law and internal energy, conversion of heat into work, Various Thermo dynamical Processes, Applications of First Law: General Relation between CP & CV, Work Done during Isothermal and Adiabatic Processes, Compressibility & Expansion Coefficient, Reversible & irreversible processes, Second law & Entropy, Carnot's cycle & theorem, Entropy changes in reversible & irreversible processes, Entropy- temperature diagrams, Third law of thermodynamics, Unattainability of absolute zero.

UNIT-II: Thermodynamic Potentials: Enthalpy, Gibbs, Helmholtz and Internal Energy functions, Maxwell's relations & applications - Joule-Thompson Effect, Clausius-Clapeyron Equation, Expression for $(C_P - C_V)$, C_P/C_V , TdS equations. Kinetic Theory of Gases: Derivation of Maxwell's law of distribution of velocities and its experimental verification, Mean free path (Zeroth Order), Transport Phenomena: Viscosity, Conduction and Diffusion (for vertical case), Law of equipartition of energy (no derivation) and its applications to specific heat of gases; mono-atomic and diatomic gases.

UNIT-III: Theory of Radiation: Blackbody radiation, Spectral distribution, Concept of Energy Density, Derivation of Planck's law, Deduction of Wien's distribution law, Rayleigh Jeans Law, Stefan Boltzmann Law and Wien's displacement law from Planck's law.

UNIT-IV: Statistical Mechanics: Phase space, Macrostate and Microstate, Entropy and Thermodynamic probability, Maxwell-Boltzmann law - distribution of velocity - Quantum statistics - Fermi-Dirac distribution law - electron gas - Bose-Einstein distribution law - photon gas - comparison of three statistics.

REFERENCE BOOKS:

1. Thermal Physics, S. Garg, R. Bansal and C. Ghosh, 1993, Tata McGraw-Hill.
2. A Treatise on Heat, Meghnad Saha, and B.N. Srivastava, 1969, Indian Press.
3. Thermodynamics, Enrico Fermi, 1956, Courier Dover Publications.
4. Heat and Thermodynamics, M.W.Zemasky and R. Dittman, 1981, McGraw Hill 13
5. Thermodynamics, Kinetic theory & Statistical thermodynamics, F.W.Sears & G.L.Salinger. 1988, Narosa
6. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
7. Thermal Physics, A. Kumar and S.P. Taneja, 2014, R. chand Publication

TEXT BOOKS

1. Brijlal and Subramanian, Heat and thermodynamics, (S.Chand & Co)
2. Mathur, Heat and thermodynamics, (S.Chand & Co).
3. J B.Rajam and CL.Arrora, A Textbook of Heat and thermodynamics, (S.Chand & Co)
4. A.B.Gupta and H.Roy, Thermal Physics, (Allied Books, New Delhi)

CORE 3: OSCILLATIONS, WAVES AND ACOUSTICS**UNIT-I**

Superposition of Two Harmonic oscillations: Two collinear harmonic oscillators, Linearity and Superposition Principle. (1) Oscillations having equal frequencies and (2) Oscillations having different frequencies (Beats), Two perpendicular harmonic oscillators, Graphical and Analytical Methods. Lissajous Figures with equal and unequal frequency and their uses.

UNIT – II

Waves Motion- General: Transverse waves on a string. Travelling and standing waves on a string. Normal Modes of a string. Group velocity, Phase velocity. Plane waves. Spherical waves, Wave intensity.

UNIT – III

Sound: Simple harmonic motion - forced vibrations and resonance - Fourier's Theorem- Application to saw tooth wave and square wave - Wave intensity. Speed of longitudinal waves in a fluid - velocity of sound in air - dependence on pressure and temperature - normal mode vibrations of air columns.

UNIT-IV

Applied Acoustics: Intensity and loudness of sound - Decibels - Intensity levels - musical notes - musical scale. Acoustics of buildings: Reverberation and time of reverberation - Absorption coefficient
- Sabine's formula - measurement of reverberation time - Acoustic aspects of halls and auditorium.

Reference Books:

1. Vibrations and Waves, I.G. Main, (Cambridge University press)
2. The Physics of Vibrations and Waves, H J Pain, (Wiley ELBS, 1976)
3. The mathematics of waves and vibrations, R K Ghosh, (Macmillan, 1975)
4. Oscillations and waves, A P French, (MIT Introductory Physics Series)
5. Vibrations and Waves, S.P.Puri, (Tata McGraw Hill)

Text Books:

1. Bajaj, Waves and Oscillations (Tata McGraw Hill)
2. D.P. Khandelwal, Oscillations and Waves (Himalaya Pub. House, Bombay)
3. M. Ghosh, A text book of Sound (S.Chand & Co.)

CORE 4: (SUPPORTIVE 1) MATHEMATICS I**UNIT-1 (ALGEBRA)**

Matrices - Rank of a matrices - Consistency of a system of linear non-homogeneous equations (statement only) - Simple problems - Characteristic roots of a square matrix - Evaluation of Eigen values and Eigen vectors of a square matrix - Cayley Hamilton theorem (Statement only) - Simple problems.

UNIT -2 (TRIGNOMETRY)

De Moivre's theorem - Expansions of $\cos(n\theta)$, $\sin(n\theta)$ and $\tan(n\theta)$ - Powers of sines and cosines of θ in terms of functions of multiples of θ . Expansions of $\sin(\theta)$, $\cos(\theta)$ in a series of ascending powers of θ - Limits and approximations.

UNIT-3 (FUNCTIONS OF COMPLEX VARIABLE)

Analytic functions - Cauchy Riemann equations - derivation and simple problems - Harmonic functions

UNIT-4 (VECTOR CALCULUS)

Vector differentiations - Scalar point functions - Vector point functions - Derivatives of a Vector point functions, sum of two vector point functions, product of scalar and Vector point function, Vector product - The vector operator Del, Gradient, Divergence and Curl - Simple application problems involving Cartesians - Laplace Operator.

UNIT - 5 (POLAR CO-ORDINATES)

Angle between radius and vector and tangent - Angle of intersection of two curves - Pedal equations of a curve

Text books:

1. S. Narayanan and T.K. Manicavachagom pillai, Calculus, S. Viswanathan Publishers
2. S. Narayan, Trigonometry, S. Viswanathan Publishers, 2012
3. P. DuraiPandian, Complex Variable, Emerald Publishers, 1979
4. P. DuraiPandian, Vector Calculus, 1984
5. Vittal and Malini, Allied Mathematics, V.Margham Publishers, 1997

Reference Books:

1. George B.Thomas, Maurice D.Weir and Joel Hass, Thomas' Calculus 12'h Edition, Pearson Education, 2015
2. Er.vin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9th Edition, 2011
3. Gilbert Strang, Linear Algebra and Its Applications, CENGAGE Learning, 2007.

CORE 5: OPTICS

UNIT-I : Ray Optics: Fermat's principle and its applications: Principle of extreme path, Proof of laws of reflection and refraction, paraxial approximation, matrix method in paraxial optics, ABCD matrix.

UNIT-II: Reflection and refraction:

Snell's law of reflection and refraction, reflection and refraction at spherical surfaces: formula for refraction at single spherical surface, sign convention. Thick lens: matrix methods in paraxial optics, basic ideas of unit planes and nodal planes, Cardinal points of an optical system, general relationship, combination of thin lenses.

Aberration in images: chromatic aberrations; achromatic combination of lenses in contact and separated lenses. Monochromatic aberrations and their reduction. Properties of wavefront, Huygen's principle.

UNIT-III : Interference and diffraction:

Interference of light: The principle of superposition; two slit interference, coherence requirements for the sources, localized fringes in thin films, transition from fringes of equal thickness to those of equal inclination Michelson interferometer; its uses for determination of wavelength, wavelength difference and standardization of the meter. Intensity distribution in multiple beam interference; Fabry - Perot interferometer and concept of finesse.

Fresnel diffraction: Half-period zones, circular apertures and obstacles, straight edge, explanation of rectilinear propagation. Cornu Spiral and its applications Babinet's Principle.

Fraunhofer diffraction:

Diffraction at a single slit, a circular aperture and a circular disc. Resolution of images; Rayleigh criterion, resolving power of a telescope and a microscope -Outline of phase contrast microscope (no derivations). Diffraction grating: Diffraction at N parallel slits; plane diffraction grating, resolving power of gratings and prisms.

UNIT-IV: Polarization Optics: Electromagnetic nature of light. Transverse nature of light waves. Plane polarized light – production and analysis. Circular and elliptical polarization. Double refraction, interference of polarized light, phase retardation plates (quarter wave and half wave plates).

REFERENCE BOOKS:

1. Optics, K D Meller, (Oxford University Press)
2. Optics, Smith and Thomson, (John Wiley and Sons, 1980)
3. Geometrical and Physical Optics, R S Longhurst, (Longmans, 1966)
4. Optics, A.N.Matveev, (Mir Publishers 1988)
5. Introduction to Classical and Modern Optics, Jurger R. Meyer –Arednt, (Prentice Hall)

TEXT BOOKS:

1. Ajoy Ghatak, Introduction to Modern Optics (Tata McGraw Hill)
2. Brijilal and Subramanian, Optics ((S.Chand & Co).
3. S.L. Kakani and H.C. Bhandrai, Optics (S.Chand & Co)
4. Jenkins and White, "Fundamentals of Optics" (McGraw-Hill)
5. B.K. Mathur, Principles of Optics, 1995, Gopal Printing.

CORE 6: ELECTRICITY AND MAGNETISM

UNIT-I: Vector Analysis: Review of vector algebra (Scalar and Vector product), gradient, divergence, Curl and their significance, Vector Integration, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors (statement only).

UNIT-II: Electrostatics: Electrostatic Field, electric flux, Gauss's theorem of electrostatics. Applications of Gauss theorem- Electric field due to point charge, infinite line of charge, uniformly charged spherical shell and solid sphere, plane charged sheet, charged conductor. Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere. Calculation of electric field from potential. Capacitance of an isolated spherical conductor. Parallel plate, spherical and cylindrical condenser. Energy per unit volume in electrostatic field. Dielectric medium, Polarisation, Displacement vector. Gauss's theorem in dielectrics. Parallel plate capacitor completely filled with dielectric.

UNIT-III : Magnetism: Magnetostatics: Biot-Savart's law & its applications- straight conductor, circular coil, solenoid carrying current. Divergence and curl of magnetic field. Magnetic vector potential. Ampere's circuital law. Magnetic properties of materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. Brief introduction of dia-, para- and ferro-magnetic materials.

UNIT-IV: Maxwell's equations and Electromagnetic wave propagation: Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils. Energy stored in magnetic field, Equation of continuity of current, Displacement current, Maxwell's equations, Poynting vector, energy density in electromagnetic field, electromagnetic wave propagation through vacuum and isotropic dielectric medium, transverse nature of EM waves, polarization.

REFERENCE BOOKS:

1. Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education..
2. Electricity and Magnetism, J.H. Fewkes & J. Yarwood. Vol. I, 1991, Oxford Univ.Press.
3. Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.
4. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.

TEXT BOOKS:

1. K K Tewari, Electricity and Magnetism (S Chand and Co.)
2. Brijlal and Subramaniam, Electricity and Magnetism (S Chand and Co.)
3. S. Mahajan and A. A. Rangawala, Electricity and Magnetism, (Tata Me Graw - Hill)
4. Khare and Srivastava, Electricity and Magnetism, (Atmaram and sons, New Delhi.)

CORE 7: PHYSICS LABORATORY**PHYSICS LABORATORY – I**

Choose any 8 experiments from the list given below

List of Experiments

1. Compound pendulum - determination of g , radius of gyration and moment of inertia
2. Young's modulus - non-uniform bending – Scale and Telescope.
3. Surface tension of a liquid and interfacial surface tension (water & kerosene) - method of drops.
4. Rigidity modulus - torsional oscillations without masses.
5. Specific heat capacity of a liquid and emissivity of a surface - method of cooling.
6. Thermal conductivity of a bad conductor- Lee's disc method.
7. Sonometer - determination of frequency and verification of laws of transverse vibrations.
8. Spectrometer- refractive index of a liquid - hollow prism.
9. P.O. box - resistivity and verification of laws of resistance.
10. Potentiometer - calibration of low range voltmeter (0 - 1.5 V).
11. Terminal velocity for bodies falling through a fluid
12. Jolly's constant volume air thermometer - determination of melting point of wax
13. Computer simulation of motion of equation of motion for a system of particles
14. Computer simulation of damped oscillator.
15. Computer simulation of spherical body falling in a viscous liquid.
16. Computer simulation of motion of molecular rotations as rigid bodies

Text Books

1. Practical Physics C.C Ouseph, V.J.Rao and V.Vijayendran
2. Practical Physics M.N.Srinivasan, Sultan son Pub.
3. D P Khandelwal, Laboratory Manual of Physics for UG classes (Vani Pub. House, New Delhi)
4. B Saraf et al, Physics through Experiments, Vol. 1, Mechanical Systems, (Vikas Publication House. New Delhi)
5. Verma, Ahluwalia, Sharma, Computational Physics, an Introduction (New Age Int. (P) Ltd.)

Reference Book

1. V Y Rajopadhye and V L Purohit, Text book of experimental Physics

PHYSICS LABORATORY – II

Choose any 8 experiments from the list given below

1. Young's modulus - cantilever - pin & microscope.
2. Melde's apparatus - determination of frequency.
3. Spectrometer –Determination N - minimum deviation method.
4. P.O. box - temperature coefficient of the material of a coil of wire.
5. Potentiometer - calibration of ammeter (0-1.5 amps).
6. Emf of thermocouple using digital thermometer
7. Study of characteristics of a thermistor
8. Stoke's method of viscosity determination
9. Study of laws of parallel and perpendicular axes for estimation of moment of inertia
10. Kater's pendulum - determination of acceleration due to gravity at a place
11. Variation of period of oscillations of a spring (or rubber band) with mass and spring constant
12. Oscillations on a bifilar suspension
13. Y - Searle's method for determining Y, n and η of a material.
14. Computer simulation of motion of Study of coupled oscillators.
15. Computer simulation of analyzing a square wave-form for its harmonic components.
16. Computer simulation of Generation of phase space plots of simple harmonic oscillator
17. Computer simulation of motion of a single pulse.

Text Books

1. Practical Physics C.C Ouseph, V.J.Rao and V.Vijayendran
2. Practical Physics M.N.Srinivasan, Sultan son Pubs
3. D P Khandelwal, Laboratory Manual of Physics for UG classes (Vani Pub. House, New Delhi)
4. B Saraf et al, Physics through Experiments, Vol. 1, Mechanical Systems, (Vikas Publication House. New Delhi)
5. Verma, Ahluwalia, Sharma, Computational Physics, an Introduction (New Age Int. (P) Ltd.)

Reference Book

1. V Y Rajopadhye and V L Purohit, Text book of experimental Physics

CORE 8: (SUPPORTIVE 2) MATHEMATICS II**UNIT -1 (INTEGRAL CALCULUS)**

Evaluation of $\int e^{ax} \cos(bx) dx$ and $\int e^{ax} \sin(bx) dx$, - Bernoulli's formula for integration by parts – Definite integrals – reduction formulae – Related definite integrals – properties – reduction formula for $\int e^{ax} x^n dx$, $\int \sin^n x dx$ and $\int \cos^n x dx$ (n is a positive integer) - Evaluation

of $\int_0^{\infty} e^{-x} x^n dx$, $\int_0^{\pi/2} \sin^n x dx$, $\int_0^{\pi/2} \cos^n x dx$, - Rule of writing down

$\int_0^{\pi/2} \sin^m x \cos^n x dx$ and illustrations

UNIT -2 (VECTOR INTEGRATION)

Gauss Divergence theorem and Stokes's theorem (Statement only) – Simple problems

UNIT-3 (FOURIER SERIES)

Definition – Finding Fourier co-efficient for a given period function with period 2π -

Odd and Even functions – Half range series

UNIT-4 (ORDINARY DIFFERENTIAL EQUATIONS)

Equations of the first order but not of the first degree – Equations solvable for dy/dx , - equations solvable for y - Equations Solvable for x - Clairaut's form (simple cases) – Linear equations with constant coefficients – Evaluation of the particular integral of the equation – e^x , $\sin(ax)$, $\cos(ax)$, x^k , $e^{ax}f(x)$

UNIT – 5 (LAPLACE TRANSFORM)

Definitions – Condition for the existence of Laplace transform – Laplace transform of 1 , e^{at} , e^{-at} , $\cos(at)$, $\sin(at)$, $\sinh(at)$, $\cosh(at)$ and t^n - Simple problems – Laplace transform of the derivatives – Laplace transform of the integral – first shifting theorem – change of scale of property – Laplace transform of function multiplied by t , divisible by t – inverse Laplace transform – solution of ordinary differential equations using Laplace transforms

Text books:

1. S. Narayanan and T.K. Manicavachagom pillai, Calculus, S. Viswanathan Publishers
2. P. DuraiPandian, Vector Calculus, 1984
3. Vittal and Malini, Allied Mathematics, V.Margham Publishers, 1997

Reference Books:

1. George B.Thomas, Maurice D.Weir and Joel Hass, Thomas' Calculus 12th Edition, Pearson Education, 2015
2. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9th Edition, 2011

CORE 9: MODERN PHYSICS AND RELATIVITY**Unit I**

Planck's quantum, Planck's constant and light as collection of photons; Photo – electric effect and Compton scattering. De Broglie wavelength and matter waves; Davission-Germer experiment Problems with Rutherford model – instability of atoms and observation of discrete atomic spectra; Bohr's quantization rule and Atomic stability; calculation of energy levels for hydrogen atoms and their spectra.

Unit II

Position measurement – gamma ray microscope thought experiment; Wave – particle duality, Heisenberg uncertainty principle – impossibility of a particle following a trajectory; estimating minimum energy; Energy – time uncertainty principle. Two slit interference experiment with photons, atoms and particles; linear superposition principle as a consequence; matter waves and wave amplitude;

Unit III

Schrodinger equation for non – relativistic particles; momentum and energy operators; stationary states; physical interpretation of wave equation, probabilities and normalization; probability and probability current densities in one dimension, simple one dimensional problems.

Unit IV

Special Theory of Relativity: Constancy of speed of light. Postulates of Special theory of Relativity. Length contraction. Relativistic addition of velocities.

Reference Books:

1. Concepts of Modern Physics, Arthur Beiser, 2009, McGraw – Hill.
2. Modern Physics, John R. Taylor, Chris D Zafiratos, Michael A Dubson, 2009, PHI
3. Modern Physics, R.A.Serway, C.J.Moses and C.A.Moyer, 2005, Cengage Learning.
4. Modern Physics, G.Kaur and G.R.Pickrell, 2014, McGraw – Hill.
5. Physics – Resnick, Halliday and Walker 9th edition, Wiley.

Text Books:

1. Quantum Mechanics, Gupta, Kumar, Sharma Jai Prakash Nath Pub. 31st Ed. 2012.
2. Essentials of Quantum Mechanics, B.N.Srivastava, Pragathi Prakasan, 2014.
3. Properties of Matter, Brijlal, S. Chand.

CORE 10: SOLID STATE PHYSICS

UNIT-I: Basics of Crystallography: Crystal geometry: Crystal lattice; crystal planes and Miller indices, unit cells. Typical crystal structures; coordination number, packing fraction. Symmetry elements; rotation, inversion and reflection, basics of point groups and crystal classes, space groups, reciprocal lattice Crystallography: Diffraction of X-rays by a crystal lattice. Laue's formulation of X-ray diffraction, Laue spots rotating crystal.

UNIT-II : Bonding and Lattice Vibrations Types of bonding in solids: Covalent, Ionic, metallic and Vander Waals bonding, hydrogen bond. Lattice Vibrations: Elastic and atomic force constants; Dynamics of chain of two types of atoms, optical and acoustic modes, interaction of light with ionic crystals. Einstein's and Debye's theories of specific heats of solids.

UNIT-III : Electrical Conduction in Solids: Conduction in metals: Drude's theory, DC conductivity, Hall effect and magneto resistance, AC conductivity, plasma frequency, thermal conductivity of metals, Fermi-Dirac distribution, thermal properties of free-electron gas. Conduction in semiconductor: Bands in solids; metals, insulators and semiconductor – electrons and holes-effective mass, donor and acceptor impurity levels.

UNIT –IV : Magnetic Properties of Solids: Magnetism: Diamagnetism, Paramagnetism due to free ions and conduction electron Curie's law, ferromagnetism, domains, hysteresis loop, outline of antiferro- and ferrimagnetism, ferrites. Superconductivity: Zero resistivity; critical temperature, critical B field. Meissner effect Type I and Type II super conductors, specific heat and thermal conductivity.

TEXTBOOKS

1. C Kittel, Introduction to Solid State Physics (Wiley Eastern , Ed., 1976)
2. S.O.Pillai, Solid State Physics (New Age International Ltd, New Delhi).
3. J.P.Srivastava, Elements of Solid State Physics, 2nd Ed.(PHI, 2007)
4. J.S. Blackmore, Solid State Physics(Cambridge University Press, 1985)
5. L.V. Azaroff, Introduction to Solids, Tata McGraw Hill, 1987)
6. Saxena, Gupta and Saxena, Fundamentals of Solid State Physics, 12th Ed. (Pragathi Prakasan).

REFERENCEBOOKS

1. Mermin and Ashcroft, Solid State Physics (New York, Holt, Rinehart and Winston)
2. W.A.Harrison, Electronic structure and the properties of solids(Freeman, 1980)
3. JP. Mc Kelvey, Solid state and semiconductor physics(Krieger, 1982)
4. HM Bosenberg, The Solid State"(Oxford University press, 1979)
5. SL Altmann, Band Theory of Metals, The Elements (Pergamon Press, 1970)
6. A J. Dekker, Solid State Physics(Prentice-Hall, 1957)

CORE 11: ATOMIC AND MOLECULAR SPECTROSCOPY**UNIT-I**

Atomic and X-ray Spectra: Atomic spectra, Coupling schemes, L-S, J-J couplings, Spectral terms, s,p,d,f, notation, selection rules. Spectra of mono-and di-valent atoms: Doublet fine structure of hydrogen lines; screening constants for mono valent atoms, series limits, doublet structure of alkali spectrum. X-ray spectra: The continuum X-ray spectrum; Duane and Hunt limit. Characteristic X-rays; Moseley's law, doublet fine structure, X-ray absorption spectra, absorption edges.

UNIT –II

Effect of magnetic field on energy levels: Angular momentum and magnetic moment of electron due to orbital motion Gyromagnetic ratios for orbital and spin motions; Bohr magneton, vector model, Lande g factor, Normal and anomalous Zeeman effects with reference to sodium D-lines

Unit III

Rotation and Vibration of Molecules: Classification of molecules as various tops, Rotational energy levels of diatomic molecules (no derivation), inter nuclear distance. Pure rotation spectra; selection rules, isotope effects on rotational energies. Vibrational energy levels, force constants, anharmonicity, dissociation energy, Spectra of diatomic molecules: Vibration-rotation spectra; selection rules, P, Q, and R branches.

Electronic levels, Raman Effect: Sharing of electrons; formation of molecular orbitals, molecular orbitals in H^+ ion, MO theory of H_2 molecule, diatomic molecular orbitals, molecular orbital energy level diagram. Electronic band systems, sequences and progressions, Franck-Condon principle. Raman effect: Stokes and anti-Stokes lines, quantum theory of Raman effect, selection rules in Raman and IR spectra.

UNIT-IV

Laser System, Types and Applications: Origin of spectral width, Schallow-Townes limit (only statement), Purity of a spectral line; Coherence: spatial and temporal, Einstein's A and B coefficients; Conditions for laser action; existence of a metastable state, population inversion by pumping and cavity resonance condition. Ruby Laser, He-Ne Laser, Dye laser; Applications of lasers: Laser communication, Medical applications and Material processing. Elementary idea of second harmonic generation.

TEXT BOOKS

1. J. B. Rajam, Atomic Physics(S. Chand & Co)
2. Beiser, Concepts of Modern Physics,(McGraw Hill International)
3. Richtmeyer et al, Introduction to Modern Physics(Tata Mc Graw Hill, India)
4. Murugesan, Modern Physics, (S.Chand & Co.)
5. C. N. Banwell, Fundamentals of molecular spectroscopy,(Tata-Mc-Graw Hill)
6. G.Aruldas, Molecular Structure & Spectroscopy,(Prentice-Hall of India)
7. M. N. Avadhanulu, An Introduction to Lasers (S.Chand and Co)

REFERENCE BOOKS

1. Walker and Straughn; Spectroscopy-Vol 1,11,III,(Wiely)
2. G Herzberg; Atomic spectra and atomic structure,(Courier Dover Publication)
3. R C Johnson, Introduction to Molecular spectra,(Methuen)
4. S.P.Khare, Modem Physics,(Rastogi Publications).
5. BB Laud; Lasers and Non-linear Optics, (Wiley Eastern, 1985)
6. G Herzberg; Molecular spectra and Molecular structure, (prentice Hall, New York)
7. R C Johnson; An Introduction to Molecular spectra (Methuen).

CORE 12: (SUPPORTIVE 3) CHEMISTRY I**Unit 1**

Intermolecular forces - Vanderwall and London forces. Liquid state theory and properties of liquids, liquid-crystal formation and applications. Solid state- forces in solids- covalent, ionic, metallic, and Vanderwall's, Lattice energy.

Unit 2

Theory of semi-conductors and its application. Bond properties- types of hybridization, bond length, bond order, bond strength. Resonance energy- resonance strength of multiple bonded species Carbon Monoxide, Nitrous Oxide, phenol, benzaldehyde, aniline.

Unit 3

Covalent bond- Orbital Overlap- hybridization, geometry of organic molecules- methane, ethylene, acetylene, benzene. Electron displacement effects, inductive, resonance, hyperconjugative and steric effects-their effect on properties of compounds. Stereoisomerism- Optical isomerism-optical activity, lactic acid, tartaric acid, racemization, resolution.

Unit 4:

Aromatic compounds-electrophilic substitution in benzene, mechanism of nitration, halogenation, Alkylation and Acylation. Preparation, properties and uses of Naphthalene, Furan, Thiophene, Pyrrole, Pyridine, Chloroform and Carbon Tetrachloride.

Unit5:

Keto-enol tautomerism. Geometric isomerization, maleic acid and fumaric acid. Rotation around single bond proffered rotations, conformers of ethane, propane, n- butane and cyclohexane. Axial and equatorial bonds.

Text books:

1. P. W. Atkins Physical Chemistry, 6th ed, 1998.
2. Wade, L.G. Organic Chemistry, Pearson Education, 5th ed, 2003.
3. M. Ladd. Introduction to Physical Chemistry, Cambridge, 1998.

CHEMISTRY PRACTICALS I

1. Estimation of sodium hydroxide using sodium carbonate standard.
2. Estimation of hydrochloric acid using oxalic acid standard.
3. Estimation of borax using sodium carbonate standard.
4. Estimation of ferrous sulphate using Mohrs salt standard.
5. Estimation of oxalic acid using ferrous sulphate standard.
6. Preparation of the following inorganic compounds: ferrous ammonium sulphate, manganous sulphate, sodium thiosulphate.

CORE 13: ELECTRONICS

UNIT-I : Current density and current. Non-steady currents and continuity equation. Kirchoffs laws. Network theorems and their applications. Non-Ohmic circuitry, thermistor. Varying current: Rise and decay of currents in LR, CR circuits and LCR circuits - resonance. Time constant. Integrating and differentiating circuits.

Unit II: Junction diode, special diodes, and their general uses: Network theorems and their applications, Classification of Conductors, insulators and semi-conductors on the basis of energy band diagram-Intrinsic and extrinsic semiconductors. P-type and N-type semi-conductors. Formation of PN junction diode – Forward and reverse characteristics – Diode resistance-Effect of temperature on extrinsic semiconductors, Halfwave, Centre tap and Bridge rectifiers, Expression for average dc voltages, qualitative ideas of filters, clipping and clamping circuits-their general applications. Zener diode – Volt – ampere characteristics-Avalanche and Zener break down mechanisms - Zener voltage. Simple voltage regulator circuit using zener diode. LED, Photodiode.

UNIT-III: Bipolar junction transistors, biasing and hybrid parameters: Construction of NPN and PNP transistors – their operation modes-operation of NPN and PNP transistors-CB, CE and CC configurations and their biasing, Input, Output and transfer characteristics of BJTs in CB and CE modes -Active, saturation and cut-off regions -Bias stability- Load line analysis- operating point.

The need of transistor biasing for faithful amplifications. Variations of transistor parameters – stability factor and stabilization – Thermal runaway-Methods of transistor biasing –Base bias with emitter feedback-Voltage divider bias, h-parameters of a transistor and their notations-hybrid equivalent circuits for CE, CB and CC mode transistors. Single stage RC coupled amplifier, calculation of mid frequency gain using h-parameters, frequency response curve (qualitative).

JFETS and MOSFETS: Construction of n-channel and p-channel JFETs-operation of n-channel JFET

– Drain characteristics of n-channel JFET-Transfer characteristics – parameters of JFET-comparison between BJT and JFET. JFET biasing circuits. MOSFETS, characteristics and parameters.

UNIT-IV: Operational amplifiers and oscillators: Principles of operational amplifiers, offset parameters, differential gain, CMRR, applications of op-amp: as inverting and non-inverting amplifiers, summing amplifier, difference amplifier, differentiator, integrator, and comparator. Concept of feedback mechanism, oscillators, Barkhausen criterion, RC oscillators (Wein-bridge & Phase-shift), Multivibrators.

TEXTBOOKS

1. R.S. Sedha, A textbook of applied electronics, 2005 (S. Chand & Co.,)
2. V.K.Metha, Principles of electronics, 2005 (S. Chand & Co.,)
3. Millmann & Halkias, Integrated Electronics (Tata McGraw Hill.)
4. M.K.Bagde, S.P. Singh, Element of Electronics(S.Chand & Co.)
5. D.Chathopadhyay & Rakshit, Electronic Fundamental and Applications (New Age International)
6. S. Salivahanan and N. Suresh Kumar, Electronic devices and electronic circuits, 2004 (TMH)
7. Malvino, Electronic principles, 6 Edition(TMh).

REFERENCEBOOKS

1. B.L.Theraja, Basic Electronics, 2005 (S. Chand & Co.,)
2. G.Nagarajan, Electronic devices, 2005 (Lakshmi Publications)
3. U.A.Bakshi and A.P.Godso, Electron devices, 2005 (Technical Publications, Pune).
4. Millman and Halkias, Electronic devices and Circuits, (McGraw Hill),
5. Horowitz and Hill, Art of Electronics(Cambridge University Press)

CORE 14: NUMERICAL METHODS AND COMPUTATIONAL PHYSICS**Unit I**

Numerical Methods: Introduction-Straight line fitting (group average and least square methods)- fitting a parabola (least square methods) – successive approximation method – condition for the convergence- order of convergence – Regula – Falsi method – Newton Rapson method-criterion for the convergence
– order of convergence – Elimination method-Gauss – Jordan method

UNIT-II

Numerical Differentiation: Numerical Differentiation – forward and backward-Integration: - Trapezoidal – Interpolation – Lagrangian - unequal-Newton’s forward interpolation formula (equal intervals) - Matrix: Solving the simultaneous equations – eigen value of a matrix by power methods.

UNIT-III

COMPUTER & FORTRAN: Computers: Introduction – input & output devices-CPU, Applications – languages & packages (outline only). Fortran: Constants, variables, operators – mode of expressions – arithmetic to FORTRAN expression – Hierarchy of operators, Statements – conditional and unconditional - i/p & o/p Statements – executable Statements-format and go to Statements – computed goto – arithmetic IF – logical IF, Built- in-functions, Do statement – simple Do loop-function subprogram Subroutine subprogram (Introduction)

UNIT -IV

Programming: Algorithm – Flow Chart-Simple programs using FORTRAN: Area and volume of geometrical structures, sum of series, product of ‘n’ numbers, Straight line, ellipse, parabola and their slope.

TEXT BOOKS:

1. M. K. Venkatraman, Numerical methods in Sci. & Eng.,(National Pub. Co.)
2. Santosh Kumar, Computer based Numerical & Statistical techniques,(S. Chand & Co, 2008)
3. Rajaraman, Computer Programming in Fortran 90and 95, (Prentice Hall of India)
4. Kandasamy, Thilagavathy & Gunavathy, Numerical methods,(S.Chand& Co., 2007)

REFERENCE BOOKS:

1. B.S.Grewal, Numerical methods in Engineering & Science with Programes in FORTRAN77, C & C++, (Khanna Pub. VIIedition, 2005)
2. Rajaraman, Computer Programing in FORTRAN77, (Prentice Hall of India, IV edition, 2002)
3. James B. Scarborough, Numerical Mathematical Analysis, (Oxford and IBH, New Delhi, 1971)
4. S.S.Sastry, Elementary Numerical Analysis,(PHI).

CORE 15: PHYSICS LABORATORY

PHYSICS LABORATORY – III

Choose any 8 experiments from the list given below

LIST OF EXPERIMENTS.

1. Young's modulus - Uniform bending - scale & telescope.
2. Rigidity modulus – Torsional pendulum with equal masses
3. Specific latent heat of fusion of ice.
4. Spectrometer- determination of wavelength - Minimum deviation method.
5. Spectrometer - i-d curve.
6. μ and BH using deflection and vibration magnetometer $\tan A$ and $\tan B$ position.
7. Carry-Foster's bridge - Resistivity of the material of the coil of wire.
8. Potentiometer - Internal resistance of a cell.
9. B.G- Comparison of emf of two cells
10. Determining the focal length of high power microscope objective
11. Study of interference fringes bi-prism arrangements
12. Study of polarization of light by simple reflection
13. Study of the rise and decay of current in a RC circuit
14. Study of the impedance of an inductor at varying frequencies to measure R and L
15. Computer simulation circuit analysis using Kirchhoff's laws.
16. Computer simulation of double slit interference

TEXTBOOKS

1. Practical Physics C.C Ouseph, V.J.Rao and V.Vijayendran
2. Practical Physics M.N.Srinivasan, Sultan son Pubs
3. D P Khandelwal, A Laboratory Manual in Physics for Undergraduate Students (Vani Publication, New Delhi)
4. B Saraf et al. "Physics through Experiments, Vol. II., EMF constant and varying, (Vikas Publications, New Delhi)
5. V Y Rajopadhye and V L Purohit, Text book of experimental Physics
6. Verma, Ahluwalia, Sharma, Computational Physics, an Introduction (New Age Int. (P) Ltd.)

REFERENCE BOOKS

1. Olon, Experiments in Modern Physics.
2. Adrian C. & Melissinos, Experiments in Modern Physics (Academic Press)

PHYSICS LABORATORY – IV

Choose any 8 experiments from the list given below LIST OF EXPERIMENTS.

1. Young's modulus – Koenig's method (Non uniform bending)
2. Rigidity Modulus – Statistic Torsion
3. Specific latent heat of fusion of ice
4. Spectrometer- determination of N - normal incidence method
5. Field along the axis of the circular coil carrying current and determination of B
6. Carry-Foster's bridge - Temperature co-efficient of the material of a wire.
7. Potentiometer -Calibration of high range voltmeter
8. Figure of merit of a periodic moving coil galvanometer.
9. B.G. - Comparison of capacities.
10. Melde's string-Specific gravity of a solid and liquid.
11. Study of optical rotation by solutions.
12. Study of the rise and decay of current in a RL circuits
13. Junction and Zenor diode characteristics
14. Study of Half and full wave rectifier
15. Computer simulation of effect of magnetic field on charged particles
16. Computer simulation of propagation of electromagnetic waves.

TEXTBOOKS

1. Practical Physics C.C Ouseph, V.J.Rao and V.Vijayendran
2. Practical Physics M.N.Srinivasan, Sultan son Pubs
3. D P Khandelwal, A Laboratory Manual in Physics for Undergraduate Students (Vani Publication, New Delhi)
4. B Saraf et al. "Physics through Experiments, Vol. II., EMF constant and varying, (Vika Publications, New Delhi)
5. V Y Rajopadhye and V L Purohit, Text book of experimental Physics
6. Verma, Ahluwalia, Sharma, Computational Physics, an Introduction (New Age Int. (P) Ltd.)

REFERENCE BOOKS

1. Olon, Experiments in Modern Physics.
2. Adrian C. & Melissinos, Experiments in Modern Physics (Academic Press).

CORE 16: (SUPPORTIVE 4) CHEMISTRY II**Unit 1:**

Co-ordination chemistry – definition of terms, classification of ligands, nomenclature. Chelation – examples, chelate effect explanation. Werner’s theory- conductivity and precipitation studies. Sedgwick’s theory- Effective atomic number concept. Pauling’s theory-postulates, applications to octahedral, square, planar and tetrahedral complexes.

Unit 2:

Biological role of Hemoglobin and Chlorophyll. EDTA and its applications. Environmental chemistry- Green House Effect, global warming, Ozone depletion, BOD and COD – importance, rainwater harvesting-needs, methods, advantage. Pollution – types, strategies in its control.

Unit 3:

Carbohydrates-classification, preparation and properties of Glucose, Fructose and Sucrose. Discussion of ring structure and mutarotation. Properties of starch and cellulose. Interconversion of Glucose and Fructose. Amino-acids classification, preparation and properties of Glycine and Alanine, preparation of peptides by Bergman method. Classification of proteins according to composition, function and shape. Protein denaturation.

Unit 4:

Dyes and Drugs-Azo dyes-congo Red, Triphenylmethans, Malachite Green, Food colours. Sulpha drugs-sulphonamides and sulpha pyrimidine, preparation and uses. Antibiotics-penicillin and Chloromycetin-source, structure and uses. Vitamins- source and structure of vitamin A, B, C, D, E and F (structural elucidation not required).

Unit 5:

Electrochemistry- Kohlrauch law-measurement of conductance, pH determination, conductometric titrations, hydrolysis of salts, derivation of Kh. Galvanic cells, EMF standard electrode potentials, reference electrodes, electrochemical series and its application, electroplating and its application. Corrosion-methods of prevention. Bioenergetics-Chemical kinetics-order of reaction (zero and first order), half-life period. Chemical equilibrium-basic idea.

Text books:

1. P. W. Atkins Physical Chemistry, 6th edition, 1998.
2. Wade, L.G, Organic Chemistry, Pearson Education, 5th edition, 2003.
3. M. Ladd, introduction to Physical Chemistry, Cambridge, 1998.

CHEMISTRY II PRACTICAL

1. Detection of elements –nitrogen, sulphur and halogens.
2. Preliminary test and detection of carbohydrate, urea, benzamide and aromatic amines.
3. Detection of anions: carbonate, sulphide, sulphate, fluoride, chloride, bromide, nitrate, oxalate, phosphate.
4. Reaction of aldehyde (aromatic), ketone (aliphatic and aromatic), carbohydrate, carboxylic acid (mono-and dicarboxylic-), phenol, aromatic primary amine, amide and diamide.
5. Systematic analysis of organic compounds containing one functional group and characterization by confirmatory tests or derivatives.

CORE 17: NUCLEAR PHYSICS**Unit I**

General Properties of Nuclei: Constituents of nucleus and their Intrinsic properties, quantitative facts about size, mass, charge density (matter energy), binding energy, average binding energy and its variation with mass number, main features of binding energy versus mass number curve, N/Z plot, angular momentum, parity, magnetic moment, electric moments, nuclear excited states.

Unit II

Nuclear Models: Liquid drop model approach, semi empirical mass formula and significance of various terms, condition of nuclear stability. Two nucleon separation energies, Fermi gas model (degenerate fermion gas, nuclear symmetry potential in Fermi gas), evidence for nuclear shell structure, nuclear magic numbers, basic assumption of shell model, concept of mean field, residual interaction, concept of nuclear force.

Unit III

Radioactivity decay: (a) Alpha decay: basics of α -decay processes, theory of α -emission, Gamow factor, Geiger Nuttall law, α -decay spectroscopy. (b) β -decay: energy kinematics for β -decay, positron emission, electron capture, neutrino hypothesis. (c) Gamma decay: Gamma rays emission & kinematics, internal conversion. Nuclear Reactions: Types of Reactions, Conservation Laws, kinematics of reactions, Q-value, reaction rate, reaction cross section, Concept of compound and direct reaction, resonance reaction, Coulomb scattering (Rutherford scattering).

Unit IV

Particle physics: Particle interactions; basic features, types of particles and its families. Symmetries and Conservation Laws: energy and momentum, angular momentum, parity, baryon number, Lepton number, Isospin, Strangeness and charm, concept of quark model, color quantum number and gluons.

Reference Books:

1. Introduction to the physics of nuclei & particles, R.A. Dunlap. (Thomson Asia, 2004)
2. Quarks and Leptons, F. Halzen and A.D. Martin, Wiley India, New Delhi
3. Basic ideas and concepts in Nuclear Physics - An Introductory Approach by K. Heyde (IOP-Institute of Physics Publishing, 2004).
4. Radiation detection and measurement, G.F. Knoll (John Wiley & Sons, 2000).
5. Theoretical Nuclear Physics, J.M. Blatt & V.F. Weisskopf (Dover Pub.Inc., 1991)

Text Books

1. Introductory nuclear Physics by Kenneth S. Krane (Wiley India Pvt. Ltd., 2008).
2. Concepts of nuclear physics by Bernard L. Cohen. (Tata Mcgraw Hill, 1998).
3. Introduction to Elementary Particles, D. Griffith, John Wiley & Sons

CORE 18: QUANTUM MECHANICS

Unit I : Time dependent Schrodinger equation: Time dependent Schrodinger equation and dynamical evolution of a quantum state; Properties of Wave Function. Interpretation of Wave Function Probability and probability current densities in three dimensions; Conditions for Physical Acceptability of Wave Functions. Normalization. Linearity and Superposition Principles. Eigenvalues and Eigen functions. Position, momentum & Energy operators; commutator of position and momentum operators; Expectation values of position and momentum. Wave Function of a Free Particle.

Unit II : Time independent Schrodinger equation-Hamiltonian, stationary states and energy eigenvalues; expansion of an arbitrary wave function as a linear combination of energy eigen functions; General solution of the time dependent Schrodinger equation in terms of linear combinations of stationary states; Application to the spread of Gaussian wave packet for a free particle in one dimension; wave packets, Fourier transforms and momentum space wave function; Position-momentum uncertainty principle.

Unit III : General discussion of bound states in an arbitrary potential- continuity of wave function, boundary condition and emergence of discrete energy levels; application to one-dimensional problem- square well potential; Quantum mechanics of simple harmonic oscillator-energy levels and energy eigen functions.

Unit IV : Quantum theory of hydrogen-like atoms: time independent Schrodinger equation in spherical polar coordinates; separation of variables for the second order partial differential equation; angular momentum operator and quantum numbers; Radial wavefunctions; Orbital angular momentum quantum numbers l and m ; s, p, d,... shells (idea only).

Reference Books:

1. Quantum Mechanics, Eugen Merzbacher, 2004, John Wiley and Sons, Inc.
2. Introduction to Quantum Mechanics, David J. Griffith, 2nd Ed. 2005, Pearson Education
3. Quantum Mechanics, Walter Greiner, 4th Edn., 2001, Springer
4. Quantum Mechanics, Bruce Cameron Reed, 2008, Jones and Bartlett Learning.

Text Books

1. P.M.Mathews & K.Venkatesan, A Text book of Quantum Mechanics, 2nd Ed.2010, McGraw Hill
2. Robert Eisberg and Robert Resnick, Quantum Mechanics, 2nd Edn., 2002, Wiley.
3. Leonard I. Schiff, Quantum Mechanics, 3rdEdn. 2010, Tata McGraw Hill.
4. G. Aruldhas, Quantum Mechanics, 2ndEdn. 2002, PHI Learning of India.
5. Quantum Mechanics for Scientists & Engineers, D.A.B. Miller, 2008, Cambridge Uni. Press.

CORE 19: DIGITAL ELECTRONICS**UNIT-I**

Digital Principles: Number system, binary arithmetic, Basic gates and universal gate operations. Boolean algebraic theorems and properties-Karnaugh map: two and four variable map, POS and SOP simplification, NAND and NOR implementation, don't care condition, Logic families: characteristics and parameters. TTL gates, TTL open collector gates, CMOS gates, TTL-CMOS interface. Combinational logic design: parity checker, half and full adders, demultiplexer, multiplexer, decoders, encoders, PAL.

UNIT-II

Flip Flops and Counters: RS flip - flops, clocked RS flip - flop, edge-triggering. JK flip - flop, D-type flip-flop, JK master slave flip-flop design procedure; serial –in – serial out. Serial –in –parallel out shift registers asynchronous counters; decade counter (Mod10 counter); NE 555 timer as astable multivibrator.

UNIT-III

A/D, D/A Converters: Principle of variable network and binary ladder type: four bit D/A converter, A/D converter, counter method and successive approximation, resolution and accuracy of D/A and A/D converter; frequency counters and digital voltmeters.

UNIT -IV

Microprocessors: Components of a micro-processor system, Architecture of 8085, Addressing modes, instruction set. Pin configuration, stack operation, memory stack and cascade stack, assembly language programming of Intel 8085. Software programmes involving addition and subtraction. Simple i/o operations using 8255 ports. Elementary introduction to 16 bit processor

TEXT BOOKS

1. Malvino&Leach, Digital Principles and Applications (Tata McGraw Hill)
2. R.P Jain, Modern Digital Electronics,(Tata McGraw-Hill. New Delhi)
3. Morris Mano.M Digital logic and computer design, (Prentice Hall of India)
4. Ramesh S.Gaonkar, Microprocessor Architecture-Programming and Applications with the 8085 (Prentice Hall)

REFERENCE BOOKS

1. Milliman & Halkias, Integrated Electronics(Tata McGraw-Hill)
2. Floyd L. Thomas; Digital fundamentals (Universal Book stall.)
3. Jacob Millman, Microelectronics (McGraw Hill)
4. Badri Ram, Fundamentals of Microprocessors and microcomputers, (Dhanpat Rai Publication)

CORE 20: PHYSICS LABORATORY

PHYSICS LABORATORY –V

Choose any 8 experiments from the list given below LIST OF GENERAL PHYSICS EXPERIMENTS:

1. Newton's Rings: determination of refractive index of the material of the lens.
2. Spectrometer: Hartmann's Interpolation Formula - Determination of wavelength
3. Spectrometer: $i - i'$ curve and determination of refractive index.
4. Spectrometer Dispersive power of the material prism
5. Spectrometer: Grating – wavelength by normal incidence method
6. Young's modulus: Elliptical fringes method.
7. Ultrasonic velocity and compressibility of the liquids - Interferometer method.
8. Field along the axis of a circular coil - Determination of moment of a magnet
9. Temperature co-efficient of a Thermistor
10. Potentiometer: Verification of laws of resistance and resistivity of the material of a wire.
11. Potentiometer: Resistance of the potentiometer and measurement of emf of a thermocouple.
12. B.G Internal resistance of a cell
13. B.G: Current and voltage sensitivities.
14. B.G: Quantity or charge sensitivity.
15. Wien's bridge: Measurement of frequency.
16. Diode laser : characteristic study
17. Simulation of 3-D models of a given kind of crystal and their study
18. Computer simulation of growth of current in RL circuit.

TEXTBOOKS

1. Practical Physics C.C Ouseph, V.J.Rao and V.Vijayendran
2. Practical Physics M.N.Srinivasan, (Sultan son Pubs)
3. D P Khandelwal, A Laboratory Manual for Physics for Undergraduate Students (Vani Publications, New Delhi)
4. B Saraf et al, Physics through Experiments, Vol. II., EMF constant and varying (Vikas Publications, New Delhi)
5. Verma, Ahluwalia & Sharma, "Computational Physics, an Introduction" (New Age Int.)

REFERENCE BOOKS

1. Olon, "Experiments in Modern Physics"
2. Adrian C. & Melissinos, Experiments in Modern Physics, (Academic Press)

PHYSICS LABORATORY –VI

Choose any 8 experiments from the list given below LIST OF ELECTRONICS EXPERIMENTS:

1. Study of CRO.
2. Transistor characteristics - common emitter.
3. Tuned collector oscillator- Frequency measurement by CRO and Frequency counter.
4. Tuned base oscillator - Frequency measurement by CRO and Frequency counter.
5. Astablemultivibrator- Using 555 Timer- Frequency measurements
6. Emitter follower.
7. Phase shift oscillator - Frequency measurement by CRO and Frequency counter.
8. Basic Logic and Universal gates using diodes and transistors components.
9. NAND and NOR as universal gates using ICs
10. Transistor Amplitude modulator and measurement of percentage of modulation.
11. OP-AMP characteristics (741 IC) -parameter measurement
12. Implementation of logic expression and their simplification
13. Half-adder and full-adder
14. Parity generator / checker
15. Flip-flop circuits using gates
16. Asynchronous counters using ICs
17. Diode AM detection
18. Assembly language programming - microprocessor – addition.

TEXTBOOKS

1. Practical Physics C.C Ouseph, V.J.Rao and V.Vijayendran
2. Practical Physics M.N.Srinivasan, (Sultan son Pubs)
3. Jain R.P, Anand M.M.S, "Digital electronics Practice Using Integrated Circuits" (Tata McGraw-Hill, 1999, New Delhi).
4. Zbar&Malvino, Basic Electronics-A text Lab Manual (Tats McGraw-Hill, 1999)
5. Verma, Ahluwalia, Sharma, "Computational Physics, an Introduction" (New Age International)

REFERENCE BOOKS

1. Malvino, Electronic principles, 6th Ed. (Tata McGraw-Hill, 1999, New Delhi).
2. Takheim, Digital electronics, 3rd Ed (McGraw-Hill International).

CORE 21: RENEWABLE ENERGY AND ENERGY HARVESTING**Unit I**

Fossil fuels and Alternate Sources of energy: Fossil fuels and Nuclear Energy, their limitation, need of renewable energy, non-conventional energy sources. An overview of developments in Offshore Wind Energy, Tidal Energy, Wave energy systems, Ocean Thermal Energy Conversion, solar energy, biomass, biochemical conversion, biogas generation, geothermal energy tidal energy, Hydroelectricity.

Unit II

Solar energy: Solar energy, its importance, storage of solar energy, solar pond, non convective solar pond, applications of solar pond and solar energy, solar water heater, flat plate collector, solar distillation, solar cooker, solar green houses, solar cell, absorption air conditioning. Need and characteristics of photovoltaic (PV) systems, PV models and equivalent circuits, and sun tracking systems.

Wind Energy harvesting: Fundamentals of Wind energy, Wind Turbines and different electrical machines in wind turbines, Power electronic interfaces, and grid interconnection topologies.

Unit III

Ocean Energy: Ocean Energy Potential against Wind and Solar, Wave Characteristics and Statistics, Wave Energy Devices.

Geothermal Energy: Geothermal Resources, Geothermal Technologies. (2 Lectures) Hydro Energy: Hydropower resources, hydropower technologies, environmental impact of hydro power sources.

Unit IV

Electromagnetic Energy Harvesting: Linear generators, physics mathematical models, recent applications Carbon captured technologies, cell, batteries, power consumption, Environmental issues and Renewable sources of energy, sustainability.

TEXT BOOKS:

1. Non-conventional energy sources - G.D Rai - Khanna Publishers, New Delhi.
2. Solar energy - M P Agarwal - S Chand and Co. Ltd.
3. Solar energy - Suhas P Sukhative Tata McGraw - Hill Publishing Company Ltd.

REFERENCE BOOKS

1. Godfrey Boyle, "Renewable Energy, Power for a sustainable future", 2004,
2. Oxford University Press, in association with The Open University.
3. Dr. P Jayakumar, Solar Energy: Resource Assesment Handbook, 2009
4. J.Balfour, M.Shaw and S. Jarosek, Photovoltaics, Lawrence J Goodrich (USA).
5. http://en.wikipedia.org/wiki/Renewable_energy

CORE 22: PHYSICS LABORATORY**PHYSICS LABORATORY –VII**

Choose any 8 experiments from the list given below LIST OF GENERAL PHYSICS EXPERIMENTS:

1. Air wedge: Determination of the thickness and insulation of the wire.
2. Spectrometer: $i - i'$ curve for given angle of deviation II method
3. Spectrometer small angle prism
4. Spectrometer: Determination of Cauchy 's constants
5. Spectrometer: Dispersive power of a grating
6. Filed along the axis of acicular coil – Determination of BH using Searl's vibration magnetometer
7. Potentiometer: Resistance of potentiometer and measurement of emf of a thermocouple.
8. Potentiometer: Temperature coefficient of resistance of the material of a coil of wire.
9. B.G: Comparison of mutual inductance of two pairs of coils.
10. B.G absolute capacity of a condenser
11. Study of divergence of a laser beam
12. Characteristics of a solar cell
13. Determination of refractive index: Abbe's refractometer.
14. Measurement of e by Milliken's method
15. Determination of Planck's constant
16. Hall probe in magnetic field measurement
17. Computer simulation of 1 -D and 2-D lattice vibrations
18. Computer simulation of nuclear chain reactions and nuclear energy.

TEXT BOOKS

1. Practical Physics C.C Ouseph, V.J.Rao and V.Vijayendran
2. Practical Physics M.N.Srinivasan, (Sultan son Pubs)
3. D P Khandelwal, A Laboratory Manual for Physics for Undergraduate Students (Vani Publications, New Delhi)
4. B Saraf et al, Physics through Experiments, Vol. II., EMF constant and varying (Vikas Publications, New Delhi)
5. Verma, Ahluwalia & Sharma, "Computational Physics, an Introduction" (New Age Int.)

REFERENCE BOOKS

1. Olon, "Experiments in Modern Physics"
2. Adrian C. & Melissinos, Experiments in Modern Physics, (Academic Press).

PHYSICS LABORATORY – VIII

Choose any 8 experiments from the list given below

LIST OF ELECTRONICS EXPERIMENTS:

1. Transistor characteristics - common base
2. Power pack - construction with Bridge rectifier and IC regulator.
3. Emitter follower
4. Single stage RC coupled CE amplifier - Frequency response curve.
5. Hartley oscillator - Frequency measurement by CRO and Frequency counter.
6. Colpitt's oscillator- Frequency measurement by CRO and Frequency counter.
7. Clipping and Clamping circuits using diodes
8. Astable –mutivibrater using transistor frequency measurement
9. Basic and Universal logic gates using ICs
10. JFET characteristics.
11. OP-AMP addition, subtraction, multiplication, Integration and differentiation.
12. Implementation of logic expression and the simplification
13. Arithmetic circuits using gates
14. Multiplexers, Demultiplexers
15. RS, D, JK and Master Slave flip-flops
16. Shift Registers
17. Synchronous counters using ICs
18. Assembly language programming - microprocessor - subtraction

TEXTBOOKS

1. Practical Physics C.C Ouseph, V.J.Rao and V.Vijayendran
2. Practical Physics M.N.Srinivasan, (Sultan son Pubs)
3. Jain R.P, Anand M.M.S, "Digital electronics Practice Using Integrated Circuits" (Tata McGraw-Hill, 1999, New Delhi).
4. Zbar & Malvino, Basic Electronics-A text Lab Manual (Tats McGraw-Hill, 1999)
5. Verma, Ahluwalia, Sharma, "Computational Physics, an Introduction" (New Age International)

REFERENCE BOOKS

1. Malvino, Electronic principles, 6th Ed. (Tata McGraw-Hill, 1999, New Delhi).
2. Takheim, Digital electronics, 3rd Ed (McGraw-Hill International).

PART III

CHEMISTRY

B.Sc., B.Ed. LIBERAL OPTIONS**PART III: B.SC.B.ED.****Branch: CHEMISTRY**

| SEM | No. | CODE | Sub | Name of the course | CCE | UE | Total |
|------|---------------------------|------|----------|--|-----|----|-------|
| I | Core 1 | | Main 1 | Chemistry-I: Atomic Structure, Bonding, General Organic Chemistry | 30 | 70 | 100 |
| | Core 2 | | Main 2 | Basic Analytical Chemistry | 30 | 70 | 100 |
| | Core 3 | | Main 3 | Green Chemistry | 30 | 70 | 100 |
| | Core 4 (Supportive 1) | | Anci 1-1 | Mathematics-I | 30 | 70 | 100 |
| II | Core 5 | | Main 4 | Chemistry-II: Chemical Energetics, Equilibria & Functional Organic Chemistry-I | 30 | 70 | 100 |
| | Core 6 | | Main 5 | Analytical Clinical Biochemistry | 30 | 70 | 100 |
| | Core 7 | | Main 6 | Chemistry-Laboratory-I Chemistry-I: Atomic Structure, Bonding, General Organic Chemistry | | 50 | 50 |
| | | | | Chemistry-Laboratory-II Chemistry-II: Chemical Energetics, Equilibria & Functional Organic Chemistry-I | | 50 | 50 |
| | Core 8 (Supportive 2) | | Anci 1-2 | Mathematics-II | 30 | 70 | 100 |
| III | Core 9 | | Main 7 | Chemistry-III: Solutions, Phase Equilibrium, Electrochemistry & Functional Group Organic Chemistry-II | 30 | 70 | 100 |
| | Core 10 | | Main 8 | Fuel Chemistry | 30 | 70 | 100 |
| | Core 11 | | Main 9 | Molecular Modelling & Drug Design | 30 | 70 | 100 |
| | Core 12 (Supportive 3) | | Anci 2-1 | Physics-I | 30 | 70 | 100 |
| IV | Core 13 | | Main 10 | Chemistry-IV: Coordination Chemistry, States of Matter & Chemical Kinetics | 30 | 70 | 100 |
| | Core 14 | | Main 11 | Nano Chemistry | 30 | 70 | 100 |
| | Core 15 | | Main 12 | Chemistry -Laboratory-III Chemistry-III: Solutions, Phase Equilibrium, Electrochemistry & Functional Group Organic Chemistry-II | | 50 | 50 |
| | | | | Chemistry-Laboratory-IV Chemistry-IV: Coordination Chemistry, States of Matter & Chemical Kinetics | | 50 | 50 |
| | Core 16 (Supportive 4) | | Anci 2-2 | Physics -II | 30 | 70 | 100 |
| V | Core 17 | | Main 13 | Analytical Methods in Chemistry | 30 | 70 | 100 |
| | Core 18 | | Main 14 | Industrial Chemicals & Environment | 30 | 70 | 100 |
| VI | Core 19 | | Main 15 | Organometallics, Bioinorganic chemistry, Polynuclear hydrocarbons and UV, IR Spectroscopy | 30 | 70 | 100 |
| | Core 20 | | Main 16 | Chemistry -Laboratory-V Industrial Chemicals & Environment | | 50 | 50 |
| | | | | Chemistry -Laboratory-VI Organometallics, Bioinorganic chemistry, Polynuclear hydrocarbons and UV, IR Spectroscopy | | 50 | 50 |
| VII | Core 21 | | Main 17 | Polymer Chemistry | 30 | 70 | 100 |
| VIII | Core 22 | | Main 18 | Chemistry -Laboratory-VII Analytical Methods in Chemistry and Analytical Clinical Biochemistry | | 50 | 50 |
| | | | | Chemistry -Laboratory-VIII Polymer Chemistry and Molecular Modelling & Drug Design | | 50 | 50 |

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CORE 1: CHEMISTRY-I: ATOMIC STRUCTURE, BONDING, GENERAL ORGANIC CHEMISTRY**Unit-I Atomic Structure**

Atomic Structure: Bohr's theory and its limitations, dual behaviour of matter and radiation, de Broglie relation, Heisenberg Uncertainty principle. Hydrogen atom spectra. Need of a new approach to Atomic structure.

Postulates of Quantum Mechanics-Time independent Schrodinger equation (derivation not required) and meaning of various terms in it. Significance of ψ and ψ^2 , Schrödinger equation for hydrogen atom. Radial and angular parts of the hydrogenic wavefunctions (atomic orbitals) and their variations for $1s$, $2s$, $2p$, $3s$, $3p$ and $3d$ orbitals (Only graphical representation). Significance of quantum numbers, orbital angular momentum and quantum numbers m_l and m_s . Shapes of s , p and d atomic orbitals, nodal planes. Spin quantum number (s) and magnetic spin quantum number (m_s). Rules for filling electrons in various orbitals, Electronic configurations of the atoms. Stability of half-filled and completely filled orbitals, Anomalous electronic configurations.

(14 Lectures)

Unit- II Chemical Bonding and Molecular Structure

Ionic Bonding: General characteristics of ionic bonding. Energy considerations in ionic bonding, lattice energy and solvation energy and their importance in the context of stability and solubility of ionic compounds. Statement of Born-Landé equation for calculation of lattice energy. Polarizing power and polarizability. Fajan's rules, ionic character in covalent compounds, bond moment, dipole moment and percentage ionic character.

Covalent bonding:

VB Approach: Shapes of inorganic molecules and ions on the basis of VSEPR and hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral, trigonal bipyramidal and octahedral arrangements. Concept of resonance and resonating structures in various inorganic compounds.

MO Approach: Rules for the LCAO method, bonding and antibonding MOs. MO treatment of homonuclear and heteronuclear diatomic molecules viz., H_2 , O_2 , N_2 , CO , NO and NO^+ . Comparison of VB and MO approaches.

(16 Lectures)

Unit- III Fundamentals of Organic Chemistry

Physical Effects, Electronic Displacements: Inductive Effect, Electromeric Effect, Resonance and Hyperconjugation. Cleavage of Bonds: Homolysis and Heterolysis.

Structure, shape and reactivity of organic molecules: Nucleophiles and electrophiles. Reactive Intermediates: Carbocations, Carbanions and free radicals.

Strength of organic acids and bases: Comparative study with emphasis on factors affecting pK values. Aromaticity: Benzenoids and Hückel's rule.

(8 Lectures)

Unit- IV Stereochemistry

Conformations: Ethane, butane and cyclohexane. Interconversion of Wedge Formula, Newmann, Sawhorse and Fischer representations. Concept of chirality (up to two carbon atoms).

Configuration: Geometrical and Optical isomerism; Enantiomerism, Diastereomerism and Meso compounds. Threo and erythro; D and L; *cis* – *trans* nomenclature; CIP Rules: R/ S (for upto 2 chiral carbon atoms) and E / Z Nomenclature (for up to two C=C systems).

(10 Lectures)

Unit V Aliphatic Hydrocarbons

Functional group approach for the following reactions (preparations and reactions) to be studied in context to their structure.

Alkanes: *Preparation:* Catalytic hydrogenation, Wurtz reaction, Kolbe's synthesis and, from Grignard reagent. *Reactions:* Free radical Substitution: Halogenation.

Alkenes: *Preparation:* Elimination reactions: Dehydration of alcohols and dehydrohalogenation of alkyl halides (Saytzeff's rule); *cis* alkenes (Partial catalytic hydrogenation) and *trans* alkenes (Birch reduction). *Reactions:* *cis*-addition (alk. KMnO_4) and *trans*-addition (bromine), Addition of HX (Markownikoff's and *anti*-Markownikoff's addition), Hydration, Ozonolysis, oxymercuration-demercuration, Hydroboration-oxidation.

Alkynes: *Preparation:* Acetylene from CaC_2 and conversion into higher alkynes; by dehalogenation of tetra halides and dehydrohalogenation of vicinal-dihalides. *Reactions:* Formation of metal acetylides, addition of bromine and alkaline KMnO_4 , ozonolysis and oxidation with hot alk. KMnO_4 .

(12 Lectures)

Reference Books:

1. Lee, J.D. *Concise Inorganic Chemistry* ELBS, 1991.
2. Cotton, F.A., Wilkinson, G. & Gaus, P.L. *Basic Inorganic Chemistry*, 3rd ed., Wiley.
3. Douglas, B.E., McDaniel, D.H. & Alexander, J.J. *Concepts and Models in Inorganic Chemistry*, John Wiley & Sons.
4. Huheey, J.E., Keiter, E.A., Keiter, R.L. & Medhi, O.K. *Inorganic Chemistry: Principles of Structure and Reactivity*, Pearson Education India, 2006.
5. Graham Solomons, T.W., Fryhle, C.B. & Snyder, S.A. *Organic Chemistry*, John Wiley & Sons (2014).
6. McMurry, J.E. *Fundamentals of Organic Chemistry*, 7th Ed. Cengage Learning India Edition, 2013.
7. Sykes, P. *A Guidebook to Mechanism in Organic Chemistry*, Orient Longman, New Delhi (1988).
8. Eliel, E.L. *Stereochemistry of Carbon Compounds*, Tata McGraw Hill education, 2000.
9. Finar, I.L. *Organic Chemistry* (Vol. I & II), E.L.B.S.
10. Morrison, R.T. & Boyd, R.N. *Organic Chemistry*, Pearson, 2010.
11. Bahl, A. & Bahl, B.S. *Advanced Organic Chemistry*, S. Chand, 2010

CORE 2: BASIC ANALYTICAL CHEMISTRY

Unit I - Introduction: Introduction to Analytical Chemistry and its interdisciplinary nature. Concept of sampling. Importance of accuracy, precision and sources of error in analytical measurements. Presentation of experimental data and results, from the point of view of significant figures.

Analysis of soil: a. Composition of soil, Concept of pH and pH measurement, Complexometric titrations, Chelation, Chelating agents, use of indicators
a. Determination of pH of soil samples.
b. Estimation of Calcium and Magnesium ions as Calcium carbonate by complexometric titration.

Unit II - Analysis of water: Definition of pure water, sources responsible for contaminating water, water sampling methods, water purification methods.
a. Determination of pH, acidity and alkalinity of a water sample.
b. Determination of dissolved oxygen (DO) of a water sample.

Analysis of food products: Nutritional value of foods, idea about food processing and food preservations and adulteration.
a. Identification of adulterants in some common food items like coffee powder, asafoetida, chilli powder, turmeric powder, coriander powder and pulses, etc.
b. Analysis of preservatives and colouring matter.

Unit III - Chromatography:

Definition, general introduction on principles of chromatography, paper chromatography, TLC etc.

- Paper chromatographic separation of mixture of metal ion (Fe^{3+} and Al^{3+}).
- To compare paint samples by TLC method.

Ion-exchange: Column, ion-exchange chromatography etc.

Determination of ion exchange capacity of anion / cation exchange resin (using batch procedure if use of column is not feasible).

Unit IV - Analysis of cosmetics:

Major and minor constituents and their function

- Analysis of deodorants and antiperspirants, Al, Zn, boric acid, chloride, sulphate.
- Determination of constituents of talcum powder: Magnesium oxide, Calcium oxide, Zinc oxide and Calcium carbonate by complexometric titration.

Suggested Applications (Any one):

- To study the use of phenolphthalein in traps cases.
- To analyze arson accelerants.
- To carry out analysis of gasoline.

Unit V - Suggested Instrumental demonstrations:

- Estimation of macro nutrients: Potassium, Calcium, Magnesium in soil samples by flame photometry.
- Spectrophotometric determination of Iron in Vitamin / Dietary Tablets.
- Spectrophotometric Identification and Determination of Caffeine and Benzoic Acid in Soft Drink.

Reference Books:

1. Willard, H.H., Merritt, L.L., Dean, J. & Steptoe, F.A. *Instrumental Methods of Analysis*. 7th Ed. Wadsworth Publishing Co. Ltd., Belmont, California, USA, 1988.
2. Skoog, D.A. Holler F.J. & Nieman, T.A. *Principles of Instrumental Analysis*, Cengage Learning India Ed.
3. Skoog, D.A.; West, D.M. & Holler, F.J. *Fundamentals of Analytical Chemistry 6th Ed.*, Saunders College Publishing, Fort Worth (1992).
4. Harris, D. C. *Quantitative Chemical Analysis*, W. H. Freeman.
5. Dean, J. A. *Analytical Chemistry Notebook*, McGraw Hill.
6. Day, R. A. & Underwood, A. L. *Quantitative Analysis*, Prentice Hall of India.
7. Freifelder, D. *Physical Biochemistry 2nd Ed.*, W.H. Freeman and Co., N.Y. USA (1982).
8. Cooper, T.G. *The Tools of Biochemistry*, John Wiley and Sons, N.Y. USA. 16 (1977).
9. Vogel, A. I. *Vogel's Qualitative Inorganic Analysis 7th Ed.*, Prentice Hall.
10. Vogel, A. I. *Vogel's Quantitative Chemical Analysis 6th Ed.*, Prentice Hall.
11. Robinson, J.W. *Undergraduate Instrumental Analysis 5th Ed.*, Marcel Dekker, Inc., New York (1995).

CORE 3: GREEN CHEMISTRY**Unit I****Introduction and Principles - Part A**

What is Green Chemistry? Need for Green Chemistry. Goals of Green Chemistry. Limitations/ Obstacles in the pursuit of the goals of Green Chemistry

(4 Lectures)

Principles of Green Chemistry and Designing a Chemical synthesis

Twelve principles of Green Chemistry with their explanations and examples and special emphasis on the following:

Designing a Green Synthesis using these principles; Prevention of Waste/ byproducts; maximum incorporation of the materials used in the process into the final products, Atom Economy, calculation of atom economy of the rearrangement, addition, substitution and elimination reactions.

Unit II Principles - Part B

Prevention/ minimization of hazardous/ toxic products reducing toxicity. risk = (function) hazard \times exposure; waste or pollution prevention hierarchy.

Green solvents– supercritical fluids, water as a solvent for organic reactions, ionic liquids, fluorous biphasic solvent, PEG, solventless processes, immobilized solvents and how to compare greenness of solvents.

Energy requirements for reactions – alternative sources of energy: use of microwaves and ultrasonic energy.

Selection of starting materials; avoidance of unnecessary derivatization – careful use of blocking/protecting groups.

Unit III Principles - Part C

Use of catalytic reagents (wherever possible) in preference to stoichiometric reagents; catalysis and green chemistry, comparison of heterogeneous and homogeneous catalysis, biocatalysis, asymmetric catalysis and photocatalysis.

Prevention of chemical accidents designing greener processes, inherent safer design, principle of ISD “What you don’t have cannot harm you”, greener alternative to Bhopal Gas Tragedy (safer route to carbaryl) and Flixborough accident (safer route to cyclohexanol) subdivision of ISD, minimization, simplification, substitution, moderation and limitation. Strengthening/ development of analytical techniques to prevent and minimize the generation of hazardous substances in chemical processes.

(30 Lectures)

Unit IV Examples of Green Synthesis/ Reactions and some real world cases

1. Green Synthesis of the following compounds: adipic acid, catechol, disodium iminodiacetate (alternative to Strecker synthesis)
2. Microwave assisted reactions in water: Hofmann Elimination, methyl benzoate to benzoic acid, oxidation of toluene and alcohols; microwave assisted reactions in organic solvents
3. Diels-Alder reaction and Decarboxylation reaction
4. Ultrasound assisted reactions: sonochemical Simmons-Smith Reaction (Ultrasonic alternative to Iodine)
5. Surfactants for carbon dioxide – replacing smog producing and ozone depleting solvents with CO₂ for precision cleaning and dry cleaning of garments.
6. Designing of Environmentally safe marine antifoulant.
7. Rightfit pigment: synthetic azo pigments to replace toxic organic and inorganic pigments.

8. An efficient, green synthesis of a compostable and widely applicable plastic (poly lactic acid) made from corn.
 9. Healthier fats and oil by Green Chemistry: Enzymatic inter esterification for production of no Trans-Fats and Oils
 10. Development of Fully Recyclable Carpet: Cradle to Cradle Carpeting
- (16 Lectures)

Unit – V Future Trends in Green Chemistry

Oxidation reagents and catalysts; Biomimetic, multifunctional reagents; Combinatorial greenchemistry; Proliferation of solventless reactions; co crystal controlled solid state synthesis (C2S3); Green chemistry in sustainable development.

(10 Lectures)

Reference Books:

1. Ahluwalia, V.K. & Kidwai, M.R. *New Trends in Green Chemistry*, Anamaya Publishers (2005).
2. Anastas, P.T. & Warner, J.K.: *Green Chemistry - Theory and Practical*, Oxford University Press (1998).
3. Matlack, A.S. *Introduction to Green Chemistry*, Marcel Dekker (2001).
4. Cann, M.C. & Connelly, M.E. *Real-World cases in Green Chemistry*, American Chemical Society, Washington (2000).
5. Ryan, M.A. & Tinnesand, M. *Introduction to Green Chemistry*, American Chemical Society, Washington (2002).
6. Lancaster, M. *Green Chemistry: An Introductory Text* RSC Publishing, 2nd Edition, 2010.

List of Experiments for Practical

1. Safer starting materials

Preparation and characterization of nanoparticles of gold using tea leaves.

2. Using renewable resources

Preparation of biodiesel from vegetable/ waste cooking oil.

3. Avoiding waste

Principle of atom economy.

Use of molecular model kit to stimulate the reaction to investigate how the atom economy can illustrate Green Chemistry.

Preparation of propene by two methods can be studied

(I) Triethylamine ion + OH⁻ → propene + trimethylpropane + water

(II) 1-propanol + H₂SO₄/Δ → propene + water

Other types of reactions, like addition, elimination, substitution and rearrangement should also be studied for the calculation of atom economy.

4. Use of enzymes as catalysts

Benzoin condensation using Thiamine Hydrochloride as a catalyst instead of cyanide.

5. Alternative Green solvents

Extraction of D-limonene from orange peel using liquid CO₂ prepared from dry ice. Mechanochemical solvent free synthesis of azomethines.

6. Alternative sources of energy

1. Solvent free, microwave assisted one pot synthesis of phthalocyanine complex of copper (II).
2. Photoreduction of benzophenone to benzopinacol in the presence of sunlight.

Reference Books:

1. Anastas, P.T & Warner, J.C. *Green Chemistry: Theory and Practice*, Oxford University Press (1998).
2. Kirchoff, M. & Ryan, M.A. *Greener approaches to undergraduate chemistry experiment*. American Chemical Society, Washington DC (2002).
3. Ryan, M.A. *Introduction to Green Chemistry*, Tinnesand; (Ed), American Chemical Society, Washington DC (2002).
4. Sharma, R.K.; Sidhwani, I.T. & Chaudhuri, M.K. I.K. *Green Chemistry Experiment: A monograph International Publishing House Pvt Ltd. New Delhi*. Bangalore ISBN 978-93-81141-55-7 (2013).
5. Cann, M.C. & Connelly, M. E. *Real world cases in Green Chemistry*, American Chemical Society (2008).
6. Cann, M. C. & Thomas, P. *Real world cases in Green Chemistry*, American Chemical Society (2008).
7. Lancaster, M. *Green Chemistry: An Introductory Text* RSC Publishing, 2nd Edition, 2010.
8. Pavia, D.L., Lampman, G.M., Kriz, G.S. & Engel, R.G. *Introduction to Organic Laboratory Techniques: A Microscale and Macroscale Approach*, W.B.Saunders, 1995.

CORE 4: (SUPPORTIVE 1)- MATHEMATICS-I**UNIT-1 (ALGEBRA)**

Matrices - Rank of a matrices - Consistency of a system of linear non-homogeneous equations (statement only) - Simple problems - Characteristic roots of a square matrix - Evaluation of Eigen values and Eigen vectors of a square matrix - Cayley Hamilton theorem (statement only) - Simple problems.

UNIT -2 (TRIGNOMETRY)

De Moivre's theorem - Expansions of $\cos(n\theta)$, $\sin(n\theta)$ and $\tan(n\theta)$ - Powers of sines and cosines of θ in terms of functions of multiples of θ . Expansions of $\sin(\theta)$, $\cos(\theta)$ in a series of ascending powers of θ - Limits and approximations.

UNIT-3 (FUNCTIONS OF COMPLEX VARIABLE)

Analytic functions - Cauchy Riemann equations - derivation and simple problems - Harmonic functions

UNIT-4 (VECTOR CALCULUS)

Vector differentiations - Scalar point functions - Vector point functions - Derivatives of a Vector point functions, sum of two vector point functions, product of scalar and Vector point function, Vector product - The vector operator Del, Gradient, Divergence and Curl - Simple application problems involving Cartesians - Laplace Operator.

UNIT - 5 (POLAR CO-ORDINATES)

Angle between radius and vector and tangent - Angle of intersection of two curves - Pedal equations of a curve

Text books:

1. S. Narayanan and T.K. Manicavachagom pillai, Calculus, S. Viswanathan Publishers
2. S. Narayan, Trignometry, S. Viswanathan Publishers, 2012
3. P. DuraiPandian, Complex Variable, Emerald Publishers, 1979
4. P. DuraiPandian, Vector Calculus, 1984
5. Vittal and Malini, Allied Mathematics, V.Margham Publishers, 1997

Reference Books:

1. George B.Thomas, Maurice D.Weir and Joel Hass, Thomas' Calculus 12'h Edition, Pearson Education, 2015
2. Er.vin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9th Edition, 2011
3. Gilbert Strang, Linear Algebra and Its Applications, CENGAGE Learning, 2007.

CORE 5: CHEMISTRY-II; CHEMICAL ENERGETICS, EQUILIBRIA & FUNCTIONAL ORGANIC CHEMISTRY-I**Unit I - Chemical Energetics and Chemical Equilibria**

Laws of Thermodynamics. Important principles and definitions of thermochemistry. Calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data. Variation of enthalpy of a reaction with temperature – Kirchoff's equation. Statement of Third Law of thermodynamics.

(10

Lectures) Free energy change in a chemical reaction. Thermodynamic derivation of the law of chemical equilibrium. Distinction between ΔG and ΔG° , Le Chatelier's principle. Relationships between K_p , K_c and K_x for reactions involving ideal gases.

(8 Lectures)

Unit II -Ionic Equilibria

Types of electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect. Salt hydrolysis-Buffer solutions. Solubility and solubility product of sparingly soluble salts – applications of solubility product principle.

(12 Lectures)

Unit III – Aromatic Hydrocarbons

Functional group approach for the following reactions (preparations and reactions) to be studied in context to their structure.

Preparation (Case benzene): from phenol, by decarboxylation, from acetylene, from benzene sulphonic acid.

Reactions: (Case benzene): Electrophilic substitution: nitration, halogenation and sulfonation. Friedel-Craft's reaction (alkylation and acylation). Side chain oxidation of alkyl benzenes.

(8 Lectures)

Unit IV - Alkyl and Aryl Halides

Alkyl Halides: Types of Nucleophilic Substitution (S_N1 , S_N2 and S_Ni) reactions.

Preparation: from alkenes and alcohols.

Reactions: hydrolysis, nitrite and nitro formation, nitrile and isonitrile formation.

Williamson's ether synthesis: Elimination versus substitution.

Aryl Halides *Preparation*: (Chloro, bromo and iodo-benzene case): from phenol, Sandmeyer & Gattermann reactions.

Reactions (*Chlorobenzene*): Aromatic nucleophilic substitution (replacement by $-OH$ group) and effect of nitro substituent. Benzyne Mechanism: KNH_2/NH_3 (or $NaNH_2/NH_3$).

(8 Lectures)

Unit V - Aliphatic and Aromatic Carbonyl Compounds, Alcohols, Phenols and Ethers

Aldehydes and ketones (aliphatic and aromatic): (Formaldehyde, acetaldehyde, acetone and benzaldehyde) *Preparation*: from acid chlorides and from nitriles.

Reactions: Reaction with HCN, ROH, $NaHSO_3$, NH_2-G derivatives. Iodoform test. Aldol Condensation, Cannizzaro reaction, Wittig reaction, Benzoin condensation. Clemmensen reduction and Wolff Kishner reduction. Meerwein-Ponndorf-Verley reduction.

Alcohols, Phenols and Ethers (Up To 5 Carbons)

Alcohols: *Preparation:* Preparation of 1°, 2° and 3° alcohols: using Grignard reagent, Ester hydrolysis, Reduction of aldehydes, ketones, carboxylic acid and esters.

Reactions: With sodium, HX (Lucas test), esterification, oxidation (alk. KMnO₄, acidic dichromate, conc. HNO₃). Oppenauer oxidation *Diols:* (Up To 6 Carbons) oxidation of diols. Pinacol-Pinacolone rearrangement.

Phenols: (Phenol case) *Preparation:* Cumene hydroperoxide method, from diazonium salts.

Reactions: Electrophilic substitution: Nitration, halogenation and sulfonation. Reimer Tiemann Reaction, Gattermann-Koch Reaction.

Ethers (aliphatic and aromatic): Cleavage of ethers with HI.

(14 Lectures)

Reference Books:

1. Graham Solomons, T.W., Fryhle, C.B. & Snyder, S.A. *Organic Chemistry*, John Wiley & Sons (2014).
2. McMurry, J.E. *Fundamentals of Organic Chemistry*, 7th Ed. Cengage Learning India Edition, 2013.
3. Sykes, P. *A Guidebook to Mechanism in Organic Chemistry*, Orient Longman, New Delhi (1988).
4. Finar, I.L. *Organic Chemistry* (Vol. I & II), E.L.B.S
5. Morrison, R.T. & Boyd, R.N. *Organic Chemistry*, Pearson, 2010.
6. Bahl, A. & Bahl, B.S. *Advanced Organic Chemistry*, S. Chand, 2010.
7. Barrow, G.M. *Physical Chemistry* Tata McGraw-Hill (2007).
8. Castellan, G.W. *Physical Chemistry* 4th Ed. Narosa (2004).
9. Kotz, J.C., Treichel, P.M. & Townsend, J.R. *General Chemistry* Cengage Learning India Pvt. Ltd., New Delhi (2009).
10. Mahan, B.H. *University Chemistry* 3rd Ed. Narosa (1998).
11. Petrucci, R.H. *General Chemistry* 5th Ed. Macmillan Publishing Co.: New York (1985).

CORE 6: ANALYTICAL CLINICAL BIOCHEMISTRY**Basic understanding of the structures, properties and functions of carbohydrates, lipids and proteins:****Unit I: Review of concepts studied in the core course:**

Carbohydrates: Biological importance of carbohydrates, Metabolism, Cellular currency of energy (ATP), Glycolysis, Alcoholic and Lactic acid fermentations, Krebs cycle. Isolation and characterization of polysaccharides.

Unit II - Proteins:

Classification, biological importance; Primary and secondary and tertiary structures of proteins: α -helix and β -pleated sheets, Isolation, characterization, denaturation of proteins.

Enzymes: Nomenclature, Characteristics (mention of Ribozymes), Classification; Active site, Mechanism of enzyme action, Stereospecificity of enzymes, Coenzymes and cofactors, Enzyme inhibitors, Introduction to Biocatalysis: Importance in "Green Chemistry" and Chemical Industry.

Unit III - Lipids:

Classification. Biological importance of triglycerides and phosphoglycerides and cholesterol; Lipid membrane, Liposomes and their biological functions and underlying applications. Lipoproteins.

Properties, functions and biochemical functions of steroid hormones. Biochemistry of peptide hormones.

Unit IV – DNA & RNA

Structure of DNA (Watson-Crick model) and RNA, Genetic Code, Biological roles of DNA and RNA: Replication, Transcription and Translation, Introduction to Gene therapy. *Enzymes:* Nomenclature, classification, effect of pH, temperature on enzyme activity, enzyme inhibition.

Unit V - Biochemistry of disease: A diagnostic approach by blood/ urine analysis.

Blood: Composition and functions of blood, blood coagulation. Blood collection and preservation of samples. Anaemia, Regulation, estimation and interpretation of data for blood sugar, urea, creatinine, cholesterol and bilirubin.

Urine: Collection and preservation of samples. 6. Formation of urine. Composition and estimation of constituents of normal and pathological urine.

List of Experiments for Practical

Identification and estimation of the following:

1. Carbohydrates – qualitative and quantitative.
2. Lipids – qualitative.
3. Determination of the iodine number of oil.
4. Determination of the saponification number of oil.
5. Determination of cholesterol using Liebermann- Burchard reaction.
6. Proteins – qualitative.
7. Isolation of protein.
8. Determination of protein by the Biuret reaction.
9. Determination of nucleic acids

Reference Books:

1. T.G. Cooper: Tool of Biochemistry.
2. Keith Wilson and John Walker: Practical Biochemistry.
3. Alan H Gowenlock: Varley's Practical Clinical Biochemistry.
4. Thomas M. Devlin: Textbook of Biochemistry.

5. Berg, J.M., Tymoczko, J.L. & Stryer, L. *Biochemistry*, W.H. Freeman, 2002.
6. Talwar, G.P. & Srivastava, M. *Textbook of Biochemistry and Human Biology*, 3rd Ed. PHI Learning.
7. Nelson, D. L. & Cox, M. M. *Lehninger's Principles of Biochemistry 7th Ed.*, W. H. Freeman.
8. Mikes, O. *Laboratory Handbook of Chromatographic & Allied Methods*, Elles Horwood Series on Analytical Chemistry, John Wiley & Sons, 1979.

CORE 7: CHEMISTRY-LABORATORY**CHEMISTRY LABORATORY-I: ATOMIC STRUCTURE, BONDING, GENERAL ORGANIC CHEMISTRY****List of Experiments for Practical*****Volumetric Analysis***

1. Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture.
2. Estimation of oxalic acid by titrating it with KMnO_4 .
3. Estimation of water of crystallization in Mohr's salt by titrating with KMnO_4 .
4. Estimation of Fe (II) ions by titrating it with $\text{K}_2\text{Cr}_2\text{O}_7$ using internal indicator.
5. Estimation of Cu (II) ions iodometrically using $\text{Na}_2\text{S}_2\text{O}_3$.
6. Estimation of hydrogen peroxide.

Organic Chemistry

1. Detection of extra elements (N, S, Cl, Br, I) in organic compounds (containing up to two extra elements).
2. Separation of organic compounds based on solubility.
3. Separation of mixtures by Chromatography: Measurement of the R_f value in each case (combination of two compounds to be given)
 - a) Identification and separation of the components of a given mixture of 2 amino acids (glycine, aspartic acid, glutamic acid, tyrosine or any other amino acid) by paper chromatography.
 - b) Identification and separation of the sugars present in the given mixture by paper chromatography.

Reference Books:

1. Svehla, G. *Vogel's Qualitative Inorganic Analysis*, Pearson Education, 2012.
 2. Mendham, J. *Vogel's Quantitative Chemical Analysis*, Pearson, 2009.
 3. Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., *Textbook of Practical Organic Chemistry*, Prentice-Hall, 5th edition, 1996.
- Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry*, Orient-Longman, 1960

CHEMISTRY LABORATORY-II: CHEMICAL ENERGETICS, EQUILIBRIA & FUNCTIONAL ORGANIC CHEMISTRY-I

List of Experiments for Practical

Physical Chemistry

(Thermochemistry)

1. Determination of heat capacity of calorimeter for different volumes.
2. Determination of enthalpy of neutralization of hydrochloric acid with sodium hydroxide.
3. Determination of enthalpy of ionization of acetic acid.
4. Determination of integral enthalpy of solution of salts (KNO_3 , NH_4Cl).
5. Determination of enthalpy of hydration of copper sulphate.
6. Study of the solubility of benzoic acid in water and determination of ΔH .

Ionic Equilibria (pH measurements)

1. Measurement of pH of different solutions like aerated drinks, fruit juices, shampoos and soaps (use dilute solutions of soaps and shampoos to prevent damage to the glass electrode) using pH-meter.
2. Preparation of buffer solutions:
 - a. Sodium acetate-acetic acid
 - b. Ammonium chloride-ammonium hydroxide
3. Measurement of the pH of buffer solutions and comparison of the values with theoretical values.

Organic Chemistry

1. Purification of organic compounds by crystallization (from water and alcohol) and distillation.
2. Criteria of Purity: Determination of melting and boiling points.
3. Preparations: Mechanism of various reactions involved to be discussed. Recrystallisation, determination of melting point and calculation of quantitative yield to be done.
 - a) Bromination of Phenol/Aniline
 - b) Benzoylation of amines/phenols
 - c) Oxime and 2,4-dinitrophenylhydrazone of aldehyde/ketone
- 4 (a) Estimation of Aniline
(b) Estimation of Phenol.

Reference Books

1. Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., *Textbook of Practical Organic Chemistry*, Prentice-Hall, 5th edition, 1996.
2. Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry* Orient-Longman, 1960.
3. Khosla, B. D.; Garg, V. C. & Gulati, A. *Senior Practical Physical Chemistry*, R.Chand & Co.: New Delhi (2011).

CORE 8: (SUPPORTIVE 2) MATHEMATICS-II**UNIT -1 (INTEGRAL CALCULUS)**

Evaluation of $\int e^{ax} \cos(bx) dx$ and $\int e^{ax} \sin(bx) dx$, - Bernoulli's formula for integration by parts – Definite integrals – reduction formulae – Related definite integrals – properties – reduction formula for $\int e^{ax} x^n dx$, $\int \sin^n x dx$ and $\int \cos^n x dx$ (n is a positive integer) - Evaluation

of $\int_0^{\infty} e^{-x} x^n dx$, $\int_0^{\pi/2} \sin^n x dx$, $\int_0^{\pi/2} \cos^n x dx$, - Rule of writing down

$\int_0^{\pi/2} \sin^m x \cos^n x dx$ and illustrations

UNIT -2 (VECTOR INTEGRATION)

Gauss Divergence theorem and Stokes's theorem (Statement only) – Simple problems

UNIT-3 (FOURIER SERIES)

Definition – Finding Fourier co-efficient for a given period function with period 2π -

Odd and Even functions – Half range series

UNIT-4 (ORDINAR DIFFERENTIAL EQUATIONS)

Equations of the first order but not of the first degree – Equations solvable for dy/dx , - equations solvable for y - Equations Solvable for x - Clairaut's form (simple cases) – Linear equations with constant coefficients – Evaluation of the particular integral of the equation – e^x , $\sin(ax)$, $\cos(ax)$, x^k , $e^{ax}f(x)$

UNIT – 5 (LAPLACE TRANSFORM)

Definitions – Condition for the existence of Laplace transform – Laplace transform of 1, e^{at} , e^{-at} , $\cos(at)$, $\sin(at)$, $\sinh(at)$, $\cosh(at)$ and t^n - Simple problems – Laplace transform of the derivatives – Laplace transform of the integral – first shifting theorem – change of scale of property – Laplace transform of function multiplied by t , divisible by t – inverse Laplace transform – solution of ordinary differential equations using Laplace transforms

Text books:

1. S. Narayanan and T.K. Manicavachagom pillai, Calculus, S. Viswanathan Publishers
2. P. DuraiPandian, Vector Calculus, 1984
3. Vittal and Malini, Allied Mathematics, V.Margham Publishers, 1997

Reference Books:

1. George B.Thomas, Maurice D.Weir and Joel Hass, Thomas' Calculus 12th Edition, Pearson Education, 2015
2. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9th Edition, 2011

**CORE 9: CHEMISTRY-III: SOLUTIONS, PHASE EQUILIBRIUM,
ELECTROCHEMISTRY & FUNCTIONAL GROUP ORGANIC CHEMISTRY-II****Unit I Solutions and Phase****Equilibria Solutions**

Thermodynamics of ideal solutions: Ideal solutions and Raoult's law, deviations from Raoult's law – non-ideal solutions. Distillation of solutions. Lever rule. Azeotropes. Partial miscibility of liquids: Critical solution temperature. Immiscibility of liquids- Principle of steam distillation. Nernst distribution law and its applications, solvent extraction.

(8 Lectures)

Phase Equilibrium

Phases, components and degrees of freedom of a system. Gibbs Phase Rule. Derivation of Clausius–Clapeyron equation and its importance in phase equilibria. Phase diagrams of one-component systems (water) and two component systems involving eutectics (lead-silver, metal-organic compound system).

(8 Lectures)

Unit II**Electrochemistry****Conductance**

Conductivity, equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes. Kohlrausch law of independent migration of ions.

Transference number. Ionic mobility. Applications of conductance measurements: determination of degree of ionization of weak electrolyte, solubility and solubility products of sparingly soluble salts, ionic product of water, hydrolysis constant of a salt. Conductometric titrations (only acid-base).

(6 Lectures)

Electrochemistry

Reversible and irreversible cells. Concept of EMF of a cell. Measurement of EMF of a cell. Nernst equation and its importance. Standard Hydrogen Electrode (SHE). Standard electrode potential. Electrochemical series.

Calculation of equilibrium constant from EMF data. Concentration cells with transference and without transference. Liquid junction potential and salt bridge.

pH determination using hydrogen electrode.

Potentiometric titrations -qualitative treatment (acid-base and oxidation-reduction only).

(8 Lectures)

Unit III Carboxylic acids, Amines and Diazonium Salts

Functional group approach for the following reactions (preparations & reactions) to be studied in context to their structure.

Carboxylic acids (aliphatic and aromatic): *Preparation* (Acidic and Alkaline hydrolysis of esters) and *Reaction*: (Hell – Volhard - Zelinsky Reaction).

Carboxylic acid derivatives (aliphatic): *Preparation* (Acid chlorides, Anhydrides, Esters and Amides from acids) and their interconversion.

Reactions: Reformatsky Reaction, Perkin condensation.

(6 Lectures)

Amines (Aliphatic and Aromatic):

Preparation: from alkyl halides, Gabriel's Phthalimide synthesis, Hofmann Bromamide reaction.

Reactions: Hofmann versus Saytzeff elimination, Carbylamine test, Hinsberg test, with HNO₂, Schotten – Baumann Reaction. Electrophilic substitution (case aniline): nitration, bromination, sulphonation.

Diazonium salts: *Preparation*: from aromatic amines.

Reactions: conversion to benzene, phenol, dyes.

(6 Lectures)

Unit IV Amino Acids, Peptides and Proteins:

Preparation of Amino Acids: Strecker synthesis, using Gabriel's phthalimide synthesis.

Zwitterion, Isoelectric point and Electrophoresis.

Reactions of Amino acids: esterification of $-\text{COOH}$ group, acetylation of $-\text{NH}_2$ group, complexation with Cu^{2+} ions, ninhydrin test.

Overview of Primary, Secondary, Tertiary and Quaternary Structure of proteins.

Determination of Primary structure of Peptides by degradation - Edman degradation (N-terminal) and C-terminal (thiohydantoin and with carboxypeptidase enzyme). Synthesis of simple peptides (upto dipeptides) by *N*-protection (t-butyloxycarbonyl and phthaloyl) & C-activating groups and Merrifield solid-phase synthesis.

(10 Lectures)

Unit V Carbohydrates:

Carbohydrates: Classification, and General Properties, Glucose and Fructose (open chain and cyclic structure), Determination of configuration of monosaccharides, Mutarotation, ascending and descending in monosaccharides. Structure of disaccharides (sucrose, cellobiose, maltose, lactose) and polysaccharides (starch and cellulose) excluding their structure elucidation.

(8 Lectures)

Reference Books:

1. Barrow, G.M. *Physical Chemistry* Tata McGraw-Hill (2007).
2. Castellan, G.W. *Physical Chemistry* 4th Ed. Narosa (2004).
3. Kotz, J.C., Treichel, P.M. & Townsend, J.R. *General Chemistry*, Cengage Learning India Pvt. Ltd.: New Delhi (2009).
4. Mahan, B.H. *University Chemistry*, 3rd Ed. Narosa (1998).
5. Petrucci, R.H. *General Chemistry*, 5th Ed., Macmillan Publishing Co.: New York (1985).
6. Morrison, R. T. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
7. Finar, I. L. *Organic Chemistry (Volume 1)*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
8. Finar, I. L. *Organic Chemistry (Volume 2)*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
9. Nelson, D. L. & Cox, M. M. *Lehninger's Principles of Biochemistry* 7th Ed., W. H. Freeman.
10. Berg, J.M., Tymoczko, J.L. & Stryer, L. *Biochemistry*, W.H. Freeman, 2002.

CORE 10: FUEL CHEMISTRY**Unit I - Review of energy sources** (renewable and nonrenewable).

Classification of fuels and their calorific value.

Unit II - Coal:

Uses of coal (fuel and nonfuel) in various industries, its composition, carbonization of coal. Coal gas, producer gas and water gas—composition and uses. Fractionation of coal tar, uses of coal tar bases chemicals, requisites of a good metallurgical coke, Coal gasification (Hydro gasification and Catalytic gasification), Coal liquefaction and Solvent Refining.

Unit III - Petroleum and Petrochemical Industry:

Composition of crude petroleum, Refining and different types of petroleum products and their applications.

Fractional Distillation (Principle and process), Cracking (Thermal and catalytic cracking), Reforming Petroleum and non-petroleum fuels (LPG, CNG, LNG, biogas, fuels derived from biomass), fuel from waste, synthetic fuels (gaseous and liquids), clean fuels.

Unit IV - Petrochemicals:

Vinyl acetate, Propylene oxide, Isoprene, Butadiene, Toluene and its derivatives Xylene.

Unit V- Lubricants:

Classification of lubricants, lubricating oils (conducting and nonconducting) Solid and semisolid lubricants, synthetic lubricants.

Properties of lubricants (viscosity index, cloud point, pore point) and their determination.

Reference Books:

1. Stocchi, E. *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK (1990).
2. Jain, P.C. & Jain, M. *Engineering Chemistry* Dhanpat Rai & Sons, Delhi.
3. Sharma, B.K. & Gaur, H. *Industrial Chemistry*, Goel Publishing House, Meerut (1996).

CORE 11: MOLECULAR MODELLING & DRUG DESIGN**Unit I Introduction to Molecular Modeling**

Introduction: Useful Concepts in Molecular Modeling: Coordinate Systems. Potential Energy Surfaces. Molecular Graphics. Surfaces. Computer Hardware and Software. The Molecular Modelling Literature.

(10 Lectures)

Unit II Force Fields

Fields. Bond Stretching. Angle Bending. Introduction to non-bonded interactions. Electrostatic interactions. van der Waals Interactions. Hydrogen bonding in Molecular Mechanics. Force Field Models for the Simulation of Liquid Water.

(14 Lectures)

Unit III Energy Minimization and Computer Simulation

Minimization and related methods for exploring the energy surface. Non-derivative method, First and second order minimization methods. Computer simulation methods. Simple thermodynamic properties and Phase Space. Boundaries. Analyzing the results of a simulation and estimating Errors.

(12 Lectures)

Unit IV Molecular Dynamics & Monte Carlo Simulation

Molecular Dynamics Simulation Methods. Molecular Dynamics using simple models. Molecular Dynamics with continuous potentials. Molecular Dynamics at constant temperature and pressure. Metropolis method. Monte Carlo simulation of molecules. Models used in Monte Carlo simulations of polymers.

(12 Lectures)

Unit V Structure Prediction and Drug Design

Structure prediction - Introduction to comparative Modeling. Sequence alignment. Constructing and evaluating a comparative model. Predicting protein structures by 'Threading', Molecular docking. Structure based de novo ligand design, Drug Discovery – Chemoinformatics – QSAR.

(12 Lectures)

Reference Books:

1. Leach, A.R. *Molecular Modelling Principles and Application*, Longman, 2001.
2. Haile, J.M. *Molecular Dynamics Simulation Elementary Methods*, John Wiley and Sons, 1997.
3. Gupta, S.P. *QSAR and Molecular Modeling*, Springer - Anamaya Publishers, 2008.

CORE 12: (SUPPORTIVE 3) PHYSICS-I

UNIT-I: Moment of inertia – radius of gyration - parallel and perpendicular axis theorem, calculation of moment of inertia of (a) ring (b) disc (c) hollow and solid spheres. Angular momentum, torque and the relation between them. Simple harmonic motion, equation of SHM, composition of two SHM at right angles, Lissajous figures.

UNIT-II: Young's modulus — bulk modulus — rigidity modulus and Poisson's ratio — derivation of the expression for bending moment of a beam in terms of its curvature of neutral axis – determination of Young's modulus of a rectangular bar — non – uniform bending — pin and microscope method-with theory (mathematical derivation) – expression for couple per unit twist-determination of rigidity modulus – torsion pendulum.

UNIT-III: Surface tension and surface energy – interfacial surface tension-experimental determination of surface tension by drop weight method-variation of surface tension with temperature — Jaeger's method – streamline and turbulent motion- equation of continuity.

UNIT -IV: Newton's law of cooling – determination of specific heat of liquid-Barton's cooling correction in calorimetric experiments – specific heat capacity of gases – ratio of specific heat capacities — determination of the ratio of specific heats of gases – Clement and Desormes method. Coefficient of thermal conductivity of a bad conductor - Lee's disc method-determination of thermal conductivity by Forbes's method. Blackbody radiation-Stefan's law – determination of Stefan's constant — second law of thermodynamics –Carnot cycle – indicator diagram – derivation of efficiency-Kelvin temperature scale.

UNIT - V: Interference — method of producing coherent sources - Fresnel's biprism — Newton's rings through transmission and reflection - Interferometers - Michelson's Interferometer – wavelength determination - Jamin's refractometer. Diffraction - Fresnel's diffraction – Fraunhofer diffraction – half period zones-rectilinear propagation of light – diffraction at a straight edge. Polarization – optical activity-specific rotator power – Polarimeter – Lawrence half shade - determination of specific rotator power-double refraction – optic axis.

TEXTBOOKS:

1. Dr.Sabesan and others, A Textbook of Allied Physics Vol-I and Vol-II
2. Ponnusamy and others, Ancillary Physics.
3. Kamalakannan and others, Ancillary Physics.

REFERENCE BOOKS

1. Halliday, Resnik & Walker, Fundamentals of Physics, 5 Ed.(Asian Books Pvt. Ltd., New Delhi)

PHYSICS I – PRACTICALS

Choose any 7 experiments from the list given below for each semester without overlap

LIST OF EXPERIMENTS:

1. Young's modulus-Non-Uniform bending-Pin & Microscope
2. Rigidity modulus-Torsional oscillations without masses.
3. Comparison of coefficient of viscosity.
4. Surface tension of a liquid and interfacial surface tension by drop weight method.
5. Spectrometer – Refractive index of a liquid- Hollow prism.
6. Spectrometer -Grating-N determination by normal incidence method.
7. Spectrometer -Grating-wavelength determination by minimum deviation method.
8. Newton's Rings.
9. Thermal conductivity of a bad conductor - Lee's disc method
10. Post office box- laws of resistance and specific resistance.
11. Melde's apparatus-Determination of frequency.
12. Meter Bridge - Temperature coefficient of the material of a coil of wire
13. Potentiometer – calibration of low range voltmeter (0 -1.5 V).
14. Potentiometer - calibration of ammeter (0-1.5 amps).
15. Figure of merit of a periodic moving coil galvanometer.
16. Field along the axis of the circular coil carrying current- Determination of BH.
17. Newton's law of cooling and specific heat determination
18. Frequency measurement by forming Lissajous figures
19. Study of Half wave rectifier.
20. Transistor characteristics-CE mode- only transfer characteristics.

TEXTBOOKS:

1. Ouseph and V.Srinivasan, Practical Physics- Part-I &II.

REFERENCE BOOKS

1. Mathchan Lazarus and others-Practical Physics

CORE 13: CHEMISTRY-IV: COORDINATION CHEMISTRY, STATES OF MATTER & CHEMICAL KINETICS**Unit-I Transition Elements (3d series)**

General group trends with special reference to electronic configuration, variable valency, colour, magnetic and catalytic properties, ability to form complexes and stability of various oxidation states (Latimer diagrams) for Mn, and Cr.

Lanthanoids and actinoids: Electronic configuration, oxidation states, colour, magnetic properties, lanthanide contraction and its consequences, separation of lanthanides (ion exchange method only).

(12 Lectures)

Unit-II Coordination Chemistry

IUPAC system of nomenclature. **Valence Bond Theory (VBT):** Inner and outer orbital complexes of Cr, Fe, Co, Ni and Cu (coordination numbers 4 and 6). Structural and stereoisomerism in complexes with coordination numbers 4 and 6. Drawbacks of VBT.

(8

Lectures) **Crystal Field Theory:** Crystal field effect, octahedral symmetry. Crystal field stabilization energy (CFSE), Crystal field effects for weak and strong fields. Tetrahedral symmetry. Factors affecting the magnitude of D. Spectrochemical series. Comparison of CFSE for *Oh* and *Td* complexes, Tetragonal distortion of octahedral geometry. Jahn-Teller distortion.

(10 Lectures)

Unit-III Kinetic Theory of Gases

Postulates of Kinetic Theory of Gases and derivation of the kinetic gas equation. Deviation of real gases from ideal behaviour, compressibility factor, causes of deviation. vander Waals equation of state for real gases. Boyle temperature (derivation not required). Critical phenomena, critical constants and their calculation from van der Waals equation. Maxwell Boltzmann distribution laws of molecular velocities and molecular energies (graphic representation – derivation not required) and their importance.

Temperature dependence of these distributions. Most probable, average and root mean square velocities (no derivation). Collision cross section, collision number, collision frequency, collision diameter and mean free path of molecules. Viscosity of gases and effect of temperature and pressure on coefficient of viscosity (qualitative treatment only).

(8 Lectures)

Unit IV – Condensed States of**Matter Liquids**

Viscosity of a liquid and determination of coefficient of viscosity using Ostwald viscometer. Effect of temperature on coefficient of viscosity of a liquid (qualitative treatment only).

(6 Lectures)

Solids

Forms of solids. Symmetry elements, unit cells, crystal systems, Bravais lattice types and identification of lattice planes. Laws of Crystallography - Law of constancy of interfacial angles, Law of rational indices. Miller indices. X-Ray diffraction by crystals, Bragg's law. Structures of NaCl, KCl and CsCl (qualitative treatment only). Defects in crystals (Schottky and Frenkel only). Glasses and liquid crystals.

(8 Lectures)

Unit-V Chemical Kinetics

The concept of reaction rates. Effect of temperature, pressure, catalyst and other factors on reaction rates. Order and molecularity of a reaction. Derivation of integrated rate equations for zero, first and second order reactions. Half-life of a reaction. General methods

for determination of order of a reaction. Concept of activation energy and its calculation from Arrhenius equation.

Theories of Reaction Rates: Collision theory and Activated Complex theory of bimolecular reactions.

(8 Lectures)

Reference Books:

1. Barrow, G.M. *Physical Chemistry* Tata McGraw-Hill (2007).
2. Castellan, G.W. *Physical Chemistry* 4th Ed. Narosa (2004).
3. Kotz, J.C., Treichel, P.M. & Townsend, J.R. *General Chemistry* Cengage Learning India Pvt. Ltd., New Delhi (2009).
4. Mahan, B.H. *University Chemistry* 3rd Ed. Narosa (1998).
5. Petrucci, R.H. *General Chemistry* 5th Ed. Macmillan Publishing Co.: New York (1985).
6. Cotton, F.A. & Wilkinson, G. *Basic Inorganic Chemistry*, Wiley.
7. Shriver, D.F. & Atkins, P.W. *Inorganic Chemistry*, Oxford University Press.
8. Wulfsberg, G. *Inorganic Chemistry*, Viva Books Pvt. Ltd.
9. Rogers, G.E. *Inorganic & Solid State Chemistry*, Cengage Learning India Ltd., 2008.

CORE 14: NANO CHEMISTRY**Unit-I: Basics of Nanochemistry**

Basics of nanomaterials: Properties of nanomaterials, quantum confinement effect, surface to volume ratio, surface properties of nanoparticles. Classification of the nano materials – zero dimensional, one dimensional, two dimensional and three dimensional nanostructures.

Unit-II: Properties of Nanomaterials

Mechanical, optical, electronic, magnetic, thermal and chemical properties of nanomaterials. Size dependent properties-size dependent absorption spectra

Unit-III: Synthetic Techniques

Chemical methods: sol-gel synthesis, solvothermal synthesis, thermolysis route. Physical methods: Pulsed laser deposition- Magnetron sputtering

Unit-IV: Applications of Nanomaterials

Catalysis on nanoparticles, semiconductors, sensors, and electronic devices, photochemistry and nanophotonics, applications of CNTs, nanomaterials in biology and medicine.

Unit-V: Characterization Techniques

X-ray diffraction- Electron microscopes – scanning electron microscopes (SEM) – transmission electron microscopes (TEM) – scanning probe microscopy – atomic force microscopy (AFM) – scanning tunneling electron microscope (STEM) – basic principles only.

Reference Books:

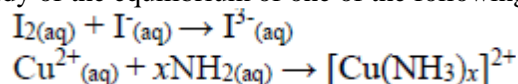
1. S.Shanmugam, Nanotechnology, , MJP Publishers, Chennai (2010).
2. Patrick Salomon , A Handbook on Nanochemistry,, Dominant Publishers and Distributers, New Delhi.
3. S. Balaji , Nanobiotechnology, MJP Publishers, Chennai (2010).
4. CNR Rao The Chemistry of Nanomaterial: Synthesis, Properties and Applications, Vol. I and II, Springer (2006).
5. Nanotechnology: Basic Science and Emerging Technologies, Mick Wilson, Kamali Kannangara, Geoff Smith, Michelle Simmons, Burkhard Raguse, Overseas Press, (2005).
6. G. B. Segreev, Nanochemistry, , Elsevier, Science, New York, (2006).
7. C. N. R. Rao, A. Mu'ller, A. K. Cheetham, "The Chemistry of Nanomaterials: Synthesis, Properties and Applications" WILEY-VCH Verlag GmbH & Co. KGaA, weinheim, 2004
8. C.N.R. Rao, G.U. Kulkarni, P.J. Thomas, Nanocrystals: Synthesis, Properties and Applications" Springer Series in materials science-95, Springer-Verlag Berlin Heidelberg 2007
9. Znong Lin Wang, "Characterization of nanophase materials" WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim, 2000.

List of Experiments for Practical

1. Chemical synthesis of Ag nanoparticles; UV-Visible absorption of the colloidal sol; Mie formalism; Estimation of size by curve fitting
2. Chemical synthesis of CdS nanoparticles; Optical absorption spectra; Band gap estimation from the band edge
3. Synthesis of ZnS nanoparticles by chemical route and determination of band structure through UV-Vis spectroscopy.
4. Aqueous to organic phase transfer of Ag and CdS nanoparticles; Confirmation by UV- Visible absorption.

CORE 15: CHEMISTRY LABORATORY**CHEMISTRY LABORATORY III: SOLUTIONS, PHASE EQUILIBRIUM,
ELECTROCHEMISTRY & FUNCTIONAL GROUP ORGANIC CHEMISTRY-II****List of Experiments for****Practical Physical Chemistry****Distribution**

Study of the equilibrium of one of the following reactions by the distribution method:

**Phase Equilibria**

- Construction of the phase diagram of a binary system (simple eutectic) using cooling curves.
- Determination of the critical solution temperature and composition of the phenol-water system and study of the effect of impurities on it.
- Study of the variation of mutual solubility temperature with concentration for the phenol-water system and determination of the critical solubility temperature.

Conductance

- Determination of cell constant
- Determination of equivalent conductance, degree of dissociation and dissociation constant of a weak acid.
- Performing the following conductometric titrations:
 - Strong acid vs. strong base
 - Weak acid vs. strong base

Potentiometry

Performing the following potentiometric titrations:

- Strong acid vs. strong base
- Weak acid vs. strong base
- Potassium dichromate vs. Mohr's salt

Organic Chemistry

- Systematic Qualitative Organic Analysis of Organic Compounds possessing monofunctional groups (-COOH, phenolic, aldehydic, ketonic, amide, nitro, amines) and preparation of one derivative.
- Separation of amino acids by paper chromatography.
 - Determination of the concentration of glycine solution by formylation method.
 - Titration curve of glycine.
 - Action of salivary amylase on starch
 - Effect of temperature on the action of salivary amylase on starch.
 - Differentiation between a reducing and a nonreducing sugar.

Reference Books:

- Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., *Textbook of Practical Organic Chemistry*, Prentice-Hall, 5th edition, 1996.
- Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry* Orient-Longman, 1960.
- Khosla, B. D.; Garg, V. C. & Gulati, A. *Senior Practical Physical Chemistry*, R. Chand & Co.: New Delhi (2011).
- Ahluwalia, V.K. & Aggarwal, R. *Comprehensive Practical Organic Chemistry*, Universities Press

CHEMISTRY LABORATORY IV: COORDINATION CHEMISTRY, STATES OF MATTER & CHEMICAL KINETICS

List of Experiments for Practical

Inorganic Chemistry

Semi-micro qualitative analysis using H₂S of mixtures - not more than four ionic species (two anions and two cations and excluding insoluble salts) out of the following:

Cations : NH₄⁺, Pb²⁺, Cu²⁺, Cd²⁺, Fe³⁺, Al³⁺, Co²⁺, Cr³⁺, Ni²⁺, Mn²⁺, Zn²⁺, Ba²⁺, Sr²⁺, Ca²⁺
Anions: CO₃²⁻, S²⁻, SO₄²⁻, NO₂⁻, CH₃COO⁻, Cl⁻, Br⁻, I⁻, NO₃⁻, SO₃²⁻, PO₄³⁻, BO₃³⁻, C₂O₄²⁻, F⁻

(Spot tests should be carried out wherever feasible)

1. Estimation of the amount of nickel present in a given solution as bis(dimethylglyoximate)nickel(II) or aluminium as oximate in a given solution gravimetrically.
2. Drawing calibration curve (absorbance at λ_{max} vs. concentration) for various concentrations of a given coloured compound (KMnO₄/ CuSO₄) and estimation of the concentration of the same in a given solution.
3. Determination of the composition of the Fe³⁺-salicylic acid complex solution by Job's method.
4. Estimation of (i) Mg²⁺ or (ii) Zn²⁺ by complexometric titrations using EDTA.
5. Estimation of total hardness of a given sample of water by complexometric titration.
6. Determination of concentration of Na⁺ and K⁺ using Flame Photometry.

Physical Chemistry

- I. Viscosity measurement (use of organic solvents excluded).
 - i. Determination of the relative and absolute viscosity of a liquid or dilute solution using an Ostwald's viscometer.
 - ii. Studying of the variation of viscosity of an aqueous solution with concentration of solute.
- II. Chemical Kinetics

Studying the kinetics of the following reactions.

 - a. Initial rate method: Iodide-persulphate reaction

Integrated rate method:

 - b. Acid hydrolysis of Ethyl acetate with hydrochloric acid.
 - c. Saponification of ethyl acetate.
 - d. Comparison of the strengths of Acids by studying kinetics of hydrolysis of ethyl acetate

Reference Books:

1. Svehla, G. *Vogel's Qualitative Inorganic Analysis*, Pearson Education, 2012.
2. Mendham, J. *Vogel's Quantitative Chemical Analysis*, Pearson, 2009.
3. Khosla, B. D.; Garg, V. C. & Gulati, A. *Senior Practical Physical Chemistry*, R. Chand & Co.: New Delhi (2011).

CORE 16: (SUPPORTIVE 4)- PHYSICS -II

UNIT-I: Ultrasonics – magnetostriction – piezo electric methods – properties of ultrasonic waves and applications.

UNIT -II: Gauss's law with proof – Electric intensity and potential due to a uniformly charged hollow conductor at a point outside, on the surface and inside a spherical conductor — capacity of a parallel plate condenser with and without a dielectric slab - capacity of a spherical conductor-Biot & Savart's law — field along the axis of a circular coil carrying current – force on current carrying conductor placed in a magnetic field – theory of moving coil galvanometer.

UNIT -III: Magnetic properties of materials – relation between – the three magnetic vectors – susceptibility and permeability - para, dia and ferromagnetism (qualitative ideas) – magnetic hysteresis – superconductivity – persistent current and Meissner Effect.

UNIT-IV: Breakdown of classical mechanics — photo electric effect — Compton effect - Davison- Germer experiment - Matter waves-wave packets -de Broglie ideas- Heisenberg uncertainty principle. Radio active isotopes (production and uses) – particle accelerator – linear accelerator – particle detectors – Wilson cloud chamber – Scintillation counter – nuclear models – Liquid drop model-Fission and Fusion reaction- nuclear reactors.

UNIT-V: Rectifiers & filters (qualitative ideas) – Transistor characteristics – transistor as a RC coupled amplifier – frequency response (without derivation) – band width – basic principles of an oscillator-Hartley oscillator – working (without derivation) – elementary ideas about modulation – elementary ideas about TV transmission and reception.

TEXTBOOKS:

1. Dr.Sabesan and others, A Textbook of Allied Physics-Vol-I and Vol-II.
2. Ponnusamy and others, Ancillary Physics.
3. Kamaiakannan and others, AncillaryPhysics.

REFERENCEBOOKS

1. Halliday, Resnik, Walker, Fundamentals of Physics, 5th Ed. (Asian Books Pvt. Ltd., New Delhi)

PHYSICS II – PRACTICALS

Ref: Physics Practical I

CORE 17: ANALYTICAL METHODS IN CHEMISTRY**Unit I Qualitative and quantitative aspects of analysis:**

Sampling, evaluation of analytical data, errors, accuracy and precision, methods of their expression, normal law of distribution if indeterminate errors, statistical test of data; F, Q and t test, rejection of data, and confidence intervals.

(5 Lectures)

Unit II Optical methods of analysis:

Origin of spectra, interaction of radiation with matter, fundamental laws of spectroscopy and selection rules, validity of Beer-Lambert's law.

UV-Visible Spectrometry: Basic principles of instrumentation (choice of source, monochromator and detector) for single and double beam instrument;

Infrared Spectrometry: Basic principles of instrumentation (choice of source, monochromator & detector) for single and double beam instrument; sampling techniques.

Structural illustration through interpretation of data.

Unit III Flame Atomic Absorption and Emission Spectrometry

Flame Atomic Absorption and Emission Spectrometry: Basic principles of instrumentation (choice of source, monochromator, detector, choice of flame and Burner designs. Techniques of atomization and sample introduction. Techniques for the quantitative estimation of trace level of metal ions from water samples

Unit IV Thermal and Electroanalytical methods of analysis

Theory of thermogravimetry (TG), basic principle of instrumentation. Techniques for quantitative estimation of Ca and Mg from their mixture.

(5 Lectures)

Electroanalytical methods:

Classification of electroanalytical methods, basic principle of pH metric, potentiometric and conductometric titrations. Techniques used for the determination of equivalence points. Techniques used for the determination of pKa values.

(10 Lectures)

Unit V Separation techniques

Solvent extraction: Classification, principle and efficiency of the technique. Qualitative and quantitative aspects of solvent extraction: extraction of metal ions from aqueous solution, extraction of organic species from the aqueous and nonaqueous media.

Chromatography: Classification, principle and efficiency of the technique.

Mechanism of separation: adsorption, partition & ion exchange. Development of chromatograms: frontal, elution and displacement methods. Qualitative and quantitative aspects of chromatographic methods of analysis: IC, GLC, GPC, TLC and HPLC. Chiral chromatographic techniques using chiral columns (GC and HPLC).

(15 Lectures)

Reference Books:

1. Jeffery, G.H., Bassett, J., Mendham, J. & Denney, R.C. *Vogel's Textbook of Quantitative Chemical Analysis*, John Wiley & Sons, 1989.
2. Willard, H.H., Merritt, L.L., Dean, J. & Settoe, F.A. *Instrumental Methods of Analysis*, 7th Ed. Wadsworth Publishing Company Ltd., Belmont, California, USA, 1988.
3. Christian, G.D; *Analytical Chemistry*, 6th Ed. John Wiley & Sons, New York, 2004.
4. Harris, D. C. *Exploring Chemical Analysis*, Ed. New York, W.H. Freeman, 2001.
5. Khopkar, S.M. *Basic Concepts of Analytical Chemistry*. New Age, International Publisher, 2009.

6. Skoog, D.A. Holler F.J. & Nieman, T.A. *Principles of Instrumental Analysis*, Cengage Learning India Ed.
7. Mikes, O. *Laboratory Handbook of Chromatographic & Allied Methods*, Elles Horwood Series on Analytical Chemistry, John Wiley & Sons, 1979.
8. Ditts, R.V. *Analytical Chemistry; Methods of Separation*, van Nostrand, 1974.

CORE 18: INDUSTRIAL CHEMICALS & ENVIRONMENT**Unit I Industrial Gases and Inorganic Chemicals**

Industrial Gases: Large scale production, uses, storage and hazards in handling of the following gases: oxygen, nitrogen, argon, neon, helium, hydrogen, acetylene, carbon monoxide, chlorine, fluorine, sulphur dioxide and phosgene.

Inorganic Chemicals: Manufacture, application, analysis and hazards in handling the following chemicals: hydrochloric acid, nitric acid, sulphuric acid, caustic soda, common salt, borax, bleaching powder, sodium thiosulphate, hydrogen peroxide, potash alum, chrome alum, potassium dichromate and potassium permanganate.

(10 Lectures)

Unit II Industrial Metallurgy

Chief modes of occurrence of metals based on standard electrode potentials. Ellingham diagrams for reduction of metal oxides using carbon as reducing agent.

Hydrometallurgy, Methods of purification of metals (Al, Pb, Ti, Fe, Cu, Ni, Zn): electrolytic, oxidative refining, Kroll process, Parting process, van Arkel-de Boer process and Mond's process.

Preparation of metals (ferrous and nonferrous) and ultrapure metals for semiconductor technology.

(8 Lectures)

Unit III Environment and its Segments Part A

Ecosystems. Biogeochemical cycles of carbon, nitrogen and sulphur.

Air Pollution: Major regions of atmosphere. Chemical and photochemical reactions in atmosphere. Air pollutants: types, sources, particle size and chemical nature; Photochemical smog: its constituents and photochemistry. Environmental effects of ozone, Major sources of air pollution.

Pollution by SO₂, CO₂, CO, NO_x, H₂S and other foul smelling gases. Methods of estimation of CO, NO_x, SO_x and control procedures.

Effects of air pollution on living organisms and vegetation. Greenhouse effect and Global warming, Ozone depletion by oxides of nitrogen, chlorofluorocarbons and Halogens, removal of sulphur from coal. Control of particulates.

Unit IV Environment and its Segments

Water Pollution: Hydrological cycle, water resources, aquatic ecosystems, Sources and nature of water pollutants, Techniques for measuring water pollution, Impacts of water pollution on hydrological and ecosystems.

Water purification methods. Effluent treatment plants (primary, secondary and tertiary treatment).

Industrial effluents from the following industries and their treatment: electroplating, textile, tannery, dairy, petroleum and petrochemicals, agro, fertilizer, etc. Sludge disposal. Industrial waste management, incineration of waste. Water treatment and purification (reverse osmosis, electro dialysis, ion exchange). Water quality parameters for wastewater, industrial water and domestic water.

(30 Lectures)

UNIT V Energy & Environment

Sources of energy: Coal, petroleum and natural gas. Nuclear Fusion / Fission, Solar energy, Hydrogen, geothermal, Tidal and Hydro, etc.

Nuclear Pollution: Disposal of nuclear waste, nuclear disaster and its management.

(10 Lectures)

Biocatalysis

Introduction to biocatalysis: Importance in “Green Chemistry” and Chemical Industry.

(6 Lectures)

Reference Books:

1. E. Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK.
2. R.M. Felder, R.W. Rousseau: *Elementary Principles of Chemical Processes*, Wiley Publishers, New Delhi.
3. J. A. Kent: *Riegel's Handbook of Industrial Chemistry*, CBS Publishers, New Delhi.
4. S. S. Dara: *A Textbook of Engineering Chemistry*, S. Chand & Company Ltd. New Delhi.
5. K. De, *Environmental Chemistry*: New Age International Pvt., Ltd, New Delhi.
6. S. M. Khopkar, *Environmental Pollution Analysis*: Wiley Eastern Ltd, New Delhi.
7. S.E. Manahan, *Environmental Chemistry*, CRC Press (2005).
8. G.T. Miller, *Environmental Science* 11th edition. Brooks/ Cole (2006).
9. A. Mishra, *Environmental Studies*. Selective and Scientific Books, New Delhi (2005)

CORE 19: ORGANOMETALLICS, BIOINORGANIC CHEMISTRY, POLYNUCLEAR HYDROCARBONS AND UV, IR SPECTROSCOPY

Unit I: Chemistry of 3d metals

Oxidation states displayed by Cr, Fe, Co, Ni and Co.

A study of the following compounds (including preparation and important properties); Peroxo compounds of Cr, $K_2Cr_2O_7$, $KMnO_4$, $K_4[Fe(CN)_6]$, sodium nitroprusside, $[Co(NH_3)_6]Cl_3$, $Na_3[Co(NO_2)_6]$.

(6 Lectures)

Unit II: Organometallic Compounds

Definition and Classification with appropriate examples based on nature of metal-carbon bond (ionic, s, p and multicentre bonds). Structures of methyl lithium, Zeiss salt and ferrocene. EAN rule as applied to carbonyls. Preparation, structure, bonding and properties of mononuclear and polynuclear carbonyls of 3d metals. p-acceptor behaviour of carbon monoxide. Synergic effects (VB approach)- (MO diagram of CO can be referred to for synergic effect to IR frequencies).

(6 Lectures)

Unit III: Bio-Inorganic Chemistry

A brief introduction to bio-inorganic chemistry. Role of metal ions present in biological systems with special reference to Na^+ , K^+ and Mg^{2+} ions: Na/K pump; Role of Mg^{2+} ions in energy production and chlorophyll. Role of Ca^{2+} in blood clotting, stabilization of protein structures and structural role (bones).

(12

Lectures) **Unit IV: Polynuclear and heteronuclear aromatic compounds and Active methylene compounds:**

Polynuclear and heteronuclear aromatic compounds:

Properties of the following compounds with reference to electrophilic and nucleophilic substitution: Naphthalene, Anthracene, Furan, Pyrrole, Thiophene, and Pyridine.

(6 Lectures)

Active methylene compounds:

Preparation: Claisen ester condensation. Keto-enol tautomerism.

Reactions: Synthetic uses of ethylacetoacetate (preparation of non-heteromolecules having upto 6 carbon).

(6 Lectures)

Unit V: Application of Spectroscopy to Simple Organic Molecules

Application of visible, ultraviolet and Infrared spectroscopy in organic molecules.

Electromagnetic radiations, electronic transitions, λ_{max} & ϵ_{max} , chromophore, auxochrome, bathochromic and hypsochromic shifts. Application of electronic spectroscopy and Woodward rules for calculating λ_{max} of conjugated dienes and α, β - unsaturated compounds.

Infrared radiation and types of molecular vibrations, functional group and fingerprint region.

IR spectra of alkanes, alkenes and simple alcohols (inter and intramolecular hydrogen bonding), aldehydes, ketones, carboxylic acids and their derivatives (effect of substitution on $>C=O$ stretching absorptions).

(18 Lectures)

Reference Books:

1. James E. Huheey, Ellen Keiter & Richard Keiter: *Inorganic Chemistry: Principles of Structure and Reactivity*, Pearson Publication.
2. G.L. Miessler & Donald A. Tarr: *Inorganic Chemistry*, Pearson Publication.
3. J.D. Lee: *A New Concise Inorganic Chemistry*, E.L.B.S.
4. F.A. Cotton & G. Wilkinson: *Basic Inorganic Chemistry*, John Wiley & Sons.
5. I.L. Finar: *Organic Chemistry* (Vol. I & II), E.L.B.S.
6. John R. Dyer: *Applications of Absorption Spectroscopy of Organic Compounds*, Prentice Hall.
7. R.M. Silverstein, G.C. Bassler & T.C. Morrill: *Spectroscopic Identification of Organic Compounds*, John Wiley & Sons.
8. R.T. Morrison & R.N. Boyd: *Organic Chemistry*, Prentice Hall.
9. Peter Sykes: *A Guide Book to Mechanism in Organic Chemistry*, Orient Longman.
10. Arun Bahl and B. S. Bahl: *Advanced Organic Chemistry*, S. Chand.

CORE 20: CHEMISTRY LABORATORY**CHEMISTRY LABORATORY-V: INDUSTRIAL CHEMICALS & ENVIRONMENT****List of Experiments for Practical**

1. Determination of dissolved oxygen in water.
2. Determination of Chemical Oxygen Demand (COD)
3. Determination of Biological Oxygen Demand (BOD)
4. Percentage of available chlorine in bleaching powder.
5. Measurement of chloride, sulphate and salinity of water samples by simple titration method (AgNO_3 and potassium chromate).
6. Estimation of total alkalinity of water samples (CO_3^{2-} , HCO_3^-) using double titration method.
7. Measurement of dissolved CO_2 .
8. Study of some of the common bioindicators of pollution.
9. Estimation of SPM in air samples.
10. Preparation of borax/ boric acid.

Reference Books:

1. E. Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK.
2. R.M. Felder, R.W. Rousseau: *Elementary Principles of Chemical Processes*, Wiley Publishers, New Delhi.
3. J. A. Kent: *Riegel's Handbook of Industrial Chemistry*, CBS Publishers, New Delhi.
4. S. S. Dara: *A Textbook of Engineering Chemistry*, S. Chand & Company Ltd. New Delhi.
5. K. De, *Environmental Chemistry*: New Age International Pvt. Ltd, New Delhi.
6. S. M. Khopkar, *Environmental Pollution Analysis*: Wiley Eastern Ltd, New Delhi

CHEMISTRY LABORATORY-VI: ORGANOMETALLICS, BIOINORGANIC CHEMISTRY, POLYNUCLEAR HYDROCARBONS AND UV, IR SPECTROSCOPY**List of Experiments for Practical****Inorganic Chemistry**

1. Separation of mixtures by chromatography: Measure the R_f value in each case. (Combination of two ions to be given)
Paper chromatographic separation of Fe^{3+} , Al^{3+} and Cr^{3+} or
Paper chromatographic separation of Ni^{2+} , Co^{2+} , Mn^{2+} and Zn^{2+}
2. Preparation of any two of the following complexes and measurement of their conductivity:
 - (i) tetraamminecarbonatocobalt (III) nitrate
 - (ii) tetraamminecopper (II) sulphate
 - (iii) potassium trioxalatoferrate (III) trihydrateCompare the conductance of the complexes with that of M/1000 solution of NaCl, MgCl_2 and LiCl_3 .

Organic Chemistry

Systematic Qualitative Organic Analysis of Organic Compounds possessing mono functional groups (-COOH, phenolic, aldehydic, ketonic, amide, nitro, amines) and preparation of one derivative.

Reference Books:

1. A.I. Vogel: Qualitative Inorganic Analysis, Prentice Hall, 7th Edn.
2. A.I. Vogel: Quantitative Chemical Analysis, Prentice Hall, 6th Edn.
3. Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., *Textbook of Practical Organic Chemistry*, Prentice-Hall, 5th edition, 1996.
4. Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry* Orient-Longman, 1960.

CORE 21: POLYMER CHEMISTRY**Unit I Introduction and importance of polymeric materials**

Different schemes of classification of polymers, Polymer nomenclature, Molecular forces and chemical bonding in polymers.

(4 Lectures)

Functionality and its importance:

Criteria for synthetic polymer formation, classification of polymerization processes, Relationships between functionality, extent of reaction and degree of polymerization. Bifunctional systems, Poly-functional systems.

(8 Lectures)

Unit II Kinetics of Polymerization

Mechanism and kinetics of step growth, radical chain growth and coordination polymerizations, Mechanism and kinetics of copolymerization, polymerization techniques.

(8 lectures)

Unit III Structure and Morphology of Polymers

Determination of crystalline melting point and degree of crystallinity, Morphology of crystalline polymers, Factors affecting crystalline melting point.

(4 Lectures)

Glass transition temperature (T_g): Determination of T_g Factors affecting glass transition temperature (T_g).

(8 Lectures)

Nature and structure of polymers-Structure Property relationships.

Polymer Solutions – Criteria for polymer solubility, Solubility parameter, Thermodynamics of polymer solutions, entropy, enthalpy, and free energy change of mixing of polymers solutions, Lower and Upper critical solution temperatures.

(8 Lectures)

Determination of molecular weight of polymers (*M_n*, *M_w*, etc) light scattering and osmotic pressure methods. Molecular weight distribution and its significance. Polydispersity index.

(8 Lectures)

Unit V P Preparation and Properties of Polymers

Properties of Polymers (Physical, thermal, Flow & Mechanical Properties).

Brief introduction to preparation, structure, properties and application of the following polymers: polyolefins, polystyrene and styrene copolymers, poly(vinyl chloride), poly(vinyl acetate), acrylic polymers, fluoropolymers, polyamides. Phenol formaldehyde resins (Bakelite, Novolac), polyurethanes, silicone polymers, polydienes, Polycarbonates, Conducting Polymers, [polyacetylene, polyaniline, poly(p-phenylene sulphide polypyrrole, polythiophene)].

(10 Lectures)

Reference Books:

1. Seymour, R.B. & Carraher, C.E. *Polymer Chemistry: An Introduction*, Marcel Dekker, Inc. New York, 1981.
2. Odian, G. *Principles of Polymerization*, 4th Ed. Wiley, 2004.
3. Billmeyer, F.W. *Textbook of Polymer Science*, 2nd Ed. Wiley Interscience, 1971.
4. Ghosh, P. *Polymer Science & Technology*, Tata McGraw-Hill Education, 1991.
5. Lenz, R.W. *Organic Chemistry of Synthetic High Polymers*. Interscience Publishers, New York, 1967.

CORE 22: CHEMISTRY -LABORATORY**CHEMISTRY LABORATORY-VII: ANALYTICAL METHODS IN CHEMISTRY
AND ANALYTICAL CLINICAL BIOCHEMISTRY****List of Experiments for Practical: Analytical Methods in Chemistry****I. Separation Techniques Chromatography:**

(a) Separation of mixtures

(i) Paper chromatographic separation of Fe^{3+} , Al^{3+} , and Cr^{3+} .

(ii) Separation and identification of the monosaccharides present in the given mixture (glucose & fructose) by paper chromatography. Reporting the R_f values.

(b) Separate a mixture of Sudan yellow and Sudan Red by TLC technique and identify them on the basis of their R_f values.

(c) Chromatographic separation of the active ingredients of plants, flowers and juices by

TLC

II. Solvent Extractions:

1. Separation of a mixture of Ni^{2+} & Fe^{2+} by complexation with DMG and extracting the Ni^{2+} DMG complex in chloroform, and determine its concentration by spectrophotometry.

2. Solvent extraction of zirconium with amberlite LA-1, separation from a mixture of iron and gallium.

3. Determine the pH of the given aerated drinks fruit juices, shampoos and soaps.

4. Determination of Na, Ca, Li in cola drinks and fruit juices using flame photometric techniques.

5. Analysis of soil:

a. Determination of pH of soil.

b. Total soluble salt

c. Estimation of calcium, magnesium, phosphate, nitrate

6. Ion exchange:

a. Determination of exchange capacity of cation exchange resins and anion exchange resins.

b. Separation of metal ions from their binary mixture.

c. Separation of amino acids from organic acids by ion exchange chromatography.

III Spectrophotometry

1. Determination of pK_a values of indicator using spectrophotometry.

2. Structural characterization of compounds by infrared spectroscopy.

3. Determination of dissolved oxygen in water.

4. Determination of chemical oxygen demand (COD).

5. Determination of Biological oxygen demand (BOD).

6. Determine the composition of the Ferric-salicylate/ ferric-thiocyanate complex by Job's method.

Reference Books:

1. Jeffery, G.H., Bassett, J., Mendham, J. & Denney, R.C. *Vogel's Textbook of Quantitative Chemical Analysis*, John Wiley & Sons, 1989.

2. Willard, H.H., Merritt, L.L., Dean, J. & Settoe, F.A. *Instrumental Methods of Analysis*, 7th Ed. Wadsworth Publishing Company Ltd., Belmont, California, USA, 1988.

3. Christian, Gary D; *Analytical Chemistry*, 6th Ed. John Wiley & Sons, New

- York, 2004.
- Harris, Daniel C: Exploring Chemical Analysis, Ed. New York, W.H. Freeman, 2001.
 - Khopkar, S.M. Basic Concepts of Analytical Chemistry. New Age, International Publisher, 2009.
 - Skoog, D.A. Holler F.J. & Nieman, T.A. *Principles of Instrumental Analysis*, Cengage Learning India Ed.
 - Mikes, O. *Laboratory Hand Book of Chromatographic & Allied Methods*, Elles Harwood Series on Analytical Chemistry, John Wiley & Sons, 1979.
 - Ditts, R.V. *Analytical Chemistry; Methods of Separation*, van Nostrand, 1974.

List of Experiments for Practical: Analytical Clinical Biochemistry

Identification and estimation of the following:

- Carbohydrates – qualitative and quantitative.
- Lipids – qualitative.
- Determination of the iodine number of oil.
- Determination of the saponification number of oil.
- Determination of cholesterol using Liebermann- Burchard reaction.
- Proteins – qualitative.
- Isolation of protein.
- Determination of protein by the Biuret reaction.
- Determination of nucleic acids

Reference Books:

- T.G. Cooper: Tool of Biochemistry.
- Keith Wilson and John Walker: Practical Biochemistry.
- Alan H Gowenlock: Varley's Practical Clinical Biochemistry.
- Thomas M. Devlin: Textbook of Biochemistry.
- Berg, J.M., Tymoczko, J.L. & Stryer, L. *Biochemistry*, W.H. Freeman, 2002.
- Talwar, G.P. & Srivastava, M. *Textbook of Biochemistry and Human Biology*, 3rd Ed. PHI Learning.
- Nelson, D. L. & Cox, M. M. *Lehninger's Principles of Biochemistry 7th Ed.*, W. H. Freeman.
- Mikes, O. *Laboratory Handbook of Chromatographic & Allied Methods*, Elles
- Horwood Series on Analytical Chemistry, John Wiley & Sons, 1979.

CHEMISTRY LABORATORY-VIII: POLYMER CHEMISTRY AND MOLECULAR MODELLING & DRUG DESIGN**POLYMER CHEMISTRY****List of Experiments for Practical****1. Polymer synthesis**

1. Free radical solution polymerization of styrene (St) / Methyl Methacrylate (MMA) / Methyl Acrylate (MA) / Acrylic acid (AA).
 - a. Purification of monomer
 - b. Polymerization using benzoyl peroxide (BPO) / 2,2'-azo-bis-isobutyronitrile (AIBN)
2. Preparation of nylon 6,6/6
3. Interfacial polymerization, preparation of polyester from isophthaloyl chloride (IPC) and phenolphthalein
 - a. Preparation of IPC
 - b. Purification of IPC
 - c. Interfacial polymerization
4. Redox polymerization of acrylamide
5. Precipitation polymerization of acrylonitrile
6. Preparation of urea-formaldehyde resin
7. Preparations of novolac resin / resole resin.
8. Microscale Emulsion Polymerization of Poly(methyl acrylate).

Polymer characterization

1. Determination of molecular weight by viscometry:
 - (i) Polyacrylamide-aq.NaNO₂ solution
 - (ii) (Poly vinyl pyrrolidone (PVP) in water
2. Determination of the viscosity-average molecular weight of polyvinyl alcohol (PVOH) and the fraction of "head-to-head" monomer linkages in the polymer.
3. Determination of molecular weight by end group analysis: Polyethylene glycol (PEG) (OH group).
4. Testing of mechanical properties of polymers.
5. Determination of hydroxyl number of a polymer using colorimetric method.

Polymer analysis

1. Estimation of the amount of HCHO in the given solution by sodium sulphite method
2. Instrumental Techniques
3. IR studies of polymers
4. DSC analysis of polymers
5. Preparation of polyacrylamide and its electrophoresis

**at least 7 experiments to be carried out.*

Reference Books:

1. M.P. Stevens, *Polymer Chemistry: An Introduction*, 3rd Ed., Oxford University Press, 1999.
2. H.R. Allcock, F.W. Lampe & J.E. Mark, *Contemporary Polymer Chemistry*, 3rd ed. Prentice-Hall (2003)
3. F.W. Billmeyer, *Textbook of Polymer Science*, 3rd ed. Wiley-Interscience (1984)
4. J.R. Fried, *Polymer Science and Technology*, 2nd ed. Prentice-Hall (2003)
5. P. Munk & T.M. Aminabhavi, *Introduction to Macromolecular Science*, 2nd ed.

John Wiley & Sons (2002)

6. L. H. Sperling, *Introduction to Physical Polymer Science*, 4th ed. John Wiley & Sons (2005)
7. M.P. Stevens, *Polymer Chemistry: An Introduction* 3rd ed. Oxford University Press (2005).

Seymour/ Carraher's Polymer Chemistry, 9th ed. by Charles E. Carraher, Jr. (2013)

MOLECULAR MODELING AND DRUG DESIGN

List of Experiments for Practical

1. Comparison of the optimized C-C bond lengths in ethane, ethene, ethyne and benzene.
Visualization of the molecular orbitals of the ethane σ bonds and ethene, ethyne, benzene and pyridine π bonds.
(a) Performing a conformational analysis of butane.
(b) Determination of the enthalpy of isomerization of *cis* and *trans* 2-butene.
2. Visualization of the electron density and electrostatic potential maps for LiH, HF, N₂, NO and CO and comments related to the dipole moments. Animation of the vibrations of these molecules.
3. (a) Relationship between the charge on the hydrogen atom in hydrogen halides with their acid character.
(b) Comparison of the basicities of the nitrogen atoms in ammonia, methylamine, dimethylamine and trimethylamine.
4. (a) Comparison of the shapes of the molecules: 1-butanol, 2-butanol, 2-methyl-1-propanol, and 2-methyl-2-propanol. Noting the dipole moment of each molecule.
(b) Interpreting the relationship between shapes and their effects in the trend observed in boiling points: (118 °C, 100 °C, 108 °C, 82 °C, respectively).
5. Building and minimizing organic compounds of your choice containing the following functional groups. Note the dipole moment of each compound:
(a) alkyl halide (b) aldehyde (c) ketone (d) amine (e) ether (f) nitrile (g) thiol (h) carboxylic acid (i) ester (j) amide.
6. (a) Determination of the heat of hydration of ethylene.
(b) Computing the resonance energy of benzene by comparison of its enthalpy of hydrogenation with that of cyclohexene.
7. Arranging 1-hexene, 2-methyl-2-pentene, (*E*)-3-methyl-2-pentene, (*Z*)-3-methyl-2-pentene, and 2,3-dimethyl-2-butene in order of increasing stability.
8. (a) Comparing the optimized bond angles of H₂O, H₂S and H₂Se.
(b) Comparing the HAH bond angles for the second row dihydrides and comparing with the results from qualitative MO theory.

Note: Software: ChemSketch, ArgusLab (www.planaria-software.com), TINKER 6.2 (dasher.wustl.edu/ffe), WebLab Viewer, Hyperchem, or any similar software.

Reference Books:

1. Leach, A.R. *Molecular Modelling Principles and Application*, Longman, 2001.
2. Haile, J.M. *Molecular Dynamics Simulation Elementary Methods*, John Wiley and Sons, 1997.
3. Gupta, S.P. *QSAR and Molecular Modeling*, Springer - Anamaya Publishers, 2008.

PART III

BOTANY

B.Sc., B.Ed. LIBERAL OPTIONS**PART III: B.SC.B.ED.****Branch: BOTANY**

| SEM | No. | Sub | Name of the course | CCE | UE | Total |
|------|---------------------------|----------|---|-----|----|-------|
| I | Core 1 | Main 1 | Thallophytes, Microbes and Plant Pathology | 30 | 70 | 100 |
| | Core 2 | Main 2 | Archegoniatae (Bryophytes, Pteridophytes, Gymnosperms and Paleobotany) | 30 | 70 | 100 |
| | Core 3 | Main 3 | Developmental Botany (Cell Biology, Angiosperm Anatomy and Embryology) | 30 | 70 | 100 |
| | Core 4 (Supportive 1) | Anci 1-1 | Zoology I | 30 | 70 | 100 |
| II | Core 5 | Main 4 | Medicinal Botany | 30 | 70 | 100 |
| | Core 6 | Main 5 | Field Botany (Ecology and Angiosperm Taxonomy) | 30 | 70 | 100 |
| | Core 7 | Main 6 | Botany Laboratory- I Thallophytes, Microbes and Plant Pathology– Practical Archegoniatae (Bryophytes, Pteridophytes, Gymnosperms and Paleobotany)- Practical | | 50 | 50 |
| | | | Botany Laboratory- II Developmental Botany (Cell Biology, Angiosperm Anatomy and Embryology)-Practical Medicinal Botany- Practical Field Botany (Ecology and Angiosperm Taxonomy)- Practical | | 50 | 50 |
| | Core 8 (Supportive 2) | Anci 1-2 | Zoology II | 30 | 70 | 100 |
| III | Core 9 | Main 7 | Economic Botany | 30 | 70 | 100 |
| | Core 10 | Main 8 | Molecular Biology | 30 | 70 | 100 |
| | Core 11 | Main 9 | Plant Physiology and Biochemistry | 30 | 70 | 100 |
| | Core 12 (Supportive 3) | Anci 2-1 | Chemistry-I | 30 | 70 | 100 |
| IV | Core 13 | Main 10 | Mushroom Culture | 30 | 70 | 100 |
| | Core 14 | Main 11 | Biofertilizers and Organic Farming | 30 | 70 | 100 |
| | Core 15 | Main 12 | Botany Laboratory-III Economic Botany – Practical & Molecular Biology- Practical | | 50 | 50 |
| | | | Botany Laboratory-IV Plant Physiology and Biochemistry- Practical Mushroom Culture- Practical Biofertilizers and Organic Farming – Practical | | 50 | 50 |
| | Core 16 (Supportive 4) | Anci 2-2 | Chemistry-II | 30 | 70 | 100 |
| V | Core 17 | Main 13 | Biostatistics and Computer Applications in Biology | 30 | 70 | 100 |
| | Core 18 | Main 14 | Plant Biotechnology | 30 | 70 | 100 |
| VI | Core 19 | Main 15 | Horticulture- Theory | 30 | 70 | 100 |
| | Core 20 | Main 16 | Plant Tissue Culture | 30 | 70 | 100 |
| VII | Core 21 | Main 17 | Ethnobotany | 30 | 70 | 100 |
| VIII | Core 22 | Main 18 | Botany Laboratory-V Biostatistics and Computer Applications in Biology- Practical Plant Biotechnology- Practical, Horticulture- Practical | | 50 | 50 |
| | | | Botany Laboratory-VI Plant Tissue culture – Practical Ethnobotany- Practical | | 50 | 50 |

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CORE 1: THALLOPHYTES, MICROBES AND PLANT PATHOLOGY**Unit 1: Algae**

General characteristics; Ecology and distribution; Range of thallus organization and reproduction; Classification of algae (Chapman, 1970); Morphology of the following: *Nostoc*, *Oedogonium*, *Caulerpa*, *Sargassum*, *Polysiphonia*. Pigments (Phycobilins) and Economic importance of algae (Biodiesel and Single Cell Protein- *Spirulina*).

Unit 2: Fungi

General characteristics, ecology and significance, range of thallus organization, cell wall composition, nutrition, reproduction and classification (Alexopoulos and Mims, 1996); Life cycle of *Dictyostelium* (Mold), *Mucor* (Zygomycota), *Aspergillus*, *Yeast* (Ascomycota), and *Agaricus* (Basidiomycota),

Unit 3: Lichens and Mycorrhiza

Symbiotic Associations-Lichens: General account, Types of lichens: Crustose, Foliose and Fruticose. Reproduction and significance.

Mycorrhiza: ectomycorrhiza and endomycorrhiza and their significance.

Unit 4: Bacteria and Viruses

Bacterial classification: Bergey's manual (9th edition)- outline. Gram's staining of Bacteria. Structure and reproduction of *E.coli*. Viruses- general account. Structure and reproduction of Tobacco Mosaic Virus (TMV).

Unit 5: Plant Pathology

Study of diseases caused by the following: *Puccinia*, *Colletotrichum*, and *Pyricularia oryzae*.

Suggested Readings

1. Alexopoulos C.J., Mims C.W. and Blackwell M. 2002. Introductory Mycology (4thed.). John Wiley and Sons (Asia), Singapore.
2. Gangulee H.C. and Kar A.K. 2011. College Botany (Vol. II). New Central Book Agency. Calcutta.
3. Kumar H.D. 1999. Introductory Phycology (2nded.). Affiliated East-West Press Pvt. Ltd. Delhi.
4. Pelczar Jr. M.J., Chan E.C.S. and Krieg N.R. 2009. Microbiology: Application Based Approach. Tata McGraw-Hill Education. New Delhi.
5. Raven P.H., Johnson G.B., Losos J.B. and Singer S.R., 2005. Biology. Tata McGraw Hill. New Delhi.
6. Sethi I.K. and Walia S.K. 2011. Text book of Fungi & Their Allies, MacMillan Publishers Pvt. Ltd. New Delhi.
7. Tortora G.J., Funke B.R. and Case C.L. 2010. Microbiology: An Introduction (10thed.). Pearson Benjamin Cummings. U.S.A.

CORE 2: ARCHEGONIATAE (BRYOPHYTES, PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY)

Unit : Amphibians of Plant Kingdom (12 Lectures)

Unifying features of archegoniates, Transition to land habit. Bryophytes: Alternation of generations. General characteristics, Range of thallus organization. Classification- outline (Schuster, 1966; up to family).

Morphology, anatomy and reproduction of *Marchantia* (Hornworts), *Anthoceros* (Liverworts), and *Funaria* (Mosses). (Developmental details not to be included). Economic importance of bryophytes.

Unit 2: Pteridophytes (14 Lectures)

General characteristics, G.M.Smith (1955) Classification(up to Class), Introduction to early land plants.

Morphology, anatomy and reproduction of *Psilotum*, *Lycopodium*, *Equisetum* and *Marsilea*. (Developmental details not to be included). Heterospory and seed habit, stelar evolution. Economic importance of Pteridophytes.

Unit 3: Gymnosperms (14 Lectures)

General characteristics, classification according to K.R.Sporne (1962; up to class). Occurrence, external morphology, anatomy and reproduction of *Cycas*, *Pinus* and *Gnetum*. (Developmental details not to be included).

Wood yielding gymnosperms, secondary metabolites from gymnosperms.

Unit 4: Paleobotany (12 Lectures)

General account on fossils and fossilization; kinds of preservation: compressions, coal balls, impressions, incrustations (Casts), petrifications (mineralized plants), compactions (Mummified plants), ambers. Geological time scale, computation of age of fossils(radio carbon dating).Economic importance of Fossils.

Unit 5: Fossil Botany (12 Lectures)

Detailed study of the following fossil Pteridophytes: *Rhynia*, *Lepidodendron*. Detailed study of the following fossil Gymnosperms: *Calamites* and *Williamsonia*.

Suggested Readings

1. Arnold C.A. 2008. An Introduction to Palaeobotany. Read Books. New York.
2. Bhatnagar S.P. and Moitra A. 1996. Gymnosperms. New Age International (P) Ltd Publishers. New Delhi.
3. Pandey B.P. 2012. College Botany(Vol. II). S.Chand & Company Pvt. Ltd. New Delhi.
4. Parihar N.S. 1991.An introduction to Embryophyta (Vol.I). Bryophyta. Central Book Depot. Allahabad.
5. Rashid A. 1999. An Introduction to Pteridophyta: Diversity, Development, Differentiation (2nd revised ed.). Vikas Publishing House Pvt Ltd. New Delhi.
6. Vashishta B.R. 1995. Botany for degree students: Bryophyta. S.Chand & Company Ltd. New Delhi.
- Vashishta P.C., Sinha A.K. and Kumar A. 2010. Pteridophyta. S.Chand & Company Pvt. Ltd. New Delhi.

CORE 3: DEVELOPMENTAL BOTANY (CELL BIOLOGY, ANGIOSPERM ANATOMY AND EMBRYOLOGY)

Unit 1: Introduction to Cell Science (12 Lectures)

Ultra-structure of Eukaryotic cell. Structure and functions of the organelles: Cell wall, Cell Membrane, Cytoskeleton, Nucleus, Mitochondria, Chloroplast, Dictyosomes.

Overview of Cell Cycle, Mitosis and Meiosis - Molecular controls of cell cycle.

Unit 2: Tissues and Organs (12 Lectures)

Root (Histogen theory) and shoot apical meristems (Tunica-Corpus theory); Simple tissue (Parenchyma, Collenchyma, Sclerenchyma) and Complex tissues (Xylem and Phloem).

Primary structure of dicot and monocot root, stem and leaf. Adaptive and productive systems – epidermis, cuticle, stomata-types, guard cells, subsidiary cells.

Unit 3: Secondary Growth (10 Lectures)

Vascular cambium – structure and function, fusiform initials, ray initials, seasonal activity-annual rings. Secondary growth in root and stem, periderm, Wood (heartwood and sapwood). Anomalous secondary growth (*Dracaena*).

Unit 4: Organization of Flower and Pollination (12 Lectures)

Structure of anther and pollen; Structure and types of ovules; Types of embryo sacs, organization and ultrastructure of mature embryo sac.

Pollination mechanisms and adaptations.

Unit 5: Fertilization, Embryo and Endosperm (14 Lectures)

Double fertilization; Seed-structure, appendages and dispersal mechanisms.

Endosperm types, structure and functions; Dicot and monocot embryo; Embryo-endosperm relationship.

Apomixis and polyembryony: Definition, types and practical applications.

Suggested Readings

1. Becker W.M., Kleinsmith L.J., Hardin J. and Bertoni G. P. 2009. The World of the Cell (7thed.). Pearson Benjamin Cummings Publishing. San Francisco.
2. Bhojwani S.S. and Bhatnagar S.P. 2011. Embryology of Angiosperms (5thed.). Vikas Publication House Pvt. Ltd. New Delhi.
3. Cooper G.M. and Hausman R.E. 2009. The Cell: A Molecular Approach. (5thed.). ASM Press & Sunderland. Washington, D.C.
4. De Robertis E.D.P. and De Robertis E.M.F. 2006. Cell and Molecular Biology. 8thed.). Lippincott Williams and Wilkins. Philadelphia.
5. Dickison W.C. 2000. Integrative Plant Anatomy. Academic Press. San Diego.
6. Evert R.R. 2006. Esau's Plant Anatomy. John Wiley & Sons Inc. New Jersey.
7. Fahn A. 1990. Plant Anatomy (4thed.). Pergamon Press. Oxford.
8. Gangulee H.C., Das K.S. and Datta C. 1988. College Botany (Vol.I). New Central Book Agency (P) Ltd. Calcutta.
9. John Jothi Prakash E. 1987. A Text Book of Plant Anatomy. Emkay Publications. Delhi.
10. Karp G. 2010. Cell and Molecular Biology: Concepts and Experiments (6thed.). John Wiley & Sons. Inc. New York.
11. Pandey B.P. 2001. Plant Anatomy. S.Chand & Company Ltd. New Delhi.
12. Rudall P.J. 2007. Anatomy of Flowering Plants: An Introduction of Structure and Development (3rded.). Cambridge University Press. Cambridge.

CORE 4 (SUPPORTIVE 1): ZOOLOGY I**UNIT I**

General classification of Animal kingdom- general characteristics of Invertebrata, Chordata and Vertebrata

UNIT II

Protozan parasites of human (Entamoeba, Trypanasoma), Canal system in sponges, Polymorphism in coelenterates, Helminth parasites of human (Tapeworm, Ascaris), Coelom and its significance.

UNIT III

Respiration in Arthropods. Metamorphosis in Insects. Economic importance of mollusca. water vascular system in Echinodermata, Larval forms in Echinodermata.

UNIT IV

Life cycle and retrogressive metamorphosis in Ascidia. Life cycle of Amphioxus. Life cycle of Balanoglossus and affinities.

UNIT V

Accessory respiratory organ in Fishes, Migration of Fishes. Parental care of Amphibia. Primary and Secondary terrestrial adaptations. Flight adaptation. Aquatic mammals and placenta in Mammals.

Suggested Readings

1. Ekambaranatha Ayyar, M and Ananthakrishnan, T.N. 1993, Outlines of Zoology, Vol.I and II, Viswanathan and Co. Madras.
2. Jordan, E.K. and P.S. Verma, 1993. Chordate Zoology, 12th edition, S. Chand & Co. Ltd., Ram Nagar, New Delhi.
3. Text book of Invertebrata – N.Arumugam et al., (2008) Saras Publications Nagerkovil
4. P.S. Dhami and J.K. Dhami – Invertebrate Zoology – S.Chand and Co. New Delhi.
6. Invertebrate Zoology – R.L.Kotpal, (2005) Rastogi Publications, Meerat.

ZOOLOGY I- PRACTICAL

I. Major Practical:

A.. Prawn:

1. Digestive system
2. Nervous system

B. Cockroach

3. Digestive system
4. Nervous system

II. Minor Dissection and Mounting:

- a) Earth worm - Body setae
- b) Honey bee - Mouth parts
- c) Mosquito - Mouth parts
- d) Prawn - Appendages

III. Spotters:

Amoeba, *Paramecium*, *Entamoeba*, *Plasmodium*, *Sycon*, *Obelia geniculata*, Sea anemone on hermit crab, *Aurelia*, *Fasciola hepatica*, *Taenia solium*, *Ascaris* – Male & Female, Leech, Fresh water mussel, star fish, *Amphioxus*, Shark (Placoid scale), *Ichthyophis*, Cobra, Pigeon (feathers) and Rabbit.

IV. Submission of Record

CORE 5: MEDICINAL BOTANY**Unit 1: Introduction (10 Lectures)**

Introduction- Health through herbs. Historical back ground, present status, scope of medicinal botany, Indian contribution to medicinal botany, Ethnobotany, a brief outline on traditional systems of medicine – Ayurvedha, Siddha, Unani, Naturopathy and Homeopathy.

Unit 2: Raw materials for Drugs from Plants I (10 Lectures)

Plant secondary metabolites of medical importance: source, description of the products, chemical constituents, active principles and therapeutic uses of the following:

- i. **Carbohydrates** - Ispaghula (*Plantago ovata*), Agar (*Gracilaria*).
- ii. **Glycosides** - Senna (*Cassia* sp), *Digitalis*, *Glycorrhiza* and *Aloe*.

Unit 3: Raw materials for Drugs from Plants II (16 Lectures)

Plant secondary metabolites of medical importance: source, description of the products, chemical constituents, active principles and therapeutic uses of the following:

- i. **Tannins** - *Acacia* and Myrobalan (*Terminlia chebula*).
- ii. **Fixed oils** - Groundnut oil (*Arachis hypogea*) and Castor oil (*Ricinus communis*).
- iii. **Volatile oils** - *Eucalyptus*, Clove, lemon and *Ocimum*.
- iv. **Resins** - Asafoetida and *Pinus*.
- v. **Alkaloids** - Cinchona, *Rauwolfia*, *Atropa*, *Opium*, Vasaka (*Adhatoda zeylanica*) and *Ephedra*.
- vi. **Steroids** – *Solanum* and *Dioscorea*.

Unit-4: Plant Toxins (6 Lectures)

Toxins of plant origin: Allergens, Teratogens and hallucinogens from hemp and mycotoxins and aflatoxins from fungi.

Unit-5: Antibiotics (12 Lectures)

Introduction to Antibiotics: Properties and Functions of antibiotics. Extraction, chemistry and therapeutic uses of the antibiotics obtained from *Penicillium*, *Aspergillus*, and *Streptomyces*. General account on neutraceuticals and cosmoceuticals.

Suggested Readings

1. Evans W.C. 1989. Trease and Evans Pharmacognosy (13thed.). Baillière Tindall. London.
2. Kadavul K. 2016. Hand Book on Utilization of Medicinal Plants. Published by author.No.9, 4th Cross Street, Vengateswara Nagar-East, Puducherry-605013.
3. Kokate C.K., Purohit A.P. and Gokhale, S.B. 2003. Pharmacognosy (23rded.). Nirali Prakashan. Pune.
4. Purohit and Vyas. 2008. Medicinal Plant Cultivation: A Scientific Approach (2nded.). Agrobios. India.
5. Trivedi P.C. 2006. Medicinal Plants: Ethnobotanical Approach. Agrobios. India.

CORE 6: FIELD BOTANY (ECOLOGY AND ANGIOSPERM TAXONOMY)**Unit 1: Introduction and Ecological factors (12 Lectures)**

Plant as a living entity- their relationship with Biotic and Abiotic factors. Soil: origin, formation, composition, soil profile, soil erosion and conservation. Water: states of water in the environment, precipitation types. Plant habitats- their types. Adaptations of hydrophytes and xerophytes.

Unit 2: Plant communities and Ecosystem (12 Lectures)

Characters; Ecotone and edge effect; Succession; Processes and types. Structure; energy flow trophic organisation; Food chains and food webs, Ecological pyramids, production and productivity; Biogeochemical cycle; Cycle of carbon, nitrogen and phosphorous. Principles of biogeographical zones; Endemism.

Unit 3: Angiosperm Taxonomy- Introduction and Identification (10 Lectures)

Classification, Nomenclature and Identification.

Functions of Herbaria, important herbaria and botanical gardens of the world and India (BSI); Documentation: Flora, Keys (Indented and Bracketed).

Ranks, categories and taxonomic groups. Principles and rules (ICBN); binominal system, typification, author citation, effective and valid publication, rejection of names, principle of priority and its limitations.

Unit 4: Angiosperm Classification and Polypetalae Families (14 Lectures)

Types of classification- artificial, natural and phylogenetic. Bentham and Hooker (up to series), Engler and Prantl (upto series/ order).

Study of the following Polypetalae families and their economic importance: Annonaceae, Rutaceae, Anacardiaceae, Fabaceae, Caesalpinaceae, Mimosaceae and Cucurbitaceae.

Unit 5: Gamopetalae, Monochlamydeae and Monocot Families (12 Lectures)

Study of the following Gamopetalae families and their economic importance: Asteraceae, Asclepiadaceae, Solanaceae, Lamiaceae.

Study of the following Monochlamydeae family and their economic importance: Euphorbiaceae.

Study of the following Monocot families and their economic importance: Liliaceae, and Poaceae.

Suggested Readings

1. Kormondy E.J. 1996. Concepts of Ecology (4thed.). Prentice Hall. USA.
2. Kumaresan V. and Annie R. 2013. Taxonomy-Systematic Botany, Economic Botany, Ethnobotany. Saras Publication. Nagercoil.
3. Lawrence G.H.M. 1951. Taxonomy of Vascular Plants. Oxford & IBH Co. Pvt. Ltd. New Delhi.
4. Pandey B.P. 2005. Taxonomy of Angiosperms. S.Chand & Company Pvt. Ltd. New Delhi.
5. Pandey B.P. 2012. College Botany (Vol. II). S.Chand & Company Pvt. Ltd. New Delhi.
6. Pandey B.P. 2010. Modern Practical Botany (Vol. II). S.Chand & Company Ltd. New Delhi.
7. Sharma P.D. 2010. Ecology and Environment (8thed.). Rastogi Publications. Meerut.
8. Simpson M.G. 2006. Plant Systematics. Elsevier Academic Press. San Diego, CA, U.S.A.
9. Singh G. 2012. Plant Systematics: Theory and Practice (3rded.). Oxford & IBH Pvt. Ltd. New Delhi.
10. Singh G. 2010. Plant Systematics: An Integrated Approach (3rded.). Science Publishers. USA.

CORE 7: BOTANY LABORATORY**BOTANY LABORATORY- I****THALLOPHYTES, MICROBES AND PLANT PATHOLOGY- PRACTICAL**

1. Study of vegetative and reproductive structures of *Nostoc*, *Volvox* (electron micrographs), *Oedogonium*, *Caulerpa*, *Sargassum* and *Polysiphonia* through temporary preparations and permanent slides.
5. *Rhizopus* and *Penicillium*: Asexual stage from temporary mounts and sexual structures through permanent slides.
6. *Yeast*: Specimens/photographs and tease mounts.
7. *Agaricus*: Sectioning of gills; Culture.
8. Lichens: Study of growth forms of lichens (crustose, foliose and fruticose).
9. Mycorrhiza: ectomycorrhiza and endomycorrhiza (Photographs).
10. Study of the following diseases: *Puccinia*, *Colletorichum* and *Pyricularia oryzae*.

ARCHEGONIATAE (BRYOPHYTES, PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY)- PRACTICAL

External and internal morphology of the following plants:

1. *Anthoceros*.
2. *Marchantia*.
3. *Funaria*.
4. *Psilotum*.
5. *Lycopodium*.
6. *Equisetum*.
7. *Marsilea*.
8. *Cycas*.
9. *Pinus*.
10. *Gnetum*.
11. Study of the structure of fossil plants: *Rhynia*, *Lepidodendron*, *Calamites* and *Williamsonia*.

BOTANY LABORATORY- II**DEVELOPMENTAL BOTANY (CELL BIOLOGY, ANGIOSPERM ANATOMY AND EMBRYOLOGY)- PRACTICAL**

1. To study eukaryotic cells with the help of light and electron micrographs.
2. Study of the photomicrographs of cell organelles.
3. To study the structure of plant cell through temporary mounts.
4. Study of mitosis and meiosis (temporary mounts and permanent slides).
5. Study of meristems through permanent slides and photographs.
6. Tissues (parenchyma, collenchyma and sclerenchyma); Macerated xylary elements, Phloem (Permanent slides, photographs)
7. Stem: Monocot: *Zea mays*; Dicot: *Helianthus*; Secondary: *Helianthus* (sections).
8. Root: Monocot: *Zea mays*; Dicot: *Helianthus*; Secondary: *Helianthus* (sections).
9. Leaf: Dicot and Monocot leaf (sections).
10. Structure of anther (young and mature), tapetum (amoeboid and secretory) (sections).
11. Types of ovules: anatropous, orthotropous, circinotropous, amphitropous/campylotropous.
12. Female gametophyte: *Polygonum* (monosporic) type of Embryo sac Development (Permanent slides/photographs).
13. Ultrastructure of mature egg apparatus cells through electron micrographs.
14. Pollination types and seed dispersal mechanisms (including appendages, aril, caruncle) (Photographs and specimens).
15. Dissection of embryo/endosperm from developing seeds.
16. Calculation of percentage of germinated pollen in a given medium.

MEDICINAL BOTANY- PRACTICAL

1. Morphological and anatomical studies of crude drugs of plants included in the syllabus.
2. Identification of crude drugs by histochemical and phytochemical methods.
3. Identification of drug adulterants.

FIELD BOTANY (ECOLOGY AND ANGIOSPERM TAXONOMY)- PRACTICAL

1. Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/ hygrometer, rain gauge and lux meter.
2. Determination of pH, and analysis of two soil samples for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency by rapid field test.
3. (a) Study of morphological adaptations of hydrophytes and xerophytes (four each). (b) Study of biotic interactions of the following: Stem parasite (*Cuscuta*), Root parasite (Orobanchae), Epiphytes, Predation (Insectivorous plants).
4. Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by species area curve method (species to be listed).
5. Quantitative analysis of herbaceous vegetation in the college campus for frequency and comparison with Raunkiaer's frequency distribution law.
6. Study of vegetative and floral characters of the families mentioned in the theory (Description, L.S. of flower, section of ovary, floral diagram/s, floral formula/e and systematic position according to Bentham & Hooker's system of classification).
7. Mounting of a properly dried and pressed specimen of any ten plant species with herbarium label (to be submitted along with Field Note).
8. Study tour (female staff should accompany girl students).

CORE 8 (SUPPORTIVE 2) ZOOLOGY II- THEORY**Unit – I: Biodiversity and Human Welfare**

Threats to Biodiversity - Habitat loss and Man-Wildlife conflict. National parks, Sanctuaries and Biosphere reserves

Unit – II:

Animal husbandry: Breeds of cattle- milk breeds- draft breeds- Dairy and Dairy products

Unit – III:

Culture: Vermiculture, Apiculture, Pisciculture and Poultry

Unit – IV**Communicable and non-communicable diseases**

Tuberculosis and Typhoid; Hepatitis (A and B), AIDS, Gonorrhoea and Syphilis Diseases of respiratory system- Asthma, Bronchitis.

Oral Cancer - cause/causative agents, symptoms, diagnostics, precaution /prevention and remedy.

Unit – V**Non – Communicable Diseases**

Stress related disorders, Hypertension, Diabetes type II, anxiety, insomnia, migraine, depression (cause, symptoms, precaution and remedy)

Suggested Readings

1. P. S. Verma and V.K.Agarwal., Concept of Ecology (Environmental biology), S.Chand & Co.Ltd., New Delhi 2004.
2. Odum E.P., Fundamentals of Ecology, Saunders Publication; Indian Edition, Nataraj Publication; Dehradun, 1998.
3. G.S.Shukla., V.B.Upadhy., Economic Zoology. Rastogi Publications, 2006
4. P.G. Fenimore Manual. Silkworm Rearing. FAO Agricultural Service Bulletin,
5. Medical Biochemistry- Ambika Shanmugam.

ZOOLOGY- II- PRACTICAL

1. Study of animals in Nature/National park
2. Study of various breeds of cattle.
3. Visit to a Fish culture pond.
4. Study of Apiculture.
5. Identification of parasites related to syllabus

CORE 9: ECONOMIC BOTANY**Unit 1: Origin of Crop Plants (16 Lectures)**

Introduction to Economic Botany. Vavilov's centres of origin of crop plants. Origin, distribution, brief idea of cultivation and economic uses of the following Food plants:

- i. **Cereals** (rice, wheat and maize)
- ii. **Pulses** (gram, arhar and pea)
- iii. **Vegetables** (potato, tomato and onion)

Unit 2: Fibre Plants (10 Lectures)

Origin, distribution, brief idea of cultivation and economic uses of the following Fibre plants:

- i. Cotton
- ii. Jute
- iii. Flax

Unit 3: Timber Plants (10 Lectures)

Origin, distribution, brief idea of cultivation and economic uses of the following Timber plants:

- (i) Neem
- (ii) Teak
- (iii) Cedar

Unit 4: Oil Plants (12 Lectures)

Origin, distribution, brief idea of cultivation and economic uses of the following Oil plants:

- i. Groundnut
- ii. Sunflower
- iii. Coconut

Unit 5: Spices and Condiments (12 Lectures)

Origin, distribution, brief idea of cultivation and economic uses of the following Spices:

- i. Coriander
- ii. Clove
- iii. Ginger

Suggested Readings:

1. Gonsalves J. 2010. Economic Botany and Ethnobotany. International Scientific Publishing Academy. New Delhi.
2. Kumaresan V. and Annie R. 2013. Taxonomy-Systematic Botany, Economic Botany, Ethnobotany. Saras Publication. Nagercoil.
3. Kocchar S.L. 2009. Economic Botany in The Tropics (3rded.), MacMillan Publishers India Ltd. New Delhi.
4. Pooja. 2005. Economic Botany. Discovery Publishing House. New Delhi.
5. Sambamurthy A.V.S.S. and Subramanyam N.S. 1989. A Textbook of Economic Botany. Wiley Eastern Ltd. New Delhi.
6. Sharma O.P. 1996. Hills Economic Botany. Tata McGraw Hill Co. Ltd. New Delhi.
7. Simpson B.B. and Conner-Ogorzaly M. 1986. Economic Botany- Plants in Our World. McGraw Hill. New York.
8. Verma V. 2009. Text Book of Economic Botany. Ane Books Pvt. Ltd. New Delhi.

CORE 10: MOLECULAR BIOLOGY- THEORY**Unit 1: The Genetic Material (14 Lectures)**

Nature of genetic material and fine structure of gene. Griffith effect, transforming principle, Hershey & Chase experiment, RNA as genetic material (TMV). Cis-trans test. Structure of DNA and RNA- Nucleoside and Nucleotides. DNA Double helix: B-form, A-form & Z-form. Chemical bonds-base pair rules. Types of RNA- mRNA, rRNA, tRNA (in prokaryotes and Eukaryotes) and miRNA (in eukaryotes).

Unit 2: Replication and Transcription of DNA (14 Lectures)

Replication of DNA- Messelson & Stahl experiment, semi-conservative, bidirectional, semi continuous model-reverse transcription.

Transcriptional machinery and key events - RNA polymerase, promoter gene- initiation, elongation and termination (in prokaryotes and eukaryotes). Modification and processing of mRNA in eukaryotes.

Unit 3: Protein synthesis (8 Lectures)

Translation- features of genetic code- Wobble hypothesis, role of t-RNA and ribosomes. Initiation, elongation and termination- peptidyl transferase.

Unit 4: Gene Regulation Gene Mutation (12 Lectures)

Regulation of gene expression- regulation at transcriptional level. Lac Operon- negative and positive control.

Gene mutation- frame shift, substitution mutation, tautomerization, depurination, base analogues, chemical and physical mutagens.

Unit 5: Polymerase chain reaction (12 Lectures)

Gene amplification (Polymerase chain reaction -PCR). Basic PCR and its modification. Application of PCR in Agriculture, Medicine and Forensics.

Sequencing of DNA: Maxam and Gilbert method, Sanger's method.

Suggested Readings

1. Allison L.A. 2007. Fundamental Molecular Biology. Blackwell Publishing. U.S.A.
2. Cooper G.M. and Hausman R.E. 2009. The Cell: A Molecular Approach. 5th edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.
3. De Robertis E.D.P. and De Robertis E.M.F. 2006. Cell and Molecular Biology (8th ed). Lippincott Williams and Wilkins. Philadelphia.
4. Friefelder D. 1987. Molecular Biology (2nded.). Narosa Publishing House. New Delhi.
5. Karp G. 2010. Cell and Molecular Biology: Concepts and Experiments(6thed.). John Wiley & Sons. Inc.
6. Krebs J.E., Goldstein E.S. and Kilpatrick S.T. 2014. Jones & Bartlett Learning, LLC. Burlington, MA.
7. Sheeler P. and Bianchi D.E. 2006. Cell and Molecular Biology (3rded.). Wiley India (P.) Ltd. New Delhi.
8. Smith- Keatry P. 1991. Molecular Genetics, MacMillan Publication Co. Ltd. London.
9. Verma P.S. and Agarwal V.K. 2009. Molecular Biology. S.Chand & Company Ltd. New Delhi.
10. Watson J.D., Baker T.A., Bell S.P., Gann A., Levine M. and Losick R. 2004. Molecular Biology of the Gene. Dorling Kindersley Publishing Inc. New Delhi.

CORE 11: PLANT PHYSIOLOGY AND BIOCHEMISTRY- THEORY**Unit 1: Plant-water relations and Mineral Nutrition (16 Lectures)**

Water as a universal solvent. Water potential and its components. Factors affecting transpiration; Root pressure and guttation.

Essential growth elements, macro and micronutrients; Criteria of essentiality of elements; Role of essential elements; Transport of ions across cell membrane (active and passive transport), carriers, channels and pumps.

Unit 2: Carbohydrates and Lipids (14 Lectures)

Carbohydrates: importance, classification, structure and properties.

Glycolysis, anaerobic respiration, TCA cycle; Oxidative phosphorylation, Glyoxylate, Oxidative Pentose Phosphate Pathway.

Lipids: importance, classification, structure and properties. Fatty acids – nomenclature and types. Biosynthesis of fatty acids (Palmitic acid).

Unit 3: Photosynthesis and Translocation of solutes (14 Lectures)

Photosynthetic Pigments (Chl *a*, *b*, xanthophylls, carotene); Photosystem I and II, reaction center, antenna molecules; Electron transport and mechanism of ATP synthesis; C₃, C₄ and CAM pathways of carbon fixation; Photorespiration.

Transpiration- Ascent of sap (Cohesion and Tension hypothesis) and its significance. Composition of phloem sap, girdling experiment; Pressure flow model; Phloem loading and unloading.

Unit 4: Amino acids, Proteins and Enzymes (10 Lectures)

Amino acids and Proteins: importance, classification and structure.

Enzymes: nomenclature, classification. Structure and properties. Mechanism of enzyme catalysis and enzyme inhibition.

Unit 5: Environmental Plant Physiology (6 Lectures)

Photoperiodism (SDP, LDP, Day neutral plants); Phytochrome (discovery and structure), red and far red light responses on photomorphogenesis. Vernalization. Phytohormones (natural Auxins and Gibberellins).

Plant Stress- definition. Plant responses to Abiotic Stresses: - cold, drought, salt and UV.

Suggested Readings

1. Battacharya D. 1999. Experiments in Plant Physiology- A Laboratory Manual. Narosa Publishing House. New Delhi.
2. Hopkins W.G. and Huner N.P. 2009. Introduction to Plant Physiology (4th ed.). John Wiley & Sons. U.S.A.
3. Murray R.K., Granner D.K., Mayes P.A. and Rodwell V.W. 2000. Harper's Illustrated Biochemistry (26th Ed.). McGraw-Hill Company Inc. U.S.A.
4. Narayanan L.M., Meyyan R.P., Nallasingam K., Prasanna Kumar S., Arumugam N. and Fatima D. 2014. Biochemistry. Saras Publication. Nagercoil, Tamil Nadu.
5. Nelson D.L. and Cox M.M. 2017. Lehninger Principles of Biochemistry (7th ed.). W.H. Freeman. London.
6. Rodwell V.W., Bender D., Botham K.M., Kennelly P.J. and Weil P.A. 2015. Harpers Illustrated Biochemistry (30th ed.). The McGraw-Hill Education. USA.
7. Salisbury F.B. and Ross C.W. 1986. Plant Physiology (3rd ed.). CBS Publishers & Distributors. New Delhi.
8. Taiz L. and Zeiger E. 2010. Plant Physiology (5th ed.). Sinauer Associates Inc. U.S.A.

CORE 12 (SUPPORTIVE 3): CHEMISTRY-I**Unit 1**

Intermolecular forces - Vanderwall and London forces. Liquid state theory and properties of liquids, liquid-crystal formation and applications. Solid state- forces in solids- covalent, ionic, metallic, and Vanderwall's, Lattice energy.

Unit 2

Theory of semi-conductors and its application. Bond properties- types of hybridization, bond length, bond order, bond strength. Resonance energy- resonance strength of multiple bonded species Carbon Monoxide, Nitrous Oxide, phenol, benzaldehyde, aniline.

Unit 3

Covalent bond- Orbital Overlap- hybridization, geometry of organic molecules- methane, ethylene, acetylene, benzene. Electron displacement effects, inductive, resonance, hyperconjugative and steric effects-their effect on properties of compounds. Stereoisomerism- Optical isomerism-optical activity, lactic acid, tartaric acid, racemization, resolution.

Unit 4:

Aromatic compounds-electrophilic substitution in benzene, mechanism of nitration, halogenation, Alkylation and Acylation. Preparation, properties and uses of Naphthalene, Furan, Thiophene, Pyrrole, Pyridine, Chloroform and Carbon Tetrachloride.

Unit5:

Keto-enol tautomerism. Geometric isomerization, maleic acid and fumaric acid. Rotation around single bond proffered rations, conformers of ethane, propane, n- butane and cyclohexane. Axial and equatorial bonds.

Text books:

1. P. W. Atkins Physical Chemistry, 6th ed, 1998.
2. Wade, L.G. Organic Chemistry, Pearson Education, 5th ed, 2003.
3. M. Ladd. Introduction to Physical Chemistry, Cambridge, 1998.

CHEMISTRY PRACTICALS I

1. Estimation of sodium hydroxide using sodium carbonate standard.
2. Estimation of hydrochloric acid using oxalic acid standard.
3. Estimation of borax using sodium carbonate standard.
4. Estimation of ferrous sulphate using Mohrs salt standard.
5. Estimation of oxalic acid using ferrous sulphate standard.
6. Preparation of the following inorganic compounds: ferrous ammonium sulphate, manganous sulphate, sodium thiosulphate.

CORE 13: MUSHROOM CULTURE – THEORY**Unit 1: History of Mushroom Culture (12 Lectures)**

Mushroom as food. Medicinal value of edible mushrooms; Poisonous mushrooms. Types of edible mushrooms available in India – *Volvariella volvacea*, *Pleurotus citrinopileatus*, *Agaricus bisporus*.

Unit 2: Infrastructure and Inputs (12 Lectures)

Mushroom Cultivation: Infrastructure and implements-mushroom sheds, design, conditions, materials- Factors influencing mushroom cultivation.

Unit 3: Stages in Mushroom Production (12 Lectures)

Medium preparation, preparation of spawn- quality of good spawn, multiplication. Mushroom bed preparation. Casing; pests, diseases and abnormalities.

Unit 4: Harvest and Storage (12 Lectures)

Harvest methods. Storage: Short-term storage (Refrigeration – up to 24 hours). Long term storage, drying, storage in salt solutions. Nutritive values– Proteins, amino acids, mineral elements. Nutrition - Carbohydrates, Crude fibre content - Vitamins.

Unit 5: Mushroom Recipes (12 Lectures)

Types of recipes prepared from mushroom. Research Centres- National level and Regional level. Cost benefit analysis - Marketing in India and abroad.

Suggested Readings

1. Hirst B. 2015. Mushrooms: A Beginners Guide to Home Cultivation. Create space Independent Publishing Platform. USA.
3. Marimuthu T., Krishnamoorthy A.S., Sivaprakasam K. and Jayarajan R. 1991. Oyster Mushrooms. Department of Plant Pathology, TNAU, Coimbatore.
4. Pandey R.K. and Ghosh S.K. 1998. Hand book on mushroom cultivation. Emkay Publications. Delhi.
5. Swaminathan M.S. 1990. Food and Nutrition. The Bangalore Printing and Publishing Co. Ltd. Bangalore.
6. Tewari and Pankaj Kapoor S.C. 1988. Mushroom cultivation, Mittal Publications. New Delhi.

CORE 14: BIOFERTILIZERS AND ORGANIC FARMING – THEORY**Unit 1: Manures and Biofertilizers****(10 Lectures)**

Need for fertilizers, manures. Manure composition. Manures for crop productivity. Differences between fertilizers and biofertilizers: pH changes and water contamination.

Unit 2: Bacterial Biofertilizers**(14 Lectures)**

General account on the microbes used as biofertilizer. *Azotobacter*: classification, characteristics– crop response to *Azotobacter* inoculum, maintenance and mass multiplication. *Rhizobium* – isolation, identification, mass multiplication, carrier based inoculants, Actinorrhizal symbiosis.

Unit 3: Algal Biofertilizers**(12 Lectures)**

Azospirillum: isolation and mass multiplication – carrier based inoculant, associative effect of different microorganisms. *Azolla* and *Anabaena azollae* association, nitrogen fixation, factors affecting growth, *Azolla* in rice cultivation.

Unit 4: Fungal Biofertilizers**(12 Lectures)**

Mycorrhizal association, types of mycorrhizal association, taxonomy, occurrence and distribution, phosphorus nutrition, growth and yield, colonization of VAM – isolation and inoculum production of VAM, and its influence on growth and yield of crop plants.

Unit 5: Organic Farming**(12 Lectures)**

Organic farming – Green manuring and organic fertilizers, Recycling of bio-degradable municipal, agricultural and industrial wastes, Biocompost making- types, method of vermicomposting, Panchakavya. Biological pest control (neem)

Suggested Readings

1. Dubey R.C. 2005. A Text book of Biotechnology. S.Chand & Co. New Delhi.
2. Kumaresan V. 2005. Biotechnology. Saras Publications. New Delhi.
3. John Jothi Prakash E. 2004. Outlines of Plant Biotechnology. Emkay Publication. New Delhi.
4. Sathe T.V. 2004. Vermiculture and Organic Farming. Daya Publishers. New Delhi.
5. Subha Rao N.S. 2000. Soil Microbiology, Oxford & IBH Publishers. New Delhi.
6. Vayas S.C, Vayas S. and Modi H.A. 1998. Bio-fertilizers and organic Farming Akta Prakashan. Nadiad

CORE 15: BOTANY LABORATORY

BOTANY LABORATORY-III

ECONOMIC BOTANY – PRACTICAL

1. Study of morphological features of food plants, vegetables, fibre yielding plants, oil yielding plants, Spices and Condiments.
2. Study of anatomical features of *Coriander*, Clove, Ginger *Azadirachta*, *Withania*.
3. Histochemical localization starch in rice and potato.
4. Economic significance of tea, coffee, rubber, sugarcane

MOLECULAR BIOLOGY- PRACTICAL

1. Isolation of DNA from plant tissues.
2. Isolation of RNA from plant tissues.
3. Isolation of bacterial plasmids.
4. Separation of DNA by Agarose gel electrophoresis.
5. Separation of RNA by Agarose gel electrophoresis.
6. Staining of nucleic acid *in vivo* (Giemsa stain).

BOTANY LABORATORY-IV**PLANT PHYSIOLOGY AND BIOCHEMISTRY- PRACTICAL**

1. Determination of osmotic potential of plant cell sap by plasmolytic method.
2. To study the effect of two environmental factors (light and wind) on transpiration by excised twig.
3. Calculation of stomatal index and stomatal frequency of a mesophyte and a xerophyte.
4. Demonstration of Hill reaction.
5. Demonstration of the activity of catalase and study of the effect of pH and enzyme concentration.
6. To study the effect of light intensity and bicarbonate concentration on O₂ evolution in photosynthesis.
7. Comparison of the rate of respiration in any two parts of a plant.
8. Separation of amino acids by paper chromatography.
9. Separation of photosynthetic pigments by paper chromatography.

MUSHROOM CULTURE- PRACTICAL

10. Sterilization of paddy straw.
11. Preparation of bed inside the polythene bags and
12. Incubation of bags.
13. Preparation of spawn.
14. Visit to a mushroom culture unit/ industry

BIOFERTILIZERS AND ORGANIC FARMING – PRACTICAL

1. Isolation and culture of *Rhizobium* and Algae.
2. Anatomy of *Azolla* leaf and identification of *Anabaena azollae*.
3. Mass cultivation of *Azolla*.
4. Isolation and culture of VAM.
5. Compost preparation- green manure, vermicompost.

CORE 16 (SUPPORTIVE 4): CHEMISTRY-II**Unit 1:**

Co-ordination chemistry – definition of terms, classification of ligands, nomenclature. Chelation – examples, chelate effect explanation. Werner's theory- conductivity and precipitation studies. Sedgwick's theory- Effective atomic number concept. Pauling's theory-postulates, applications to octahedral, square, planar and tetrahedral complexes.

Unit 2:

Biological role of Hemoglobin and Chlorophyll. EDTA and its applications. Environmental chemistry- Green House Effect, global warming, Ozone depletion, BOD and COD – importance, rainwater harvesting-needs, methods, advantage. Pollution – types, strategies in its control.

Unit 3:

Carbohydrates-classification, preparation and properties of Glucose, Fructose and Sucrose. Discussion of ring structure and mutarotation. Properties of starch and cellulose. Interconversion of Glucose and Fructose. Amino-acids classification, preparation and properties of Glycine and Alanine, preparation of peptides by Bergman method. Classification of proteins according to composition, function and shape. Protein denaturation.

Unit 4:

Dyes and Drugs-Azo dyes-congo Red, Triphenylmethans, Malachite Green, Food colours. Sulpha drugs-sulphonamides and sulpha pyrimidine, preparation and uses. Antibiotics-penicillin and Chloromycetin-source, structure and uses. Vitamins- source and structure of vitamin A, B, C, D, E and F (structural elucidation not required).

Unit 5:

Electrochemistry- Kohlrauch law-measurement of conductance, pH determination, conductometric titrations, hydrolysis of salts, derivation of Kh. Galvanic cells, EMF standard electrode potentials, reference electrodes, electrochemical series and its application, electroplating and its application. Corrosion-methods of prevention. Bioenergetics-Chemical kinetics-order of reaction (zero and first order), half-life period. Chemical equilibrium-basic idea.

Text books:

1. P. W. Atkins Physical Chemistry, 6th edition, 1998.
2. Wade, L.G, Organic Chemistry, Pearson Education, 5th edition, 2003.
3. M. Ladd, introduction to Physical Chemistry, Cambridge, 1998.

CHEMISTRY II PRACTICAL

1. Detection of elements –nitrogen, sulphur and halogens.
2. Preliminary test and detection of carbohydrate, urea, benzamide and aromatic amines.
3. Detection of anions: carbonate, sulphide, sulphate, fluoride, chloride, bromide, nitrate, oxalate, phosphate.
4. Reaction of aldehyde (aromatic), ketone (aliphatic and aromatic), carbohydrate, carboxylic acid (mono-and dicarboxylic-), phenol, aromatic primary amine, amide and diamide.
5. Systematic analysis of organic compounds containing one functional group and characterization by confirmatory tests or derivatives.

CORE 17: BIOSTATISTICS AND COMPUTER APPLICATIONS IN BIOLOGY**Unit 1: Biostatistics-I (12 Lectures)**

Introduction to Biostatistics, definition, characteristics, importance and usefulness, limitations. Collection, classification and presentation of data (tabulation, graphical representation-Histogram, simple bar, multiple bar and divided bar diagrams, pie diagram, frequency curve and frequency polygon). Frequency distribution: definition, types, class width, class mark, class frequency, relative frequency, percentage frequency and frequency density.

Unit 2: Biostatistics-II (12 Lectures)

Measures of central tendency- Characteristics: definition and calculations of mean, median, and mode. Measures of variation- standard deviation and standard error.

Unit 3: Basics of Computer (12 Lectures)

Types of computers, accessories and its functions, input-output devices, concepts of different operation systems, details of Networks, Internet and email. Database types and its uses, fundamentals of digital imaging, uses of different programming languages.

Unit 4: Softwares used in Biology (12 Lectures)

Outline of MS-Office (MS-Word, MS-Excel and MS-Power point). Database softwares- MS access, Image editing softwares (Photoshop), Biological Sequence Searching and Comparison softwares (BLAST), Search engines (Google, Mozilla Firefox), GIS softwares (Google Earth).

Unit 5: Computer Applications in Biology (12 Lectures)

Introduction to Bioinformatics and its applications, EMBL and GenBank Data Libraries, PIR Database, Fundamentals of Geographic Information Systems (GIS) and Remote Sensing and its uses in biology. Information systems- BTIS, ENVIS.

Introduction to statistical softwares- SPSS and PSPP (open source), use for descriptive statistical analysis.

Suggested Readings

1. Banerjee P.K. 2009 Introduction to Biostatistics- A Text Book of Biometry. S.Chand & Co. New Delhi.
2. Bemis K. PSPP: Purdue STAT 582 User Manual. http://www.stat.purdue.edu/~jennings/stat582/software/pspp_manual.pdf
3. Chernick M.R. and Friis R.H. 2003. Introductory Biostatistics for the Health Sciences: Modern Applications including Bootstrap. John Wiley & Sons. New Jersey.
4. Cox J. Lambert J. and Frye C. 2011. Step by Step: Microsoft Office Professional 2010. Microsoft Press. Washington. <https://capdtron.files.wordpress.com/2013/01/office-professional-2010-step-by-step.pdf>
5. Daniel W.W. 2005. Biostatistics: A Foundation for Analysis in the Health Sciences (7thed.). John Wiley & Sons (Asia) Pvt. Ltd. Singapore.
6. Lambert J. and Frye C. 2015. Microsoft Office 2016 Step by Step. Microsoft Press. USA. <https://ptgmedia.pearsoncmg.com/images/9780735699236/samplepages/9780735699236.pdf>
7. PSPP Users' Guide. GNU PSPP Statistical Analysis Software Release 0.10.2. <http://www.gnu.org/software/pspp/manual/pspp.pdf>
8. PSPP Tutorial. <https://www.youtube.com/watch?v=GG-wbMS9i7g>
9. Rutkosky 2007. MS Office. BPB Publication. New Delhi.
10. Genbank: <https://www.ncbi.nlm.nih.gov/genbank/>
11. EMBL Nucleotide Sequence Database <http://www.ebi.ac.uk/>

CORE 18: PLANT BIOTECHNOLOGY- THEORY**Unit 1: Plant Tissue Culture, Design of Lab and Media (12 Lectures)**

Plant tissue culture: Definition, History of Plant Tissue Culture (PTC). Cellular differentiation and redifferentiation. Totipotency. Designing of PTC lab. Sterilization procedures for chemicals and glassware. Outlines on PTC media- (MS medium in detail). Plant growth regulators. Gelling agents (Agar). Types of explants.

Unit 2: Types of Tissue Cultures- I and Secondary metabolites (12 Lectures)

Callus culture and cell suspension culture. Direct and indirect organogenesis. Somaclonal variations and their uses in agriculture.

Basics of Secondary metabolite production of Shikonin from *Lithospermum erythrorhizon*; Morphine from *Papaver somniferum*; Vincristine from *Catharanthus roseus*.

Unit 3: Types of Tissue Cultures- II (12 Lectures)

Meristem culture- virus free plant production. Micropropagation (using axillary and apical bud cultures). Anther and pollen cultures. Protoplast isolation and culture. Somatic hybridization: selection of somatic hybrids and cybrids. Somatic embryogenesis- artificial seed production.

Unit 4: Genetic Engineering and Cloning Vectors (12 Lectures)

Principles and tools of genetic engineering: Restriction endonucleases- Type II enzymes; nomenclature. DNA ligase and DNA Polymerases.

Cloning Vectors – Bacterial vectors (pBR322, pUC8), Viral vectors (M13, λ phage), Hybrid vectors (cosmids), Artificial Chromosomes (Bacterial and Yeast).

Unit 5: Transgenic Plants, Bioethics and Biosafety (12 Lectures)

Agrobacterium (Ti plasmid) mediated gene transfer. Particle gun bombardment, Microinjection, Electroporation. Introduction to molecular markers.

Production of transgenic plants: Insect resistance (*Bt* gene), Bruise resistance and drought resistance. Introduction to Golden Rice, Plantibodies, Edible vaccines, Bioplastics. Bioethics and Biosafety of GM crops.

Suggested Readings

1. Brown T.A. 2001. Gene Cloning and DNA Analysis- An Introduction (4thed.). Blackwell Science. Oxford.
2. Clark D.P. and Pazdernik N.J. 2009. Biotechnology- Applying the Genetic Revolution. Elsevier Academic Press. USA.
3. Das H.K. 2010. Textbook of Biotechnology (4thed.). Wiley India Pvt Ltd. New Delhi.
4. Chawla H.C. 2003. Plant Biotechnology- Laboratory Manual for Plant Biotechnology. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
5. Desmond S.T. Nicholl. 2010. An Introduction to Genetic Engineering. Cambridge University Press. New Delhi.
6. Dubey R.C. 2006. A Text Book of Biotechnology. S.Chand & Company Ltd. New Delhi.
7. Gupta P.K. 2000. Elements of Biotechnology. Rastogi Publications. Meerut.
8. Harisha S. 2007. Biotechnology Procedures and Experiments Handbook. Infinity Science Press Llc. Hingham. MA.
9. Ignacimuthu S. 2003. Plant Biotechnology. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.

10. Keshavachandran R. and Peter, K.V. 2008. Plant Biotechnology- Methods in Tissue Culture and Gene Transfer. University Press (India) Pvt. Ltd. Hyderabad.
11. Kumar H.D. 1998. Modern Concepts of Biotechnology. Vikas Publishing House Pvt Ltd. New Delhi
12. Kumaresan V. 2010. Biotechnology. Saras Publication. Nagercoil. Tamil Nadu.
13. Mosier N.S. and Ladisch M.R. 2009. Modern Biotechnology- Connecting Innovations in Microbiology and Biochemistry to Engineering Fundamentals. John Wiley & Sons Inc. New Jersey.
14. Prakash J. and Pierik R.L.M. 1993. Plant Biotechnology- Commercial prospects and Problems. Science Publishers, Inc. U.S.A.
15. Primrose S., Twyman R. and Old B. 2001. Principles of Gene Manipulation (6th ed.). Blackwell Science. Oxford.
16. Verma P.S. and Agarwal V.K. 2009. Genetic Engineering. S.Chand & Co. Ltd. New Delhi.

CORE 19: HORTICULTURE- THEORY**Unit 1: Landscaping and Gardening (12 Lectures)**

Plants of aesthetic interest. Gardening types. Importance and classification of horticultural crops - their culture and nutritive value, area and production, exports and imports, fruit and vegetable zones of India and of different states, nursery management practices, soil and climate. Irrigation, fertilizer application, pest and diseases.

Unit 2: Orchard and Kitchen Garden Layout (12 Lectures)

Vegetable gardens, nutrition and kitchen garden and other types of gardens – principles, planning and layout, management of orchards, planting systems and planting densities. Rejuvenation of old orchards, top working, frame working, principles of organic farming.

Unit 3: Nursery and Canopy Management (12 Lectures)

Production and practices for fruit, vegetable and floriculture crops, propagation- cutting, layering, grafting. Principles and methods of pruning.

Unit 4: Cropping Systems (12 Lectures)

Types and use of growth regulators in horticulture, water management, weed management, fertility management, cropping systems: intercropping, multi-tier cropping, mulching, bearing habits, factors influencing the fruitfulness and unfruitfulness.

Unit 5: Disease Control and Pest Management

Horticultural crop diseases by:

- (i) Rodents
- (ii) Viruses
- (iii) Insects

Suggested Readings

1. Adams C.R. and Early M.P. 2004. Principles of Horticulture. Butterworth Heinemann. Oxford University Press. Oxford.
2. Bansil P.C. 2008. Horticulture in India. CBS Publishers and Distributors. New Delhi.
3. Chadha K.L. 2001. Handbook of Horticulture. ICAR, New Delhi.
4. Chattopadhyay P.K. 2001. A text book on Pomology (Fundamentals of fruit growing). Kalyani Publication. New Delhi.
5. Christopher E.P. 2001. Introductory Horticulture. Biotech Books. New Delhi.
6. Hartmann H.T., Kester D.E., Davies JR. F.T. and Geneve R.L. 2011. Hartmann & Kester's Plant Propagation: Principles and Practices (8thed.). PHI Learning Pvt. Ltd. Delhi.
7. Jitendra Singh. 2006. Basic Horticulture. Kalyani Publishers. New Delhi.
8. Kumar N. 1997. Introduction to Horticulture. Rajalakshmi Publication. Nagercoil.
9. Rajan S. and Markose B.L. 2007. Propagation of horticultural crops. New India Publishing. New Delhi.
10. Senn T.L., Andrews F.S. and Halfacre P.G. 1975. Fundamentals of Horticulture. Tata McGraw Hill Publishing Co. New Delhi.
11. Sheela V.L. 2011. Horticulture. MJP Publishers. Chennai.
12. Vijaikumar Uma Rao. 2008. Horticulture terms – Definitions and Terminology. IBD Publishers. Dehradun.

CORE 20: PLANT TISSUE CULTURE- THEORY**Unit 1: Introduction and History****(6 Lectures)**

History of Plant Tissue Culture (PTC). Totipotency, Dedifferentiation, Redifferentiation.

Unit 2: Culture Media**(14 Lectures)**

General account on Plant Tissue Culture Media: Murashige and Skoog medium- Macronutrients, Micronutrients, Vitamins, Carbon sources, Agar (solidifying agent), Organic supplements. Plant Growth Regulators- PGRs: Auxins, Cytokinins, Gibberellins, Abscisic acid and Ethylene.

Unit 3: Sterilization Procedures**(14 Lectures)**

Sterilization procedures:- Physical methods: Wet method - autoclave, water bath, Dry methods: Hot air oven, Microwave oven. Chemical methods: use of alcohols, formaldehyde, phenol, sodium hypochlorite, mercuric chloride. Surface sterilization of explants, cleaning of hand.

Unit 4: *In Vitro* Cultures

Callus induction, Cell suspension cultures, Somatic embryogenesis- artificial seeds. Somaclonal variations.

Micropropagation using meristems and nodal explants.

Haploid plant production through androgenesis and gynogenesis. Embryo and endosperm culture with their applications.

Unit 5: Applications of PTC**(12 Lectures)**

Secondary metabolites production in cultures. Production of plumbagin from *Plumbago zeylanica*, vincristine from *Catharathus roseus*, azadiractin from *Azadirachta indica*.

Applications of plant tissue cultures in Agriculture.

Suggested Readings

1. Bhojwani S.S. and Razdan M.K. 1996. Plant Tissue Culture: Theory and Practice. Elsevier Science Amsterdam. The Netherlands.
2. Dods J.H. and Robers L.W. 1995. Experiments in Plant Tissue Culture (3rded.). Cambridge University Press. Cambridge.
3. Gamborg O.L. and Philip, G.C. 1995. Plant Cell, Tissue and Organ Culture. Narosa Publishing House. New Delhi.
4. Gupta P.K. 1995. Elements of Biotechnology. Rastogi Publication. Meerut.
5. Keshavachandran R. and Peter K.V. 2008. Plant Biotechnology: Methods in Tissue Culture and Gene Transfer. Universities Press (India) Pvt. Ltd. Hyderabad.
6. Kumaresan V. 2015. Plant Biotechnology. Saras Publication. Nagercoil.
7. Misra S.P. 2015. Plant Tissue Culture (2nded.). Ane Book Pvt. Ltd. Chennai.
8. Narayanasamy S. 1994. Plant Cell and Tissue Culture. Tata McGraw-Hill Publishing Company Ltd. New Delhi.

CORE 21: ETHNOBOTANY- THEORY**Unit 1: Ethnobotany (12 Lectures)**

Introduction, concept, scope and objectives; Ethnobotany as an interdisciplinary science. The relevance of ethnobotany in the present context; Major and minor ethnic groups or Tribals of India, and their life styles. Plants used by the tribals: (a) Food plants (b) intoxicants and beverages (c) Resins and oils and miscellaneous uses.

Unit 2: Methodology of Ethnobotanical Studies

(a) Field work (b) Herbarium (c) Ancient Literature (d) Archaeological findings (e) temples and sacred places.

Unit 3: Role of Ethnobotany in Modern Medicine (16 Lectures)

Medico-ethnobotanical sources in India; Significance of the following plants in ethnobotanical practices (along with their habitat and morphology) (a) *Azadirachta indica* (b) *Ocimum sanctum* (c) *Vitex negundo*. (d) *Gloriosa superba* (e) *Tribulus terrestris* (f) *Pongamia pinnata* (g) *Cassia auriculata* (h) *Indigofera tinctoria*. Role of ethnobotany in modern medicine with special example *Rauwolfia serpentina*, *Trichopus zeylanicus*, *Artemisia annua*, *Withania somnifera*.

Unit 4: Conservation of Plant Genetic Resources (12 Lectures)

Role of ethnic groups in conservation of plant genetic resources. Endangered taxa and forest management (participatory forest management).

Unit 5: Ethnobotany and Legal Aspects (12 Lectures)

Ethnobotany as a tool to protect interests of ethnic groups. Sharing of wealth concept with few examples from India. Biopiracy, Intellectual Property Rights and Traditional Knowledge- Patent

Suggested Readings

1. Colton C.M. 1997. Ethnobotany – Principles and applications. John Wiley and Sons. Lichester.
2. Jain S.K. 1995. Manual of Ethnobotany. Scientific Publishers. Jodhpur.
3. Jain S.K. (ed.). 1981. Glimpses of Indian Ethnobotany. Oxford and IBH. New Delhi.
4. Jain S.K. 1990. Contributions of Indian ethnobotany. Scientific publishers. Jodhpur.
5. Kumaresan V. and Annie R. 2013. Taxonomy-Systematic Botany, Economic Botany, Ethnobotany. Saras Publication. Nagercoil.
6. Pullaiah T. and Krishnamurthy K.V. and Bahadur B. 2017. Ethnobotany of India: The Indo-Gangetic Region and Central India (Vol. 5). Apple Academic Press. USA.
7. Rama Ro N. and Henry A.N. 1996. The Ethnobotany of Eastern Ghats in Andhra Pradesh, India. Botanical Survey of India. Howrah.
8. Sinha R.K. 1969. Ethnobotany. The Renaissance of Traditional Herbal Medicine – INA – SHREE Publishers. Jaipur.

CORE 22: BOTANY LABORATORY**BOTANY LABORATORY-V****BIostatistics AND COMPUTER APPLICATIONS IN BIOLOGY- PRACTICAL**

1. Tabulation of biological data.
2. Calculation of mean, median, mode, standard deviation and standard error using biological data.
3. To plot and import Graphs and Charts using biological and statistical data in MS-office.
4. Search biological information (texts and images) using Internet.
5. Biological sequence searching using BLAST software.

PLANT BIOTECHNOLOGY- PRACTICAL

1. Murashige and Skoog medium preparation.
2. Sterilization and inoculation of explants on culture media.
3. Callus culture.
4. Micropropagation (axillary bud or terminal bud).
5. Anther and Ovary culture.
6. Protoplast isolation and culture- demonstration.
7. Identification of photographs pertaining to chapters mentioned in the theory.
8. Identification of Crown gall disease by specimen or photograph.

HORTICULTURE- PRACTICAL

1. Vegetable gardening.
2. Making of kitchen garden.
3. Pruning of crop plants.
4. Study of effect of growth regulators, Auxin (IAA, NAA), Cytokinins (Zeatin, BAP), Gibberellins on plant growth.

BOTANY LABORATORY-VI

PLANT TISSUE CULTURE – PRACTICAL

1. Sterilization of glassware and culture media.
2. Preparation of MS medium.
3. Surface sterilization of explants.
4. Callus induction
5. Micropropagation using nodal explants and shoot tip explants.
6. Anther culture.

ETHNOBOTANY- PRACTICAL

1. Field visit to meet ethnic people of hills and preparation and submission of report on Botanical names, vernacular name, family, uses of plants for traditional medicines.
2. Preparation of 5 Herbarium of ethnobotanically important plants.
3. Study of habitat of ethnobotanical plants mentioned in theory.
4. Study of morphology of plants used in traditional medicine.

PART III

ZOOLOGY

B.Sc., B.Ed. LIBERAL OPTIONS**PART III: B.SC.B.ED.****Branch: ZOOLOGY**

| SEM | No. | Sub | Name of the course | CCE | UE | Total |
|---------------------------|---------------------------|--------------|---|-----|-----|-------|
| I | Core 1 | Main 1 | Biodiversity of Invertebrates | 30 | 70 | 100 |
| | Core 2 | Main 2 | Biodiversity of Chordates and Vertebrates | 30 | 70 | 100 |
| | Core 3 | Main 3 | Animal Physiology | 30 | 70 | 100 |
| | Core 4 (Supportive 1) | Anci 1-1 | Botany I | 30 | 70 | 100 |
| II | Core 5 | Main 4 | Microbiology | 30 | 70 | 100 |
| | Core 6 | Main 5 | Developmental Biology | 30 | 70 | 100 |
| | Core 7 | Main 6 | Laboratory- I | | 50 | 50 |
| | | | Biodiversity of Invertebrates-Practical Biodiversity of Chordates and Vertebrates Practical | | | |
| | | | Laboratory- II | | 50 | 50 |
| | | | Animal Physiology Practical Microbiology Practical Developmental Biology Practical | | | |
| Core 8 (Supportive 2) | Anci 1-2 | Botany II | 30 | 70 | 100 | |
| III | Core 9 | Main 7 | Vector Biology | 30 | 70 | 100 |
| | Core 10 | Main 8 | Immunology | 30 | 70 | 100 |
| | Core 11 | Main 9 | Ornamental Fish Culture and Aquarium Technology | 30 | 70 | 100 |
| | Core 12 (Supportive 3) | Anci 2-1 | Chemistry-I | 30 | 70 | 100 |
| IV | Core 13 | Main 10 | Cell and Molecular Biology | 30 | 70 | 100 |
| | Core 14 | Main 11 | Biochemistry and Intermediary Metabolism | 30 | 70 | 100 |
| | Core 15 | Main 12 | Laboratory-III | | 50 | 50 |
| | | | Vector Biology Practical Immunology Practical Ornamental Fish Culture and Aquarium Technology Practical | | | |
| | | | Laboratory-IV | | 50 | 50 |
| | | | Cell and Molecular Biology Practical Biochemistry and Intermediary Metabolism Practical | | | |
| Core 16 (Supportive 4) | Anci 2-2 | Chemistry-II | 30 | 70 | 100 | |
| V | Core 17 | Main 13 | Bioinstrumentation | 30 | 70 | 100 |
| | Core 18 | Main 14 | Endocrinology and Reproductive Biology | 30 | 70 | 100 |
| VI | Core 19 | Main 15 | Poultry and Dairy Science | 30 | 70 | 100 |
| | Core 20 | Main 16 | Evolution and Conservation Biology | 30 | 70 | 100 |
| VII | Core 21 | Main 17 | Genetics and Biotechnology | 30 | 70 | 100 |
| VIII | Core 22 | Main 18 | Laboratory-V | | 50 | 50 |
| | | | Bioinstrumentation Practical Endocrinology and Reproductive Biology Practical | | | |
| | | | Laboratory-VI | | 50 | 50 |
| | | | Poultry and Dairy Science Practical Evolution and Conservation Biology Practical Genetics and Biotechnology Practical | | | |

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CORE 1: BIODIVERSITY OF INVERTEBRATES

Objectives:

1. To understand Biodiversity, Habitat, Adaptation organization and taxonomic status of invertebrates.
2. Explaining the basic aspects of classification, structural and functional details of Invertebrates.

Unit I:

Principles of Taxonomy – Binomial nomenclature – Rules of nomenclature – Whittaker's five kingdom concept and classification of Animal Kingdom..

PROTOZOA: General characters and classification up to classes with suitable examples of Indian context. Type study – *Paramecium*

PORIFERA: General characters and classification up to classes with suitable examples of Indian context. Type study – *Leucosolenia*

Unit II:

COELENTERATA: General characters and classification up to classes with suitable examples of Indian context. Type study – *Obelia*,

CTENOPHORA: Classification, Salient features with suitable examples of Indian context.

Unit III:

PLATYHELMINTHES : General characters and classification up to classes with suitable examples of Indian context. Type Study: *Taenia solium*

ASCHELMINTHES: General characters and classification up to classes with suitable examples of Indian context. Type study: *Ascaris lumbricoides*

Unit IV:

ANNELIDA : General characters and classification up to classes with suitable examples of Indian context. Type study; *Nereis*

ARTHROPODA : General characters and classification up to classes with suitable examples of Indian context. Type study; *Panaeus monodon*

Unit V:

MOLLUSCA : General characters and classification up to classes with suitable examples of Indian context. Type study; *Unio*

ECHINODERMATA : General characters and classification up to classes with suitable examples of Indian context. Type study; *Asterias*.

Suggested Readings

1. Kotpal, R. L., 2000, Modern Text Book of Zoology –Invertebrates, 8th Revised edition(Reprint), Rastogi Publications, Meerut – 250 002.
2. Ayyar, E.K. and T.N. Ananthkrishnan, 1992. Manual of Zoology Vol. 1 (Invertebrate), Part I & II. S. Viswanathan (Printers and Publishers) Pvt Ltd., Madras, 991p.
3. Jordan, E.L. and P.S. Verma, 2010, Invertebrate Zoology, S. Chand & Co Ltd., Ram Nagar, New Delhi.
4. Hyman volume I to VI, 1955, McGraw Hill Co. New York.
5. Barnes R.D (1992) Invertebrate Zoology IV Edn. Holt saunders International Edn.

CORE 2: BIODIVERSITY OF CHORDATES AND VERTEBRATES

Objectives : To discuss habitat, adaptations and organization of chordates.

UNIT – I

Salient Features of Phylum Chordata.

PROCHORDATA:

Characteristics and classification of Prochordata upto order level with examples Type study: Ascidia
General topic: Origin of Chordata.

UNIT –II PISCES

General characters and classification up to orders with examples Type study: Shark. (without endoskeleton)

General Topic: Accessory respiratory organs in fishes,

AMPHIBIA

General characters and classification up to orders with examples Type study: Frog (without endoskeleton)

General Topic: Parental care in Amphibians

UNIT – III REPTILIA

General characters and classification up to orders with examples Type study – Calotes. (without endoskeleton)

General Topic: Identification of poisonous and non-poisonous snakes..

UNIT – IV AVES

General characters and classification up to orders with examples Type study – Pigeon (without endoskeleton)

General Topic Flight adaptations in Birds.

UNIT – V MAMMALIA

General characters and classification up to orders with examples Type study – Rabbit (without endoskeleton)

General Topic: Aquatic Mammals.

Suggested Readings

1. Ekambaranatha Ayyar & T.N.Ananthakrishnan (1995) A manual of Zoology Vol – II, (part I & II) S.Viswanathan Pvt. Ltd. Chennai.
2. Jordan.E.L & P.S.Verma (2000) „Chordate Zoology“ S.Chand & Co New Delhi.
3. Kotpal, R. L., Modern Text Book of Zoology – Vertebrates, Revised Edition (Reprint), Rastogi Publications, Meerut – 250 002.
4. Young, J. Z., 2004, The Life of Vertebrates, 3rd Edition, Oxford University Press, London.
5. Parker and Hanswell, 2004, Text Book of Zoology, Vol II (Chordata), A.Z.T,B.S. Publishers and Distributors, New Delhi – 110 051.
6. Hickman, C.P. Jr., F.M.Hickuman and L.S. Roberts, 1984. Integrated Principles of Zoology, 7th Edition, Times Merror/Mosby College Publication. St. Louis. 1065pp.

CORE 3: ANIMAL PHYSIOLOGY

Objectives : Explaining various aspects of physiological activities of animals with special reference to mammals.

UNIT – I

Nutrition : Types of nutrition, Food and feeding mechanisms, Digestive enzymes and their role in digestion,

UNIT – II

Respiration : Respiratory organs, Respiratory pigments and functions. Transport of gases [Co₂ and O₂] - Chloride Shift, Haldane and Bohr's effect

Circulation: Composition, properties and functions of Blood , Mechanism of blood clotting, Structure of human heart- Cardiac cycle, Origin of heart beat , Pace maker , Regulation of heart beat, ECG, Blood Pressure, Arrhythmias

UNIT – III

Excretion: Kidney, Nephron - structure and mechanism of urine formation in mammals... Osmo ionoregulation and thermoregulation

UNIT – IV

Muscle Physiology: Types of muscles, Structure and chemical composition of skeletal muscle, Mechanism of muscle contraction

Nerve Physiology: Neuron – Structure, types of neurons. Nerve impulse, Synapse , Synaptic transmission of impulses, Neurotransmitters and reflex arc.

UNIT -V

Receptors: Photoreceptor – Structure of a mammalian eye, Retina – visual pigments, Physiology of vision. Phonoreceptor – Structure of mammalian ear , Mechanism of hearing, Physiology of equilibrium, Chemoreceptors

Suggested Readings

1. Sambasivaiah, Kamalakara rao and Augustine chellappa 1990. A Text book of Animal physiology and ecology, S. Chand & co., Ltd., New Delhi – 110 055.
2. Parameswaran, Anantkrishnan and Ananta Subramanyam, 1975. Outlines of Animal Physiology,
3. S. Viswanathan [printers & Publishers] Pvt. Ltd.
4. William S. Hoar, 1976. General and comparative physiology, prentice Hall of India Pvt. Ltd., New Delhi. 110 001.
5. Wood.D.W, 1983, Principles of Animal Physiology 3rd Ed.,
6. Prosser,C.L. Brown, 1985, Comparative Animal Physiology, Satish Book Enterprise, Agra

CORE 4: (SUPPORTIVE 1) BOTANY I- THEORY**(Bacteria, Algae, Fungi, Archegoniatae, Angiosperms and Economic Botany)****Unit I: Monerans (12 Lectures)**

Salient features of bacterium and cyanobacterium. Ultrastructure and reproduction of *Escherichia coli* and *Nostoc*.

Unit II: Algae and Fungi (12 Lectures)

General characters of Algae and Fungi. Study of structure and reproduction of *Volvox* and *Oedogonium*; *Aspergillus* and *Puccinia*.

Unit III: Archegoniatae (12 Lectures)

Salient features of Bryophytes, Pteridophytes and Gymnosperms. Structure, reproduction and life cycle of the following genera: *Marchantia*, *Selaginella* and *Pinus*.

Unit IV: Angiosperms (12 Lectures)

Introduction to flower, fruit and seeds. Study of Angiospermic families: Annonaceae, Asclepiadaceae, Nyctaginaceae and Poaceae.

Unit V: Economic Botany (12 Lectures)

Binomial, family and morphology of the useful parts of the following categories: Cereals (rice, wheat, barley), Millets (finger millet, pearl millet, broom-corn), Pulses (green gram, ground nut, soya bean), Oils (sunflower, coconut, gingelly), Spices (clove, pepper, cardamom), Beverages (cocoa, tea, coffee) and Medicines (*Adhatoda*, ginger, *Aloe*).

Suggested Readings

1. Kumaresan V. and Annie R. 2013. Taxonomy-Systematic Botany, Economic Botany, Ethnobotany. Saras Publication. Nagercoil.
2. Pandey B.P. College Botany (Vol.I). 2010. S.Chand and Company Ltd. New Delhi.
3. Rashid A. 1998. An introduction to Bryophyta. Vikas Publishing House (P) Ltd. New Delhi.
4. Singh G. 2010. Plant Systematics: An Integrated Approach. Science Publishers. USA.
5. Srivastava H.N. 1998. Gymnosperms. Pradeep Publications. Jalandhar.
6. Vasishtha B.R., Sinha A.K. and Kumar A. 2010. Botany for degree students- Pteridophyta. S. Chand and Company Ltd. New Delhi.
7. Vasishtha B.R., Sinha A.K. and Kumar A. 2011. Botany for degree students- Bryophyta. S.Chand and Company Ltd. New Delhi.
8. Vasishtha P.C., Sinha A.K. and Kumar A. 2006. Botany for degree students- Gymnosperms. S.Chand and Company Ltd. New Delhi.
9. S.Chand and Company Ltd. New Delhi.
10. Vasishtha B.R., Sinha A.K. and Singh V.P. 2010. Botany for degree students- Algae. S.Chand and Company Ltd. New Delhi.
11. Vasishtha B.R. and Sinha A.K. 2010. Botany for degree students- Fungi. S.Chand and Company Ltd. New Delhi.

BOTANY I- PRACTICAL

(Bacteria, Algae, Fungi, Archegoniatae, Angiosperms and Economic Botany)

1. Study of genera included in Unit I,II and III.
2. Study of families included in Unit IV.
3. Study of products of economic importance included in Unit V.

CORE 5: MICROBIOLOGY

Objectives: To emphasize the importance of integrating new knowledge on Microorganisms.

UNIT-I**Scope of Microbiology**

Diversity of Microbes, Broad classification of bacteria, fungi, yeast and virus. Structure and functions of bacteria and virus , Bacterial Culture – Media & types.

UNIT-II**Microbes of the Environment**

Air, Water and Soil and its role in ecosystem, Role of Microbes in Ecosystem Bioremediation of industrial wastes, sewage treatment plants,

UNIT-III**Agricultural Microbiology**

Microorganisms as biofertilizers, production and application of. Microbial biopesticides; Mechanism of N₂ fixation.

UNIT –IV**Food Microbiology:**

Microbes of milk and food, Pasteurization and food spoilage. Fermentation techniques and Production of alcohol. Uses of microbes in food Industry - Bread , Vinegar,

UNIT- V**Microbial Control**

Concept of Sterilization pasteurization, tyndalization; fumigation, ultrasonication, and filtration.

Suggested Readings

1. Burden, K.L. and R.P. Williams (6th Ed.) 1968. Microbiology. The Macmillan Co., London 2.Roberts, T.A. and F.A. Skinner (Eds.) 1983. Food Microbiology: Advances and Prospects,
2. Academic Press, Inc. London,
3. Pelczer, M.J., Reid, R.D. And Chan, E.C.S. (1996), Microbiology, V Ed., Tata McGraw Hill Publishing Company Ltd., New Delhi.
4. Ananthanarayanan, T And Jayaram Paniker, C.K. (2000), Text Book of Microbiology, VI Ed., Orient Longman Ltd., Madras.
5. C.B.Powar, H.F.Daginawala, (1965) General Microbiology Himalayan Publishing House

CORE 6: DEVELOPMENTAL BIOLOGY**Objectives:**

To understand ontogenesis, the development of animals including parthenogenesis and to study embryonic adaptations, human reproduction and reproductive technology in man.

UNIT – I

Theories of developmental biology; Gametogenesis – Spermatogenesis and Oogenesis Types of eggs and egg membranes ; Fertilization – External and internal fertilization, sperm – egg interaction, physiological changes in the organization of egg cytoplasm, theories of fertilization. Parthenogenesis ,types -. Natural and artificial parthenogenesis.

UNIT – II**Cleavage**

Types, Patterns and factors affecting cleavage; Types of blastula Blastulation and Gastrulation in frog and chick, Fate maps in frog and Morphogenetic movements.

UNIT – III**Tubulation**

Neurulation and organogenesis : Development of brain, eye , heart in frog ; Extra-embryonic membranes. Placentation in mammals.

UNIT-IV

Genetic control of development- Organizer concept and embryonic induction. Concept of neotony and paedogenesis-Regeneration in Planarians and Amphibians. Metamorphosis in Amphibians.

UNIT V

Assisted reproductive technology- Human Pregnancy and Gestation, infertility- Artificial Insemination – Cryopreservation – in-vitro fertilization – Embryo Transfer and its advantages - Concept of test-tube baby. Ethics in assisted reproductive technology and embryo manipulation. Teratogenesis and factors involved.

Suggested Readings

1. Balinsky, B.I. 1981. An Introduction to Embryology. W.B. Saunders Company. Philadelphia.
2. Berry.A.K.2007. An Introduction to Embryology, Emkay Publications, New Delhi-51.
3. Verma, P.S. and Agarwal V.K. 2005. Chordate Embryology (Developmental biology) S.Chand & Company Ltd., New Delhi.
4. Rastogi, V.B and Jayaraj, M.S. 2002. Developmental Biology Kedar Nath Ram Nath, Meerut.
5. Twyman, R.M. 2003. Developmental Biology. Viva Books Private Ltd., New Delhi.

CORE 7: ZOOLOGY LABORATORY**ZOOLOGY LABORATORY- I****BIODIVERSITY OF INVERTEBRATES-PRACTICAL****I. DISSECTION****A.Prawn:**

1. Digestive system
2. Nervous system

B. Cockroach

3. Digestive system
4. Nervous system
5. Male Reproductive system
6. Female Reproductive system

II. MOUNTING

7. Earth worm- Body setae and Penial setae
8. Mouth parts of Mosquito
9. Sting apparatus of Honey bee
10. Prawn appendages:

III – SPOTTERS (any 30 spotters)**A- Classify giving reasons up to order:**

1. *Paramecium*
2. *Scypha*
3. *Aurelia*
4. *Fasciola*
5. *Ascaris*
6. *Neanthes*
7. *Panaeus*
8. *Lamellidens*
9. *Asterias*

B- Draw labeled sketches:

10. L.S. Sponge
11. *Obelia medusa*
12. *Physalia*
13. Ephyra larva
14. Redia larva
15. Cercaria larva
16. *Mysis* larva

17. *Alima* larva

18. Bipinnaria larva

C- Comment on Biological significance:19. *Entamoeba*20. *Paramecium* – Conjugation21. *Plasmodium*22. *Obelia* colony23. *Veleva*24. *Fasciola* – Miracidium25. *Taenia* – Mature proglottid26. *Ascaris*27. *Heteronereis*

28. Trochophore larva

29. *Chaetopterus*30. *Peripatus*31. *Hirudinaria*32. *Limulus*

33. Nauplius larva

34. Zoea larva

35. *Chiton*36. *Sepia*37. *Octopus*38. *Sacculina* on crab

39. Sea anemone on Hermit crab

D – Relate structure and function:

40. Sponge – Spicules

41. Sponge – Gemmule

42. *Taenia* – Scolex43. *Neanthes* – Parapodium

44. Earth worm – Penial setae

45. *Panaeus* – Petasma

46. Honey bee – Sting apparatus

47. Scorpion – Book – lung

48. Starfish – Pedicellaria

49. Starfish - Tube foot.

BIODIVERSITY OF CHORDATES AND VERTEBRATES PRACTICAL**I. DISSECTION**

Fish: Digestive, Nervous system, Male and female Reproductive system

II. MOUNTING

1. *Scoliodon*: Placoid scales.
2. *Mugil*: Ctenoid scales.

III – SPOTTERS (any 30 spotters)**A- Classify giving reasons up to order:**

1. *Balanoglossus*
 2. *Herdmania* (=Ascidian)
 3. *Branchiostoma* (= *Amphioxus*)
 4. *Petromyzon*
 5. *Scoliodon sorrakowah*
 6. *Mugil oeur*
 7. *Rana hexadactyla*
 8. *Calotes versicolor*
 9. *Columba livia*
 10. *Oryctolagus cuniculus*
- B - Draw labeled sketches:**
11. *Amphioxus* – T.S. through pharynx.
 12. *Doliolum*
 13. *Salpa*
 14. Arboreal organ of cat fish
 15. Accessory respiratory organ of *Anabas*
 16. Flight muscle of Birds

17. Poisonous apparatus of Snake
18. *Narcine*
19. *Naja naja*
20. *Typhlops*

C- Comment on Biological significance:

21. Tornaria larva
22. Ascidian Tadpole larva
23. *Anabas scandens*
24. *Hippocampus*
25. *Echeneis*
26. *Rhacophorus*
27. *Ichthyophis*
28. *Amblystoma*
29. Axolotle larva
30. *Chamaeleon*
31. *Vipera russelli* (= Russel's viper)
32. *Draco volans*
33. Bat

D –Relate structure and function:

34. Fish - air bladder
35. Fang of Snake
36. Placoid- Scale of Shark.
37. Filter feeding structure of Whale-Balen plates
38. Quill Feather of pigeon
39. Aquatic mammals- limbs
40. Contour feather

ZOOLOGY LABORATORY - II**ANIMAL PHYSIOLOGY PRACTICAL**

1. Qualitative detection of human salivary amylase in relation to either pH or temperature.
2. Oxygen consumption of fresh water fish with reference to body weight.
3. Detection of nitrogenous waste products (Ammonia, urea and uric acid) in fish tank water, frog tank water, bird excreta and mammalian urine/ Kidney.
4. Estimation of Haemoglobin from Human Blood
5. Determination of blood clotting time
6. Calculation of Body Mass Index (BMI)
7. Estimation of Erythrocyte Sedimentation Rate(ESR)
8. Measurement of Blood Pressure (BP)
9. Pulmonary function test by Spirometer

Spotters

1. B.P.apparatus
2. Stethoscope.
3. ECG apparatus
4. Types of Muscle cell
5. Pace Maker
6. Nerve Cell
7. Nephron
8. Spirometer

MICROBIOLOGY PRACTICAL

1. Identification of microorganisms from the habitats [simple staining, differential staining,]
2. Morphological Observation of bacterial cell.
3. Methods of inoculation Of microbes – Spore plate, Streak and Swab.
4. Motility study of Lactobacillus – Hanging drop method

Spotters:-

Mycoplasmas, Rickettsiae, Chlamydiae, Staphylococcus aureus, Streptococcus pneumoniae, Salmonella, HIV, Hepatitis virus and Rabies virus.
Fermentor, Bioreactors, Biofilters

DEVELOPMENTAL BIOLOGY PRACTICAL

1. Blastoderm mounting in Chick (demonstration only)
2. Study of the following prepared slides / models
3. Section of testis and Ovary [Mammalian]
4. Slides of Mammalian sperm and ovum.
5. Study of Egg types – Frog's Egg, Hen's Egg.
6. Study of cleavage stages 2 Cell, 4Cell, 8Cell
7. Blastula and gastrula of Frog- yolk plug stage, neural plate and neural tube.
8. Slides of different stages of chick embryo – 18 hours [primitive streak stage], 24 hours, 48 hours 72 hours and 96 hours.

CORE 8: (SUPPORTIVE 2) BOTANY II- THEORY**(Cytology, Anatomy, Physiology, Microbiology and Plant Ecology)****Unit I: Cell and Organelles (10 Lectures)**

Study of plant cell organelles with emphasis on cell wall, Chloroplast, Mitochondria and Nucleus.

Unit II: Plant Anatomy (12 Lectures)

Anatomy of primary and secondary structure of dicot- stem and root; primary structure of stem and root in monocot, anatomy of dicot and monocot leaf.

Unit III: Plant Physiology (12 Lectures)

Brief study of mechanism of ion uptake and transport, photosynthesis (photochemical reactions, carbon assimilation reactions- C_3 and C_4 cycles), nitrogen fixation by symbiotic bacteria and phytohormones (auxins and cytokinins).

Unit IV: Microbiology (14 Lectures)

Survey of useful microbes: Agricultural uses of microbes: biodegradation and biodeterioration. Soil microflora- biofertilizers. Industrial uses of microbes (fermentation, alcoholic beverages); Food microbiology (microbial spoilage of food, microbial contamination of milk and water).

Unit V: Plant Ecology (12 Lectures)

Plant Ecology: Brief study of ecosystems, plants as primary producers, food chain and food web, ecological pyramids. Forests their importance and conservation, urban and rural forestry. Plants as pollution indicators.

Suggested Readings

1. De Robertis E.D.P. and De Robertis E.M.F. 2006. Cell and Molecular Biology. 8th ed.). Lippincott Williams and Wilkins. Philadelphia.
2. Dickison W.C. 2000. Integrative Plant Anatomy. Academic Press. San Diego.
3. John JothiPrakash E. 1987. A Text Book of Plant Anatomy. Emkay Publications. Delhi.
4. Kormondy E.J. 1996. Concepts of Ecology (4thed.). Prentice Hall, U.S.A.
5. Regland A. and Arumugan N. 2016. Fundamentals of Plant Anatomy and iques. Saras Publication. Nagercoil, Tamil Nadu.
6. Salisbury F.B. and Rose C.W. 1986. Plant Physiology(3rded.). CBS Publishers and Distributers. New Delhi.
7. Stanier R.V., Adelberg E.A. and Ingraham J.L. 1978. General Microbiology (4th ed.). Macmillan, London, UK.
8. Taiz L. and Zeiger E. 2010. Plant Physiology (5thed.). Sinauer Associates Inc. U.S.A.
9. Thorpe N.O. 1984. Cell Biology. John Wiley & Sons, New York. USA.

BOTANY - II- PRACTICAL

(Cytology, Anatomy, Physiology, Microbiology and Plant Ecology)

4. Study of Cell Organelles include in Unit I from electron micrographs.
5. Anatomical studies of plant parts included in Unit II.
6. To perform simple experiments as included in Unit III.
7. Study of microbes as included in Unit IV.
8. Study of ecological processes included in Unit V.

CORE 9: VECTOR BIOLOGY

Objectives:

To understand insect vectors of economic importance To study vector born diseases and their control

Unit-1

Introduction - Scope of vector biology; Classification of insects vectors; - Morphological features of Insect vectors, Mouth parts, feeding habits; Types of Vectors (mechanical and biological), Adaptations of vectors, Reservoirs, Host Specificity

Unit-2

Dipteran insect vectors – Mosquitoes, Sand fly, Houseflies; transmission cycles ,Study of Dipteran-borne diseases – Malaria, Dengue, Filariasis; Leishmaniasis, Phlebotomus fever; cholera and dysentery

Unit-3

Siphonapteran insect vectors – Flea, transmission cycles; Study of Flea-borne diseases – Plague, Endemic Typhus.

Siphunculatan insect vectors-Human louse, transmission cycles; Study of louse-borne diseases – Relapsing fever, Trench fever.

Unit-4

Hemipteran insect vectors – Bugs, transmission cycles; Bug-borne diseases; Chagas disease, Q fever.

Unit - 5

Control of vector and vector borne diseases; Vector control- Chemical, Biological, Genetic and Environmental. Insecticide resistance in vectors. Drug resistance in pathogens. Importance of education, awareness and Community participation.

Suggested Readings

1. Imms, A.D. (1977). A General Text Book of Entomology. Chapman & Hall, UK
2. Chapman, R.F. (1998). The Insects: Structure and Function. IV Edition, Cambridge University Press, UK
3. Hati, A. K. (2001). Medical Entomology. Allied Book Agency, Kolkata.
4. Pedigo L.P. (2002). Entomology and Pest Management. Prentice Hall Publication
5. Mathews, G. (2011). Integrated Vector Management: Controlling Vectors of Malaria and Other Insect Vector Borne Diseases. Wiley-Blackwell

CORE 10: IMMUNOLOGY

Objectives : To study the process which help to maintain the organisms internal environment, when challenged with foreign substances.
To understand the advances in Immunology

Unit: I

Introduction-Scope of immunology- Historical perspectives - Immunohaematology- blood groups, blood transfusion, Rh-incompatibilities; Types of immunity- innate and acquired immunity.

Unit: II

Anatomy of lympho-reticular system- primary and secondary lymphoid organs; Cells of the immune system, T and B cells receptors-activation and function.

Unit: III

Antigens- Types, properties, antigenic determinants, haptens, adjuvants. Immunoglobins- types, structure and properties, Monoclonal and polyclonal antibodies; Antigen-antibody interactions. Vaccines- types, toxoids, antitoxins.

Unit: IV

Immune responses- Primary and secondary immune response- Cell mediated and humoral immune responses, Immune responses against tumors, Immunologic tolerance and disorders, autoimmune diseases.

Unit: V

Complement system- Classical and alternate pathway , MHC-classes, haplotype, MHC and peptide interactions. Hypersensitivity reactions – types and diseases. Types of grafts, graft Vs host reactions.

Suggested Readings

1. Ivan M.Roit 1994. Essential Immunology-Blackwell scientific publications, oxford.
2. Janis kuby 1993. Immunology II edition. W.H.Frumen and company, New york.
3. William E.Paul 1993. Fundamental immunology. II edition Raven press, New york.
4. Ian R. Tizard, 1995, Immunology: An Intoduction, 4th edition, Saunders College Publishing,
5. Chakravarthy, A.K. (1996) – Immunology, Tata Mc Graw Hill Publishing Co. Ltd., New Delhi.

CORE 11: ORNAMENTAL FISH CULTURE AND AQUARIUM TECHNOLOGY

Objective :

To impart training on Aquarium fish keeping technology

To create knowledge on self employment opportunity

UNIT - I

Importance and scope of ornamental fish culture – Economic potential, commercial and aesthetic value of ornamental fish culture, trends in ornamental fish farming in the world and in India. Taxonomy of important freshwater and marine ornamental fish of indigenous and exotic species.

UNIT – II

Popular ornamental fishes: Beta, Colisa, Macropodus, Trichogaster leeri, T. italics microlepis, Zebra fish. Gold fish varieties: Koi, Puntius, tetra, Glass fish, cichilids, angel fish, molly, guppy. Marine species: Hippocampus, scat, Biology, habits and patterns of reproduction of Gold fish and Zebra fish.

UNIT – III

Fish farms - mass production of fancy fishes, preparations for breeding – breeding behaviour of chosen fishes: carp, fighter fish – induced breeding – food and feeding – live feeds: rotifers, tubifex and artificial feeds.

UNIT –IV

Disease management: Common bacterial, viral, fungal, protozoan and crustacean infections - treatment and control.

UNIT –V

Aquarium design, Construction and preparation: size, shape, substrate, ornamental aquatic plants. Construction and functions of Bio-filters; aerators – accessories for fish tanks – hood and light, nets, suction tube and maintenance of water quality: controlling ammonia build up, pH, feeding regimes.

Suggested Readings.

1. Baradach, JE, JH Ryther and WO Mc Larney (1972). Aquaculture. The Farming and Husbandry of Freshwater and Marine Organisms. Wiley Interscience, New York.
2. Jameson, J.D. and R.Santhanam (1996). Manual of ornamental fisheries and farming technology. Fisheries College and Research Institute, Thoothukudi.
3. Mitchell Beazley, 1998. The complete guide to tropical aquarium fish care. Read and Consumes Book Ltd., London.
4. Jameson, J.D. Alangara Meen Valarpu (in Tamil). National Book House, New Delhi.
5. Mill Dick, 1993: Aquarium fish, DK Publ.Co,Inc. New York –USA

CORE 12: (SUPPORTIVE 3) CHEMISTRY-I**Unit 1**

Intermolecular forces - Vanderwall and London forces. Liquid state theory and properties of liquids, liquid-crystal formation and applications. Solid state- forces in solids- covalent, ionic, metallic, and Vanderwall's, Lattice energy.

Unit 2

Theory of semi-conductors and its application. Bond properties- types of hybridization, bond length, bond order, bond strength. Resonance energy- resonance strength of multiple bonded species Carbon Monoxide, Nitrous Oxide, phenol, benzaldehyde, aniline.

Unit 3

Covalent bond- Orbital Overlap- hybridization, geometry of organic molecules- methane, ethylene, acetylene, benzene. Electron displacement effects, inductive, resonance, hyperconjugative and steric effects-their effect on properties of compounds. Stereoisomerism- Optical isomerism-optical activity, lactic acid, tartaric acid, racemization, resolution.

Unit 4:

Aromatic compounds-electrophilic substitution in benzene, mechanism of nitration, halogenation, Alkylation and Acylation. Preparation, properties and uses of Naphthalene, Furan, Thiophene, Pyrrole, Pyridine, Chloroform and Carbon Tetrachloride.

Unit5:

Keto-enol tautomerism. Geometric isomerization, maleic acid and fumaric acid. Rotation around single bond proffered rotations, conformers of ethane, propane, n- butane and cyclohexane. Axial and equatorial bonds.

Text books:

1. P. W. Atkins Physical Chemistry, 6th ed, 1998.
2. Wade, L.G. Organic Chemistry, Pearson Education, 5th ed, 2003.
3. M. Ladd. Introduction to Physical Chemistry, Cambridge, 1998.

CHEMISTRY LAB I

1. Estimation of sodium hydroxide using sodium carbonate standard.
2. Estimation of hydrochloric acid using oxalic acid standard.
3. Estimation of borax using sodium carbonate standard.
4. Estimation of ferrous sulphate using Mohrs salt standard.
5. Estimation of oxalic acid using ferrous sulphate standard.
6. Preparation of the following inorganic compounds: ferrous ammonium sulphate, manganous sulphate, sodium thiosulphate

CORE 13: CELL AND MOLECULAR BIOLOGY**Objectives:**

- To learn the structure and functions of various cellular components.
- To understand the molecular basis of cell structure DNA structure and functions.

Unit – I

History of cell biology – Cell theory – Cell as the basic unit of living organism,

Difference between Prokaryotic and Eukaryotic cell, Ultra structure of an Animal Cell, Plasma membrane – Ultra structure, chemical composition, models (Bilayer, Unit membrane, fluid mosaic) and functions.

Unit-II

Cell organelles – Ultra structure, chemical composition and functions of Endoplasmic reticulum, Ribosomes, Golgi complex, Lysosomes, Centrioles, and Mitochondria.

Unit – III

Nucleus and Nucleolus – structure, composition and functions. Chromosomes – structure, heterochromatin and Euchromatin, Giant chromosome – polytene and lambrush Cell Cycle – mitosis and meiosis.

Unit – IV

Nucleic acids – Molecular structure of DNA and RNA , DNA replication, Transcription, Types of RNA, Protein Synthesis (Eukaryotic) , Regulation of Protein Synthesis.

Unit – V

Gene Mutation, Molecular basis of Gene Mutation (Sickle cell anemia, phenylketonuria) – Mutagenic agents - Physical and chemical. DNA Repair , DNA Recombination
DNA barcoding- role of mitochondrial DNA in barcoding;

Suggested Readings:

1. Verma, P.S., and V.K. Agarwal, 1995, Cell and Molecular Biology, 8th edition, S. Chand & Co.,New Delhi-110 055,567
2. De Robertis, E.D.P. and E.M.F. De Robertis, 2006, Cell & Molecular Biology, 8th Edition, Indian Reprint.
3. Rastogi, S.C., 2010, Cell and Molecular Biology, Second Edition. New Age International (p) Ltd., New Delhi.
4. Powar, C.B.,1989.Essentials of Cytology, Himalaya Publishing House, Bombay, 368p.
5. Loewy, A.G. and P. Sickevitz, 1969, Cell Structure and Function, Amerind Publishing Co., New Delhi-110 020, 516pp.

CORE 14: BIOCHEMISTRY AND INTERMEDIARY METABOLISM

Objectives:

To define and explain the basic principles of biochemistry and metabolic pathway

UNIT I

Scope of Biochemistry – Dissociation constant of water, Hydrogen ion concentration, Buffers and electrolytes. Acidity, alkalinity and pH determination.

UNIT-II

Carbohydrate: classification and structure of carbohydrate with examples. Protein: classification and structure with examples. Lipid: classification and structure with examples.

UNIT-III

Enzymes: classification, mechanism of enzyme action, factors affecting enzyme action, Isoenzymes. Vitamins: Structure and function of fat and water soluble vitamins.

UNIT-IV

Intermediary metabolism-Glycolysis -TCA Cycle- Electron transport chain, Deamination, of aminoacids, B- Oxidation of fatty acids. HMP shunt pathway

UNIT – V

Bioenergetics – energy and its forms – free energy – laws of thermodynamics – enthalpy and entropy – redox coupling and ATP bioenergetics.

Suggested Readings

1. H.S. Srivastava, Elements of Biochemistry (2006) Rastogi Publications, Meerut.
2. . Rastogi, S.C., 2007, Outlines of Biochemistry: A Quick Review.
3. Veerakumari.L, 2004, Bio Chemistry, MJP Publications.
4. Harpers Biochemistry – Robert K.Muuay., Daryl.K.Granner., Peter.A.Mayes., & Victor.
5. W.Rodwell (2004) Prentice Hall International, ISBN-8385-3612-3.
6. Principles of Biochemistry y A.L Lehninger, D.L Nelson& M.M.Cox (1993) Worth publishers Newyork.

CORE 15: ZOOLOGY LABORATORY**ZOOLOGY LABORATORY -III****VECTOR BIOLOGY PRACTICAL**

1. Study of different kinds of mouth parts of insects
2. Study of following insect vectors through permanent slides/ photographs:
Aedes, Culex, Anopheles, Pediculus humanus capitis, Pediculus humanus corporis, Phthirus pubis, Xenopsylla cheopis, Cimex lectularius, Phlebotomus argentipes, Musca domestica, through permanent slides/ photographs
3. Study of different diseases transmitted by above insect vectors

IMMUNOLOGY PRACTICAL

1. Human Blood grouping [ABO and Rh]
2. Study of prepared slides of primary and secondary lymphoid organs.
Thymus, Spleen, Bone marrow, Lymph node. Peyer's patches Bursa fabricus T – cell, B-cell MALT GALT

ORNAMENTAL FISH CULTURE AND AQUARIUM TECHNOLOGY PRACTICAL

1. Identification of Common freshwater aquarium fishes
2. Identification of Common marine ornamental fishes
3. Identification of plants and décor materials for aquarium
4. Identification, symptoms and treatment of diseases of aquarium fishes
5. Field visit: Visit to ornamental/aqua farms (Tour report submission)

ZOOLOGY LABORATORY-IV**CELL AND MOLECULAR BIOLOGY PRACTICAL**

1. Onion root tip – squash preparation and study of mitosis
2. Chironomous larva - squash preparation of giant chromosome.
3. Squash preparation of squamous epithelial cells from buccal smear
4. Measurement of cell dimensions by using stage and ocular micrometer
5. Total count of RBC and WBC using Haemocytometer.
6. Blood Smear Preparation – Differential count of W.B.C.
7. Study of prepared slides of histology. Columnar Epithelium
Ciliated epithelium
Glandular Epithelium
Cartilage T.S.
Bone T.S.
Male germ cell -sperm
Female germ cell- egg
8. Isolation and Estimation of DNA and RNA (Demonstration only)
9. Protein separation by Gel electrophoresis (PAGE) (Demonstration only)

BIOCHEMISTRY AND INTERMEDIARY METABOLISM PRACTICAL

1. Qualitative analysis of sugar
2. Qualitative analysis of Glycogen
3. Qualitative analysis of Protein
4. Quantitative analysis of glucose
5. Quantitative analysis of protein
6. Separation of Aminoacid by Paper Chromatography
7. Enzyme Assay – Urease
8. pH meter
9. Models of biomolecules

CORE 16: (SUPPORTIVE 4) CHEMISTRY-II**Unit 1:**

Co-ordination chemistry – definition of terms, classification of ligands, nomenclature. Chelation – examples, chelate effect explanation. Werner’s theory- conductivity and precipitation studies. Sedgwick’s theory- Effective atomic number concept. Pauling’s theory-postulates, applications to octahedral, square, planar and tetrahedral complexes.

Unit 2:

Biological role of Hemoglobin and Chlorophyll. EDTA and its applications. Environmental chemistry- Green House Effect, global warming, Ozone depletion, BOD and COD – importance, rainwater harvesting-needs, methods, advantage. Pollution – types, strategies in its control.

Unit 3:

Carbohydrates-classification, preparation and properties of Glucose, Fructose and Sucrose. Discussion of ring structure and mutarotation. Properties of starch and cellulose. Interconversion of Glucose and Fructose. Amino-acids classification, preparation and properties of Glycine and Alanine, preparation of peptides by Bergman method. Classification of proteins according to composition, function and shape. Protein denaturation.

Unit 4:

Dyes and Drugs-Azo dyes-congo Red, Triphenylmethans, Malachite Green, Food colours. Sulpha drugs-sulphonamides and sulpha pyrimidine, preparation and uses. Antibiotics-penicillin and Chloromycetin-source, structure and uses. Vitamins- source and structure of vitamin A, B, C, D, E and F (structural elucidation not required).

Unit 5:

Electrochemistry- Kohlrauch law-measurement of conductance, pH determination, conductometric titrations, hydrolysis of salts, derivation of Kh. Galvanic cells, EMF standard electrode potentials, reference electrodes, electrochemical series and its application, electroplating and its application. Corrosion-methods of prevention. Bioenergetics-Chemical kinetics-order of reaction (zero and first order), half-life period. Chemical equilibrium-basic idea.

Text books:

1. P. W. Atkins Physical Chemistry, 6th edition, 1998.
2. Wade, L.G, Organic Chemistry, Pearson Education, 5th edition, 2003.
3. M. Ladd, introduction to Physical Chemistry, Cambridge, 1998.

CHEMISTRY LAB II

1. Detection of elements –nitrogen, sulphur and halogens.
2. Preliminary test and detection of carbohydrate, urea, benzamide and aromatic amines.
3. Detection of anions: carbonate, sulphide, sulphate, fluoride, chloride, bromide, nitrate, oxalate, phosphate.
4. Reaction of aldehyde (aromatic), ketone (aliphatic and aromatic), carbohydrate, carboxylic acid (mono-and dicarboxylic-), phenol, aromatic primary amine, amide and diamide.
5. Systematic analysis of organic compounds containing one functional group and characterization by confirmatory tests or derivatives.

CORE 17: BIOINSTRUMENTATION**Objectives:**

To acquire the knowledge of basic principles and applications of tools. To know the techniques for the measurement of physical, physiological, biochemical and biological factors in man and other living organism.

UNIT – I

Microscope - Principles and types of light Microscope , Phase Contrast Microscope, X-ray Microscope, Fluorescence Microscope, Confocal microscope , Type of Electron Microscope (SEM and TEM)

UNIT – II

Centrifuge - Types of Centrifuge – Clinical ,Refrigerated and High Speed centrifuges.
pH meter and its application, Colorimeter, Spectrophotometer - Principle, Structure and Uses.

UNIT – III

Chromatography – Types - Paper, Thin layer, Column Chromatography Electrophoresis – Types – Paper and PolyAcrylamide Gel Electrophoresis.

UNIT – IV

Blotting techniques – Southern, Northern and Western
DNA and RNA sequencing method (First,second and third generation) , PCR and gene amplifier.

UNIT – V

Geiger Muller Counter, Biochemical application of radioisotopes, Radio isotopic technique – Radio Immuno assay , Autoradiography

Suggested Readings

1. A.Upadhyaya, K.Upathyaya and N.Nath, (2003) Biophysical chemistry, Principles and Techniques, 3rd Ed, Himamalaya publishing house.
2. H.B.Bull, F.H.Davis, An introduction to physical Biochemistry 2nd Ed, Philadelphia 1971.
3. Gurumani.N 2006. Research methodology for biological sciences MJP publ. Chennai
4. T.S.work and E.Work, 2001. Laboratory techniques in Biochemistry and Molecular Biology.
5. Keith Wilson and John walker,2010. Principle and techniques of biochemistry and Molecular Biology.

CORE 18: ENDOCRINOLOGY AND REPRODUCTIVE BIOLOGY

Objectives : Explaining the role of hormones on physiological activities of animals with special reference to humans.

UNIT – I

Scope of Endocrinology, Endocrine glands, hormones and hormone action, Structure, hormone secretion and functions of hypothalamus and pituitary gland Pineal gland – circadian rhythm.

UNIT – II

Structure of thyroid gland – Biosynthesis of thyroid hormones, Biological functions of Thyroid hormones, Regulation of Thyroid secretion Hormones of parathyroid Glands and their biological action

UNIT – III

Adrenal Cortex – Glucocorticoids, Mineralocorticoids and their biological function Renin Angiotensin System

Adrenal Medulla – Catecholamines – Synthesis and Biological action

UNIT – IV

Pancreatic (Islets of Langerhans) hormones – Insulin, Glucagon – Biosynthesis, Regulation, Biological action, Gastrointestinal Hormones

UNIT – V

Male reproductive system: Structure of Testes, Biosynthesis of testosterone, Regulation and functions

Female reproduction system: Structure of Ovary, Biosynthesis of estrogen, Feedback regulation and functions Female Reproductive Cycle – Estrous, Menstrual Placental hormones – parturition – Lactation.

Suggested Readings

1. Mac E Hadley, 1992 Endocrinology, Third edition, prentice Hall, New Delhi Jersey
2. Wilson J.D and Foster D.W 1992, William's textbook of endocrinology, 8th edition, WB saunders company, Philadelphia.
3. Turner C.D and Bagnarr, J.T., 1994, General Endocrinology, 6th edition, WB saunder's company, Philadelphia [saunder's international students edition]
4. Prakash S Lohar Endocrinology, Hormones and Human Health.
5. Hormones" by A.W. Norman and G. Litwack, Academic Press 2nd Edition

CORE 19: POULTRY AND DAIRY SCIENCE**Objectives:**

To impart training on Modern Poultry and Dairy Science Technology To create knowledge on self employment opportunity.

UNIT – I

External morphology of a fowl, Classification of fowls based on their Use.

Nutritive value of meat and egg, Meat type – Broilers, Egg type- White Leghorn, Dual purpose Varieties, Game and Ornamental purpose Varieties

UNIT-II

Management of Broilers and Egg Layers – Housing and Equipment, Brooding, feeding and health care Poultry diseases- prevention and control (any five), Vaccination

UNIT-III

Dairy breeds of India : Cattle and Buffaloes, Native and Exotic Breeds

Nutritive value of Milk and meat , Milk synthesis and Secretion, Composition of Milk. Artificial Insemination Programme, Merits and Demerits of Inbreeding and Outbreeding

UNIT-IV

Farm Management : Housing and Equipments of dairy forms- Feed, Care and Management of adult and newborn calves, Live Stock diseases and Management

UNIT-V

Storage and Marketing of Poultry and Dairy Products, Role of Govt. and Co operative Societies in Production and Marketing. Progressive plans to promote Poultry and Dairy technology as a Self employment Venture.

Suggested Readings

1. Gopalakrishnan C.A and G.Murley Mohan Lal 1997, Livestock and Poultry enterprises for rural development, Vikash, New Delhi.
2. Gnaanamani M.R., 1998 Modern aspects of commercial poultry keeping, Giri.
3. Chauhan H.V.S. and S.Roy, Poultry diseases, diagnosis and treatment New Age International, 1996.
4. . G.C. Banerjee – A Text book of Animal Husbandry – Oxford & IBH Publication, New Delhi.
5. . GH Schmidt; T.D. Van Vleck, - Principles of Dairy science – Surget Pvt. Ltd., 1982.

CORE 20: EVOLUTION AND CONSERVATION BIOLOGY

Objectives :

To explain the scientific concepts of animal evolution through theories and evidences.

Unit –I

Origin of Life on Earth, Evidences of Evolution – Morphological, Embryological, and palaeontological. Geological time scale – Fossils & Fossilization, Dating of Fossil Living, connecting and Extinct Fossils.

Unit –II

Theories of Evolution : Lamarckism, Neo-lamarckism, Darwinism, Neo-Darwinism, De Vries concept of Mutation, Modern version of Mutation theory.

Unit –III

Origin of Species, Phylogenetic and biological concept of species: Mechanisms of reproductive isolation; Models of speciation

Hardy –Weinberg law of genetic equilibrium. natural selection, mutation, genetic drift and migration.

Unit –IV

Concepts of conservation : prospective and expression of biodiversity concepts, Scope-Regional and National approaches for biodiversity conservation, Conservation of terrestrial and aquatic resources. Human impact on terrestrial and aquatic resources, Information on CITES, IUCN, CBD and RDB. Concepts of threatened fauna of India. IUCN categories, wildlife conservation approaches and limitations, Project tiger.

Unit – V

Threats to biodiversity: Habitat loss; invasive species, Overexploitation, Climatic changes. Anthropogenic activities: Pollution. Biodiversity management : Ex-situ and In-situ conservation. Protected areas- Wild life wealth of India, Hot spots, Restoration of damaged ecosystem and endangered population

Suggested Readings

1. Dobzhansky, T., F.J. Ayala, G.L. Stebbins and J.M. Valentine 1998. Evolution, Surjeet Publications, New Delhi.
2. Dobzhansky T 1984 Genetics and Origin of species. Columbia Univ. Press.
3. Krishnamurthy, K. V. 2003. Textbook of Biodiversity. Science Publication.
4. Groom, M. J., Meffe, G. R. and Carroll, C. R. 2006. Principles of Conservation Biology, Sinauer Associates, Inc., USA.
5. Rangarajan M. (2001) India's Wildlife History. Permanent Black, New Delhi, India.

CORE 21: GENETICS AND BIOTECHNOLOGY**Objectives:**

To know the principles of genetics and to integrate biology with technology.

UNIT – I

Introduction to genetics , Basis of Mendelian Inheritance and Mendelian Laws, Interaction of Genes –Multiple Alleles – Blood Groups and their Inheritance in Human.

UNIT – II

Linkage and crossing over – Drosophila – Morgan’s Experiments - Cytological Evidence for Crossing Over. Sex determination and sex linkage in Drosophila and Man.

UNIT –III

Chromosomal aberrations: Euploidy, Aneuploidy and Polyploidy – Turners Syndrome, Klinefelters Syndrome, Down syndrome and Cat- Cry Syndrome . Hybridization –Inbreeding, Out breeding, Heterosis.

UNIT – IV

Definition – Scope and importance of Biotechnology -Tools of Genetic Engineering – Restriction enzymes – nuclease, ligase, polymerase and reverse transcriptase – cloning vectors – plasmid (pBr322), lambda phage,cosmid and phasmids.

UNIT – V

Techniques of Genetic Engineering – an overview of R DNA technology, application of R DNA technology in agriculture, medicine and environment.

Suggested Readings

- 1) Verma P.S. and Agarwal V.K. – Concepts of Genetics
- 2) Rastogi V.B. A text book of Genetics, Kadarnath, Ramnath, Meerat.
- 3) Sambamurthy. AVSS - Genetics – Narosa Pub. House, New Delhi.
- 4) P.K.Gupta – Elements of Biotechnology [2001] Rastogi publication, Meerut.
- 5) Lohar.P.S – Biotechnology (2005) – MJP Publishers, Chennai – 5

CORE 22: ZOOLOGY LABORATORY

ZOOLOGY LABORATORY-V

BIOINSTRUMENTATION PRACTICAL

Experiment/Spotter

1. Determination of pH by pH meter
2. Principle and Operation of Centrifuge
3. Principle and Operation of Colorimeter
4. Principle and Operation of Spectrophotometer
5. Principle and Operation of Electrophoresis

ENDOCRINOLOGY AND REPRODUCTIVE BIOLOGY PRACTICAL

1. Observation of permanent slides – Pancrease, Testes, Ovary, Adrenal Pituitary
2. Test for Pregnancy
3. Fertility test

ZOOLOGY LABORATORY -VI**POULTRY AND DAIRY SCIENCE PRACTICAL**

1. Identification of feathers
2. Incubation of Eggs: Temperature and humidity control.
3. Identification of eggs
4. Biochemical estimation of nutritive contents in a hen's egg (demonstration)
5. Visit to poultry markets and study of specific marketing problems.
6. Testing freshness of Egg
7. Screening of fertilization

Spotters/Chart

1. Identification of different varieties of poultry and dairy
2. Equipments

EVOLUTION AND CONSERVATION BIOLOGY PRACTICAL

1. Study of Fossils
2. Field Visit to wild life sanctuaries and National parks(Tour report submission)
3. Homologous organs
4. Analogous organs
5. Industrial melanism
6. Adaptive radiation (Darwin finches)
7. Living fossils
8. Connecting link
9. Hardy Weinberg law calculation

GENETICS AND BIOTECHNOLOGY PRACTICAL
GENETICS

1. Observation of wild and Mutant forms of Drosophila.
2. Human Blood Grouping.
3. Study on Normal Karyotype - male and female,
4. Chromosomal Disorder : Down syndrome, Turner and Klinefelter syndrome

BIOTECHNOLOGY

5. Study of prepared slides, Models or specimen. Escherichia coli, Bacteriophage Plasmid
6. Demonstration of P.C.R technique: Southern blot, Electrophoresis
7. Visit to Biotechnology lab and Report.

PART III

COMPUTER SCIENCE

B.Sc., B.Ed. LIBERAL OPTIONS
PART III: B.SC.B.ED.
Branch: COMPUTER SCIENCE

| SEM | No. | Sub | Name of the course | CCE | UE | Total |
|------|---------------------------|----------|--|-----|----|-------|
| I | Core 1 | Main 1 | Introduction to Problem Solving using C | 30 | 70 | 100 |
| | Core 2 | Main 2 | Digital Electronics & Computer Organization | 30 | 70 | 100 |
| | Core 3 | Main 3 | Lab-1: Programming in C lab | | 50 | 50 |
| | | | Lab-II: Digital lab | | 50 | 50 |
| | Core 4 (Supportive 1) | Anci 1-1 | Mathematics-I | 30 | 70 | 100 |
| II | Core 5 | Main 4 | PYTHON Programming | 30 | 70 | 100 |
| | Core 6 | Main 5 | Data Structures & Algorithms | 30 | 70 | 100 |
| | Core 7 | Main 6 | Lab-III: PYTHON lab | | 50 | 50 |
| | | | Lab-IV: Data Structure & Algorithm lab | | 50 | 50 |
| | Core 8 (Supportive 2) | Anci 1-2 | Mathematics-II | 30 | 70 | 100 |
| III | Core 9 | Main 7 | Software Engineering | 30 | 70 | 100 |
| | Core 10 | Main 8 | Operating Systems | 30 | 70 | 100 |
| | Core 11 | Main 9 | Database Management System | 30 | 70 | 100 |
| | Core 12 (Supportive 3) | Anci 2-1 | Physics-I/ Operations Research | 30 | 70 | 100 |
| IV | Core 13 | Main 10 | Visual Programming using C# | 30 | 70 | 100 |
| | Core 14 | Main 11 | Computer Networks | 30 | 70 | 100 |
| | Core 15 | Main 12 | Lab-V: Visual Programming & DBMS lab | | 50 | 50 |
| | | | Lab-VI: Networks lab | | 50 | 50 |
| | Core 16 (Supportive 4) | Anci 2-2 | Physics-II/ Discrete Mathematics | 30 | 70 | 100 |
| V | Core 17 | Main 13 | Object Oriented Programming using JAVA | 30 | 70 | 100 |
| | Core 18 | Main 14 | Web Technology | 30 | 70 | 100 |
| VI | Core 19 | Main 15 | Lab-VII: Object Oriented Programming using Java lab | | 50 | 50 |
| | | | Lab-VIII: Web Technology lab | | 50 | 50 |
| | Core 20 | Main 16 | Open Elective (any one) 1. Distributed System 2. Computer Graphics 3. Artificial Intelligence 4. Introduction to E-Commerce | 30 | 70 | 100 |
| VII | Core 21 | Main 17 | Microprocessors & Microcontrollers | 30 | 70 | 100 |
| VIII | Core 22 | Main 18 | Lab-IX: Microprocessor lab | | 50 | 50 |
| | | | Lab-X: Project | | 50 | 50 |

*note: Stream for Supportive Papers should be chosen in the first semester, same stream should be chosen in the successive semesters

Stream A: Science related papers (Physics I, II) or

Stream B: Mathematics related paper (Operations Research, Discrete Mathematics)

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CORE 1: INTRODUCTION TO PROBLEM SOLVING USING C

Prerequisite: - Basic knowledge of Mathematics and Computers

Objective

- To learn the concepts of “ C ” Programming
- To learn how to use develop software programs for day-to-day applications.

MODULE – I

Introduction to Computers - Characteristics of Computers, Uses of computers, Types and generations of Computers – Basic Computer Organization -Modules of a computer – Planning the Computer Program - Debugging, Types of errors - Documentation – Techniques of Problem Solving – Problem solving aspects – Top-Down aspects – Implementation of algorithms – Program verification - Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.

MODULE- II

C Programming Language- C Standard Library- C++ and Other C-based Languages- Object Technology- Introduction to C Programming - Memory Concepts-Decision Making - Secure C Programming - Structured Program Development in C- Algorithms-Pseudocode- Control Structures- if Selection Statement- while Repetition Statement - Assignment Operators- Increment and Decrement Operators- C Program Control- for Repetition Statement - switch Multiple-Selection Statement - do...while Repetition Statement - break and continue Statements-Logical Operators

MODULE – III

C Functions - Program Modules in C - Math Library Functions – Functions- Function Definitions -Function Prototypes: A Deeper Look - Function Call Stack and Stack Frames- Passing Arguments By Value and By Reference - Recursion vs. Iteration - C Arrays - Defining Arrays - Passing Arrays to Functions- Sorting Arrays- Searching Arrays - Multidimensional Arrays

MODULE – IV

Structure & Union - C Pointers- Pointer Variable Definitions and Initialization- Pointer Operators- Passing Arguments to Functions by Reference - sizeof Operator - Pointer Expressions and Pointer Arithmetic- Relationship between Pointers and Arrays - Pointers to Functions - C Characters and Strings – Character - Handling Library- String-Conversion Functions - Standard Input/Output Library Functions-String-Manipulation Functions -C Formatted Input/Output

MODULE –V

C File Processing - Files and Streams- Creating a Sequential-Access File- Reading Data from a Sequential-Access File - Random-Access Files - Creating a Random-Access File- Writing Data Randomly to a Random-Access File- Reading Data from a Random-Access File- C Preprocessor

Text Books:

1. P. K. Sinha & Priti Sinha, “Computer Fundamentals”, BPB Publications, 2007.
2. R.G. Tromeay, “How to solve it by computer”, Prentice Hall, 1982.
3. Paul Deital & Harvey Deital, “C How to Program”, 7th edition, Pearson Education, 2013.

CORE 2: DIGITAL ELECTRONICS & COMPUTER ORGANIZATION

Prerequisite: Basic knowledge about computers

Objectives:

- To learn the fundamentals of digital system design.
- To learn combinational and sequential logic.
- To learn hardware fundamentals of computer design.

MODULE – I

Number systems & Conversions – Arithmetic of number systems – binary codes – BCD – The excess – 3code – Gray code – ASCII – EBCDIC - Introduction to Logic Circuits – logic functions & gates – Inversion – truth tables – logic gates – truth table of basics gates – timing diagrams of NOT, AND & OR gates – Boolean algebra – NAND& NOR logic gates - truth table of a logic circuit – de-morgan’s theorem

MODULE – II

Logic families – factors affecting performance of a logic family – register transistor logic – diode transistor logic – DCTL – ECL – TTL logic family – Karnaugh maps – two, three & four-variables K-map – loops in K-map – mapping of K-maps – don’t care condition

MODULE – III

Sequential logic circuits – sequential circuits – SR flip flop – D flip flop – JK flip flop – T flip flop – flip flop triggering – Shift registers – data movements in digital systems – classification of counters – Combinatorial logic circuits – designing procedure– code converters – multiplexers – multiplexer tree – demultiplexers /decoders – half & full adder – half & full subtractor – encoders – BCD adder

MODULE – IV

Basic Structure of Computers - Computer Types, Functional Modules, Basic operational Concepts, Bus Structures, Software, Performance, Multiprocessors and Multi-computers, Historical perspective - Input/Output Organization - Accessing I/O devices, Interrupts, Processor examples, Direct memory access, Buses, Interface circuits, Standard I/O interfaces.

MODULE – V

Memory System - Basic concepts, Semi-conductor RAM memories, Read-only memories, Speed, Size and Cost, Cache memories, Performance considerations, Virtual Memories, memory management requirements, Secondary Storage.

Text Books:

1. Morris Mano M, “Digital Logic and Computer Design”, Pearson Education, 4th edition, 2014.
2. S.S. Bhatti & Ragul Malhotra, ”A Textbook of Digital Electronics”, I.K. International publishing, New Delhi, 2013.
3. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, “Computer Organization”, 5th edition, McGraw Hill, 2002.

CORE 3: COMPUTER LAB

Lab-I: PROGRAMMING IN C LAB

LIST OF EXERCISES

1. Simple C programs
2. Program to illustrate control statements
3. Program to illustrate FOR loop
4. Program to illustrate SWITCH & WHILE statements
5. Program to illustrate functions
6. Program to illustrate user-defined functions
7. Program to illustrate arrays
8. Program to illustrate usage of pointers
9. Program to illustrate character handling libraries.
10. Program to illustrate string manipulation
11. Program to illustrate creation of files & streams.
12. Program to illustrate creation, reading & accessing sequential & random files

Lab-II: DIGITAL LAB

LIST OF EXERCISES

1. Study of Logic Gates
2. Design of Adder and Subtractor
3. Design and Implementation of Code Convertors
4. Design of 4-Bit Adder And Subtractor
5. Design and Implementation of Magnitude Comparator
6. 16 Bit Odd/Even Parity Checker and Generator
7. Design and Implementation of Multiplexer and Demultiplexer
8. Design and Implementation of Encoder And Decoder
9. Design and Implementation of 3 Bit Synchronous Up/Down Counter
10. Design and Implementation of Shift Register
11. Simulation of Logic Gates
12. Simulation of Adder and Subtractor
13. Design of 4-Bit Adder and Subtractor

CORE 4: (SUPPORTIVE 1) MATHEMATICS I**UNIT-1 (ALGEBRA)**

Matrices - Rank of a matrices - Consistency of a system of linear non-homogeneous equations (statement only) - Simple problems - Characteristic roots of a square matrix - Evaluation of Eigen values and Eigen vectors of a square matrix - Cayley Hamilton theorem (statement only) - Simple problems.

UNIT -2 (TRIGONOMETRY)

De Moivre's theorem - Expansions of $\cos(n\theta)$, $\sin(n\theta)$ and $\tan(n\theta)$ - Powers of sines and cosines of θ in terms of functions of multiples of θ . Expansions of $\sin(\theta)$, $\cos(\theta)$ in a series of ascending powers of θ - Limits and approximations.

UNIT-3 (FUNCTIONS OF COMPLEX VARIABLE)

Analytic functions - Cauchy Riemann equations - derivation and simple problems - Harmonic functions

UNIT-4 (VECTOR CALCULUS)

Vector differentiations - Scalar point functions - Vector point functions - Derivatives of a Vector point functions, sum of two vector point functions, product of scalar and Vector point function, Vector product - The vector operator Del, Gradient, Divergence and Curl - Simple application problems involving Cartesians - Laplace Operator.

UNIT - 5 (POLAR CO-ORDINATES)

Angle between radius and vector and tangent - Angle of intersection of two curves - Pedal equations of a curve

Text books:

1. S. Narayanan and T.K. Manicavachagom pillai, Calculus, S. Viswanathan Publishers
2. S. Narayan, Trigonometry, S. Viswanathan Publishers, 2012
3. P. DuraiPandian, Complex Variable, Emerald Publishers, 1979
4. P. DuraiPandian, Vector Calculus, 1984
5. Vittal and Malini, Allied Mathematics, V.Margham Publishers, 1997

Reference Books:

1. George B.Thomas, Maurice D.Weir and Joel Hass, Thomas' Calculus 12'h Edition, Pearson Education, 2015
2. Er.vin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9th Edition, 2011
3. Gilbert Strang, Linear Algebra and Its Applications, CENGAGE Learning, 2007.

CORE 5: PYTHON PROGRAMMING

Prerequisite: Knowledge of any programming language
Objectives:

- To learn about the fundamentals of computers
- To learn how to install Python, start the Python shell
- To learn to perform basic calculations, print text on the screen and create lists, and perform simple control flow operations using if statements and for loops
- To learn how to reuse code with functions

MODULE – I

Computer Systems - Python Programming Language Computational Thinking - Python Data Types - Expressions, Variables, and Assignments – Strings – Lists – Objects & Classes – Python standard library

MODULE – II

Imperative programming – Python modules – print() function – functional eval() - Execution Control Structures – user-defined functions python variables & assignments parameter passing

MODULE – III

Text Data, Files & Exceptions – Strings revisited – formatted output – files – errors & exceptions - Execution Control Structures – decision control & the IF statement

MODULE – IV

Container and Randomness – Dictionaries – other built-in container types – character encodings & strings – module random

MODULE – V

FOR loop & Iteration Patterns – two-dimensional lists- while loop – more loop patterns – additional iteration control statements- namespaces – encapsulation in functions – global vs local namespaces exceptional flow control – modules as namespaces

Text Books:

Ljubomir Perkovic, “Introduction to Computing Using Python: An Application Development Focus”, John Wiley & Sons, 2012

CORE 6: DATA STRUCTURES AND ALGORITHMS

Prerequisite: Knowledge of any programming language **Objectives:**

- To acquaint students with data structures used when programming for the storage and manipulation of data.
- The concept of data abstraction and the problem of building implementations of abstract data types are emphasized.
- Data Structure Algorithms for stack, queues, linked list, trees, graphs, sorting and searching.

MODULE-I

Definition of a Data structure - primitive and composite Data Types, Arrays, Operations on Arrays, Ordered lists - Stacks - Operations - Applications of Stack - Infix to Postfix Conversion.

MODULE-II

Recursion – Queue - operations - Singly Linked List – Operations - Application - Representation of a Polynomial - Polynomial Addition - Doubly Linked List - Operations.

MODULE-III

Trees: Binary Trees - Operations - Graph - Definition, Types of Graphs, Graph Traversal - DFS and BFS.

MODULE-IV

Basic Design and Analysis techniques of Algorithms, Correctness of Algorithm - Algorithm Design Techniques - Iterative techniques - Divide and Conquer - Dynamic Programming, Greedy Algorithms.

MODULE - V

Role of algorithms in computing - Sorting and Searching Techniques - Elementary sorting techniques –Bubble Sort, Insertion Sort, Merge Sort, Quick Sort

Text Books

1. Ellis Horowitz, Sartaj Sahni and Anderson, “Fundamentals of Data Structure in C”, University Press, 2nd edition, 2008.
2. T.H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein. “ Introduction to Algorithms, PHI, 3rd edition. 2009.

CORE 7: COMPUTER LAB**Lab III: PYTHON LAB****LIST OF EXERCISES**

1. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Program to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria:
 - Grade A: Percentage ≥ 80
 - Grade B: Percentage ≥ 70 and < 80
 - Grade C: Percentage ≥ 60 and < 70
 - Grade D: Percentage ≥ 40 and < 60
 - Grade E: Percentage < 40
3. Program using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. Program to display the first n terms of Fibonacci series.
5. Program to find factorial of the given number.
6. Program to find sum of the following series for n terms: $1 - 2/2! + 3/3! - - - n/n!$
7. Program to calculate the sum and product of two compatible matrices.
8. Program to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according to the formula $m=60/(t+2)$, where t is the time in hours. Sketch a graph for t vs. m, where $t \geq 0$.
9. A population of 1000 bacteria is introduced into a nutrient medium. The population p grows as follows:

$$P(t) = (15000(1+t))/(15 + e^t)$$
 where the time t is measured in hours. WAP to determine the size of the population at given time t and plot a graph for P vs t for the specified time interval.
10. Input initial velocity and acceleration, and plot the following graphs depicting equations of motion:
 - I. velocity wrt time ($v=u+at$)
 - II. distance wrt time ($s=u*t+0.5*a*t*t$)
 - III. distance wrt velocity ($s=(v*v-u*u)/2*a$)

Lab IV: DATA STRUCTURE & ALGORITHM LAB

LIST OF LAB EXERCISES

1. Implementation of stack
2. Implementation of Queue
3. Implementation of Singly Linked List
4. Implementation of Doubly linked list
5. Implementation of Binary tree and traversals (BFS & DFS)
6. Implementation of Insertion sort
7. Implementation of Selection Sort
8. Implementation of Quick sort
9. Implementation of Merge sort
10. Implementation of Infix to Postfix & Infix to Prefix notations.

CORE 8: (SUPPORTIVE 2) MATHEMATICS II**UNIT -1 (INTEGRAL CALCULUS)**

Evaluation of $\int e^{ax} \cos(bx) dx$ and $\int e^{ax} \sin(bx) dx$, - Bernoulli's formula for integration by parts – Definite integrals – reduction formulae – Related definite integrals – properties – reduction formula for $\int e^{ax} x^n dx$, $\int \sin^n x dx$ and $\int \cos^n x dx$ (n is a positive integer) - Evaluation

of $\int_0^{\infty} e^{-x} x^n dx$, $\int_0^{\pi/2} \sin^n x dx$, $\int_0^{\pi/2} \cos^n x dx$, - Rule of writing down

$\int_0^{\pi/2} \sin^m x \cos^n x dx$ and illustrations

UNIT -2 (VECTOR INTEGRATION)

Gauss Divergence theorem and Stokes's theorem (Statement only) – Simple problems

UNIT-3 (FOURIER SERIES)

Definition – Finding Fourier co-efficient for a given period function with period 2π -

Odd and Even functions – Half range series

UNIT-4 (ORDINARY DIFFERENTIAL EQUATIONS)

Equations of the first order but not of the first degree – Equations solvable for dy/dx , - equations solvable for y - Equations Solvable for x - Clairaut's form (simple cases) – Linear equations with constant coefficients – Evaluation of the particular integral of the equation – e^x , $\sin(ax)$, $\cos(ax)$, x^k , $e^{ax}f(x)$

UNIT – 5 (LAPLACE TRANSFORM)

Definitions – Condition for the existence of Laplace transform – Laplace transform of 1 , e^{at} , e^{-at} , $\cos(at)$, $\sin(at)$, $\sinh(at)$, $\cosh(at)$ and t^n - Simple problems – Laplace transform of the derivatives – Laplace transform of the integral – first shifting theorem – change of scale of property – Laplace transform of function multiplied by t , divisible by t – inverse Laplace transform – solution of ordinary differential equations using Laplace transforms

Text books:

1. S. Narayanan and T.K. Manicavachagom pillai, Calculus, S. Viswanathan Publishers
2. P. DuraiPandian, Vector Calculus, 1984
3. Vittal and Malini, Allied Mathematics, V.Margham Publishers, 1997

Reference Books:

1. George B.Thomas, Maurice D.Weir and Joel Hass, Thomas' Calculus 12th Edition, Pearson Education, 2015
2. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9th Edition, 2011

CORE 9: SOFTWARE ENGINEERING

Prerequisite: Basic knowledge of programming

Objectives:

- Identify, formulate, and solve software engineering problems, including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements
- Elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of a software project.
- Need to function effectively as a team member
- Understanding professional, ethical and social responsibility of a software engineer
- Participate in design, development, deployment and maintenance of a medium scale software development project.

MODULE – I

Introduction to Software Engineering – evolving role of software – defining software engineering – changing nature of software – software myths – terminologies – role of software development – software life cycle models – build & fix model – waterfall model – incremental model – evolutionary model – unified model – selection of a life cycle model

MODULE – II

Software Requirements: Analysis & Specifications – requirements engineering – type of requirements – feasibility studies – requirements elicitation – requirement analysis – requirement documentation – requirement validation – requirement management – Case studies

MODULE – III

Software Project Planning – size estimation – cost estimation – models – Constructive cost model – software risk management – software design – what is design – modularity – strategy of design – function oriented design - object oriented design

MODULE – IV

Software Metrics – Software & Metrics: What & Why – token count – data structure metrics – information flow metrics – object oriented metrics – Use-Case metrics – metrics analysis - software reliability – basic concepts – software reliability models – capability maturity model

MODULE – V

Software testing – strategic approach to software testing – terminologies – functional testing – structural testing – levels of testing – validation testing – the art of debugging – testing tools

Text Book:

1. K.K. Aggarwal & Yogesh Singh, “Software Engineering”, New Age International Publishers, 2012.
2. Roger S. Pressman, “Software Engineering: A Practitioner’s Approach”, McGraw Hill, 7th edition, 2010.

CORE 10: OPERATING SYSTEMS

Prerequisite: Knowledge of computers & computer organization

Objectives:

- To learn Structure and functions of OS
- To learn Processes and Threads, Scheduling algorithms
- To learn Principles of concurrency and Memory management
- To learn I/O management and File systems

MODULE - I

Introduction - Mainframe systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – Handheld Systems - Hardware Protection - System Components – Operating System Services – System Calls – System Programs - Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter-process Communication.

MODULE - II

Threads – Overview – Threading issues - CPU Scheduling – Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple-Processor Scheduling – Real Time Scheduling - The Critical-Section Problem – Synchronization Hardware – Semaphores – Classic problems of Synchronization – Critical regions – Monitors.

MODULE - III

System Model – Deadlock Characterization – Methods for handling Deadlocks - Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlocks - Storage Management – Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging.

MODULE - IV

Virtual Memory – Demand Paging – Process creation – Page Replacement – Allocation of frames – Thrashing - File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection

MODULE - V

File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management. Kernel I/O Subsystems - Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management - Case Study: The Linux System & Windows

Text Books:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, 6th edition, John Wiley & Sons, 2003.
2. Harvey M. Deitel, “Operating Systems”, 2nd edition, Pearson Education, 2002.

CORE 11: DATABASE MANEGEMENT SYSTEM

Prerequisite: Knowledge of data structures and file-handling
Objectives:

- To learn about the basics of database management systems (DBMS), with an emphasis on how to organize, maintain and retrieve efficiently, and effectively the information from a DBMS.
- To learn the fundamental concepts of the relational model, including relations, attributes, domains, keys, foreign keys, entity integrity and referential integrity.
- To learn how to normalize the data using 1st, 2nd & 3rd normal forms
- To define and manipulate the relational databases in SQL.

MODULE - I

Overview of Database Management System - Introduction, file-based system, drawbacks of file-Based System, Data and information, Database, Database management System, Objectives of DBMS, Evaluation of Database management system, classification of Database Management System, DBMS Approach, advantages of DBMS, Anis/spark Data Model, data models, Components and Interfaces of Database Management System - Database Architecture, situations where DBMS is not Necessary - DBMS Vendors and their Products.

MODULE - II

Entity-Relationship Model - Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, ISA relationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, aggregation and composition - advantages of ER modeling.

MODULE - III

Relational Model – Introduction - ACID property - CODD Rules, relational data model, concept of key, relational integrity – primary key – foreign key - normalization – 1st normal form, 2nd normal form & 3rd normal form.

MODULE - IV

Structured Query Language - Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Data Manipulation Language, Data Control Language - Table Modification Commands – primary & foreign keys

MODULE - V

PL/SQL: Introduction, Shortcoming in SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, steps to Create a PL/SQL, steps to create a Cursors, Procedure, Function, Packages, Exceptions Handling, Database Triggers, Types of Triggers.

Text Books

1. Abraham Silberschatz, Henry Korth, and S. Sudarshan, “Database System Concepts”, 6th edition, McGraw Hill, 2010,
2. Bulusu, “Oracle PL/SQL Programming”, OReilly, 5th edition, 2009.
3. Steve Bobrowski, “Hands-On Oracle Database 10g Express Edition for Windows”, Tata McGraw Hill, 2010.

CORE 12: (SUPPORTIVE 3) PHYSICS I

UNIT-I: Moment of inertia – radius of gyration - parallel and perpendicular axis theorem, calculation of moment of inertia of (a) ring (b) disc (c) hollow and solid spheres. Angular momentum, torque and the relation between them. Simple harmonic motion, equation of SHM, composition of two SHM at right angles, Lissajous figures.

UNIT-II: Young's modulus — bulk modulus — rigidity modulus and Poisson's ratio — derivation of the expression for bending moment of a beam in terms of its curvature of neutral axis – determination of Young's modulus of a rectangular bar — non – uniform bending — pin and microscope method-with theory (mathematical derivation) – expression for couple per unit twist-determination of rigidity modulus – torsion pendulum.

UNIT-III: Surface tension and surface energy – interfacial surface tension-experimental determination of surface tension by drop weight method-variation of surface tension with temperature — Jaeger's method – streamline and turbulent motion- equation of continuity.

UNIT -IV: Newton's law of cooling – determination of specific heat of liquid-Barton's cooling correction in calorimetric experiments – specific heat capacity of gases – ratio of specific heat capacities — determination of the ratio of specific heats of gases – Clement and Desormes method. Coefficient of thermal conductivity of a bad conductor - Lee's disc method-determination of thermal conductivity by Forbes's method. Blackbody radiation-Stefan's law – determination of Stefan's constant — second law of thermodynamics –Carnot cycle – indicator diagram – derivation of efficiency-Kelvin temperature scale.

UNIT - V: Interference — method of producing coherent sources - Fresnel's biprism — Newton's rings through transmission and reflection - Interferometers - Michelson's Interferometer – wavelength determination - Jamin's refractometer. Diffraction - Fresnel's diffraction – Fraunhofer diffraction – half period zones-rectilinear propagation of light – diffraction at a straight edge. Polarization – optical activity-specific rotator power – Polarimeter – Lawrence half shade - determination of specific rotator power-double refraction – optic axis.

TEXTBOOKS:

1. Dr.Sabesan and others, A Textbook of Allied Physics Vol-I and Vol-II
2. Ponnusamy and others, Ancillary Physics.
3. Kamalakannan and others, Ancillary Physics.

REFERENCE BOOKS

1. Halliday, Resnik & Walker, Fundamentals of Physics, 5 Ed.(Asian Books Pvt. Ltd., New Delhi)

PHYSICS I – PRACTICALS

Choose any 7 experiments from the list given below for each semester without

overlap **LIST OF EXPERIMENTS:**

1. Young's modulus-Non-Uniform bending-Pin& Microscope
2. Rigidity modulus-Torsional oscillations without masses.
3. Comparison of coefficient of viscosity.
4. Surface tension of a liquid and interfacial surface tension by drop weight method.
5. Spectrometer –Refractive index of a liquid- Hollow prism.
6. Spectrometer -Grating-N determination by normal incidence method.
7. Spectrometer -Grating-wavelength determination by minimum deviation method.
8. Newton's Rings.
9. Thermal conductivity of a bad conductor - Lee's disc method
10. Post office box- laws of resistance and specific resistance.
11. Melde's apparatus-Determination of frequency.
12. Meter Bridge - Temperature coefficient of the material of a coil of wire
13. Potentiometer – calibration of low range voltmeter (0 -1.5 V).
14. Potentiometer - calibration of ammeter (0-1.5 amps).
15. Figure of merit of a periodic moving coil galvanometer.
16. Field along the axis of the circular coil carrying current- Determination of BH.
17. Newton's law of cooling and specific heat determination
18. Frequency measurement by forming Lissajous figures
19. Study of Half wave rectifier.
20. Transistor characteristics-CE mode- only transfer characteristics.

TEXTBOOKS:

1. Ouseph and V.Srinivasan, Practical Physics- Part-I &II.

REFERENCE BOOKS

1. Mathchan Lazarus and others-Practical Physics

CORE 12: (SUPPORTIVE 3) - OPERATIONS RESEARCH

1. Linear programming problem Graphical method - Simplex method.
2. Transportation problem.
3. Assignment problem Travelling salesman problem.
4. Replacement problem Replacement of items that deteriorate with time and Replacement of items that fail completely.
5. Network analysis Basic concepts Construction of network diagram CPM and PERT.

Text book:

Kanti Swarup, P.K.Gupta and Man Mohan, Operations Research, 1991.

Unit 1: Chapter 2 Sections 2.1 to 2.3 and Chapter 3 Sections 3.1 to 3.3 Chapter 4 Sections 4.1, 4.3,4.4

Unit 2: Chapter 10 Sections 10.1 to 10.12

Unit 3: Chapter 11 Sections 11.1 to 11.3 and 11.6

Unit 4: Chapter 18 Sections 18.1 to 18.3

Unit 5: Chapter 21 Sections 21.1 to 21.6

CORE 13: VISUAL PROGRAMMING USING C#

Prerequisite: Knowledge of C language and DBMS

Objectives:

- To understand the various types of applications
- To get expertise in visual programming
- To understand the functionalities of middleware platform

MODULE – I

Introduction - C, C++, Objective-C, Java and C# - Extensible Markup Language (XML) - Introduction to Microsoft .NET - The .NET Framework and the Common Language Runtime - Introduction to Object Technology - Introduction to C# Applications - Creating a Simple Application in Visual C# Express - Formatting Text with Console.WriteLine and Console.WriteLine - Another C# Application: Adding Integers – Arithmetic - Decision Making: Equality and Relational Operators - Strings and Characters

MODULE – II

Introduction to Classes and Objects – Introduction - Classes, Objects, Methods, Properties and Instance Variables - Declaring a Class with a Method and Instantiating an Object of a Class - Declaring a Method with a Parameter - UML Class Diagram with a Property - Software Engineering with Properties and set and get Accessors - Initializing Objects with Constructors - Floating-Point Numbers and Type decimal - Control Statements

MODULE – III

Classes and Objects: A Deeper Look – Introduction - Controlling Access to Members - Referring to the Current Object's Members with the this Reference – Indexers - Default and Parameterless Constructors – Composition - Garbage Collection and Destructors- static Class Members - Data Abstraction and Encapsulation - Object Initializers – Delegates Object-Oriented Programming: Inheritance - Polymorphism, Interfaces and Operator Overloading-Exception Handling

MODULE – IV

Graphical User Interfaces with Windows Forms – Introduction - Windows Forms - Control Properties and Layout - Labels, TextBoxes and Buttons - GroupBoxes and Panels - CheckBoxes and RadioButtons - NumericUpDown Control - Mouse-Event Handling- Keyboard-Event Handling – Menus- various controls - Multiple Document Interface (MDI) Windows - Visual Inheritance - User-Defined Controls

MODULE – V

Databases and LINQ - Introduction - relational Databases - LINQ to SQL - Querying a Database with LINQ - Dynamically Binding Query Results - Retrieving Data from Multiple Tables with LINQ - Creating a Master/Detail View Application - Tools and Web Resources Case Study

Text Book:

Paul Deitel & Harvey Deitel, “C# 2010 for Programmers”, Pearson Education, 4th edition, 2011.

CORE 14: COMPUTER NETWORKS

Prerequisite: Basic knowledge of computers

Objectives:

- Given an environment, after analyzing the channel characteristics, appropriate channel access mechanism and data link protocols are chosen to design a network.
- Given an environment, analyzing the network structure and limitations, appropriate routing protocol is chosen to obtain better throughput.
- Given various load characteristics and network traffic conditions, decide the transport protocols and timers to be used.

MODULE - I

Introduction to Networks – Topology - Network Architecture - Reference Models - Example Networks – Transmission Medias

MODULE - II

Data link layer - Design Issues, Error Detection and Correction - Elementary Data Link Protocols - Sliding Window Protocols - Network Layer - Design Issues, Routing Algorithms - Congestion Control Algorithms

MODULE - III

Internetworking - Transport Layer - The Transport Service – Service provided to the Upper Layers, elements of Transport Protocols – Addressing, Connection Establishment, Connection Release, Flow Control & Buffering - TCP - Introduction, TCP Service model, TCP Protocol, TCP Segment Header, TCP connection Establishment, TCP Connection Release, TCP Transmission Policy, TCP Congestion Control

MODULE - IV

Application layer - Domain Naming System - DNS Namespace, Resource Records, Name Servers - Electronic mail - Architecture and Services, The User Agent, Messages Formats, Message Transfer

MODULE - V

The World Wide Web - Architectural Overview, Static Web Documents, Dynamic Web Documents, Hyper Text Transfer Protocol (HTTP) - Introduction to Security.

Text Books:

Andrew S. Tanenbaum, “Computer Networks”, Prentice Hall India, 5th edition, 2010.

CORE 15: COMPUTER LAB**Lab -V: VISUAL PROGRAMMING & DBMS LAB****LIST OF EXERCISES****DBMS**

For any TWO online application such as library information system, students; information system, employee information systems, payroll system, ticket reservation system etc., do the followings:

1. Create database and establish relationships between tables
2. Draw ER diagrams
3. Create view to extract details from two or more tables
4. Create stored procedures
5. Create functions
6. Create cursors & database triggers.
7. Create PL/SQLs.

C#

1. Implement Classes and Objects, Inheritance & Polymorphism
2. Implement Interfaces, Operator Overloading, Delegates and Events
3. Implement Exception Handling & Multi-Threading
4. Create Console application & Window Applications.
5. Create programs using SDI & MDI
7. Create program using Database Controls
8. Develop any TWO case studies listed below:
 - I. Inventory Control
 - II. Retail Shop Management
 - III. Employee Information System
 - IV. Personal Assistant Program
 - V. Students' Information System

Lab-VI: NETWORKS LAB

LIST OF EXERCISES

1. Implementation of Error Detection / Error Correction Techniques
2. Implementation of Stop and Wait Protocol and sliding window
3. Implementation and study of Go back-N and selective repeat protocols
4. Implementation of High Level Data Link Control
5. Study of Socket Programming and Client – Server model
6. Write a socket Program for Echo/Ping/Talk commands.
7. To create scenario and study the performance of network with CSMA / CA Protocol and compare with CSMA/CD protocols.
8. Network Topology - Star, Bus, Ring
9. Implementation of distance vector routing algorithm
10. Implementation of Link state routing algorithm
11. Encryption and decryption.

CORE 16: (SUPPORTIVE 4) PHYSICS II

UNIT-I: Ultrasonics – magneto-striction – piezo electric methods – properties of ultrasonic waves and applications.

UNIT -II: Gauss's law with proof – Electric intensity and potential due to a uniformly charged hollow conductor at a point outside, on the surface and inside a spherical conductor — capacity of a parallel plate condenser with and without a dielectric slab - capacity of a spherical conductor-Biot & Savart's law — field along the axis of a circular coil carrying current – force on current carrying conductor placed in a magnetic field – theory of moving coil galvanometer.

UNIT -III: Magnetic properties of materials – relation between – the three magnetic vectors
– susceptibility and permeability - para, dia and ferromagnetism (qualitative ideas) – magnetic hysteresis – superconductivity – persistent current and Meissner Effect.

UNIT-IV: Breakdown of classical mechanics — photo electric effect — Compton effect - Davison- Germer experiment - Matter waves-wave packets -de Broglie ideas-Heisenberg uncertainty principle. Radio active isotopes (production and uses) – particle accelerator – linear accelerator – particle detectors – Wilson cloud chamber – Scintillation counter – nuclear models – Liquid drop model-Fission and Fusion reaction-nuclearreactors.

UNIT-V: Rectifiers & filters (qualitative ideas) – Transistor characteristics – transistor as a RC coupled amplifier – frequency response (without derivation) – band width – basic principles of an oscillator-Hartley oscillator – working (without derivation) – elementary ideas about modulation – elementary ideas about TV transmission and reception.

TEXTBOOKS:

1. Dr.Sabesan and others, A Textbook of Allied Physics-Vol-I and Vol-II.
2. Ponnusamy and others, Ancillary Physics.
3. Kamaiakannan and others, AncillaryPhysics.

REFERENCEBOOKS

1. Halliday, Resnik, Walker, Fundamentals of Physics, 5thEd. (Asian Books Pvt. Ltd., New Delhi)

PHYSICS II – PRACTICALS

Ref: Physics Practical I

CORE 16: (SUPPORTIVE 4) DISCRETE MATHEMATICS**UNIT I: Mathematical Logic:**

Connectives Well formed formulas Tautology Equivalence of formulas Duality law Tautological implications Normal forms.

UNIT II: Algebraic Structures:

Algebraic systems and their properties Semigroups and monoids Homomorphisms of semi groups and monoids Subsemigroups and submonoids Grammars and languages, Syntax analysis Polish expressions and their compilation Finite state machines.

UNIT III: Graph Theory:

Definition Application of graphs Finite and infinite graphs Incidence and degree, Isolated vertex, pendent vertex and null graph Isomorphism Sub graphs.

UNIT IV: Paths and Circuits:

Walks, paths and circuits Connected graphs, disconnected graphs and components, Euler graphs Operations on graphs More on Euler graphs - Hamiltonian paths and circuits.

UNIT V: Trees

Trees Some properties of trees Pendent vertices in a tree Distance and centers in a tree Rooted and binary trees Counting trees - Spanning trees.

TEXT BOOK:

1. J.P.Trembley and R.Manohar, Discrete Mathematical Structures with Applications to Computer Science, Mc Graw Hill Book Company, 1997.
Chapters 3 and 4 (Sections 3.1, 3.2, 3.3, 3.4 and 4.6) Relevant portions in Chapters 1.
2. Narasinga Deo: Graph Theory with Applications to Engineering and Computer Science, Prentice Hall of India Private Limited, New Delhi.
Relevant portions in Chapters 1, 2 and 3.

CORE 17: OBJECT ORIENTED PROGRAMMING USING JAVA

Prerequisite: Basic knowledge of programming **Objectives:**

- On successful completion of the course the students should have understood the object oriented programming in java
- Should have idea about GUI bases programming
- Should have idea about database programming

MODULE – I

Introduction – Introduction to java applications – Introduction to classes, objects, methods & Strings - Control statements - Arrays

MODULE – II

Class & Objects – constructor – function overloading & overriding - Inheritance - Polymorphism – Interface – package - exception handling - Introduction to Multithreading

MODULE – III

Exception Handling – GUI components – Introduction – Overview of Swing components – Swing vs AWT – SWING: Displaying Text and Images in a Window - Text Fields and an Introduction to Event Handling with Nested Classes - Common GUI Event Types and Listener Interfaces - How Event Handling Works – various event handling – layout manager

MODULE – IV

Files, Streams & Object Serialization – Introduction – Files & Streams – Sequential Access Text Files – Object Sterilization

MODULE – V

Applets & Java Web Start – applet life-cycle – sandbox security model – Java web start & Java Network Launch Protocol (JNLP) – Accessing databases with java database connectivity (JDBC)

Text Books:

Paul Deital & Harvey Deital, "Java: How to Program", Pearson Education, 10th edition, 2015.

CORE 18: WEB TECHNOLOGY

Prerequisite: Knowledge of operating system, computer network, DBMS, and java language.

Objectives:

- To inculcate knowledge of web technological concepts and functioning of internet
- To learn and program features of web programming languages.
- To understand the major components of internet and associated protocols.
- To design an innovative application for web.

MODULE – I

Web Essentials: Clients, Servers, and Communication - Internet - Basic Internet Protocols - The World Wide Web - World Wide Web - HTTP Request Message - HTTP Response Message - Web Clients - Web Servers

MODULE - II

Markup Languages: XHTML - An Introduction to HTML - HTML's History and Versions - Basic XHTML Syntax and Semantics - Some Fundamental HTML Elements. - Relative URLs - Lists - Tables - Frames - Forms - Defining XHTML's Abstract Syntax: XML - Creating HTML Documents - Style Sheets: CSS- Introduction to Cascading Style Sheets - Cascading Style Sheet Features - CSS Core Syntax - Style Sheets and HTML - Style Rule Cascading and Inheritance - Text Properties - CSS Box Model

MODULE – III

Client-Side Programming: JavaScript Language - History and versions of JavaScript - Introduction to JavaScript - JavaScript in Perspective - Basic Syntax - Variables and Data Types - Statements. - Operators - Literals - Functions - Objects - Arrays - Built-in Objects - Host Objects: Browsers and the DOM - Introduction to the Document Object Model- Intrinsic Event Handling - DOM History and Levels

MODULE – IV

Server-Side Programming: Java Servlets - Model-View-Controller Paradigm - Servlet Architecture Overview - Servlets Generating Dynamic Content - Servlet Life Cycle - Parameter Data

MODULE – V

Sessions - Cookies - URL Rewriting - Servlets and Concurrency – database programming using Servlet.

Text Book:

1. Jeffery C. Jackson, "Web Technologies: A Computer Science Perspective", Pearson Education, 2007.
2. Julie C. Meloni," Sams Teach Yourself; HTML, CSS, and JavaScript All in One", SAMS, 2014.

CORE 19: COMPUTER LAB

Lab VII: OBJECT ORIENTED PROGRAMMING USING JAVA

LAB LIST OF EXERCISES

1. Program to illustrate various data types in Java.
2. Program to illustrate class and objects.
3. Program to illustrate control structures (if-then, while, switch).
4. Program to illustrate the concept of arrays (creation, initialization and processing).
5. Program to illustrate Multidimensional arrays.
6. Program to illustrate Constructor and its overloading.
7. Program to illustrate Inheritance and Packages.
8. Program to illustrate Interface and static methods.
9. Program to illustrate modifiers protected, this, final and super.
10. Program to illustrate Exception Handling Technique.
11. Program to illustrate to input/output streams.
12. Program to illustrate File handling technique.
13. Program to illustrate threading.
14. Program to illustrate simple Java applets.
15. Program to illustrate database programming

Lab VIII: WEB TECHNOLOGY LAB

LIST OF EXPERIMENTS

1. Creation of HTML Files
2. Working with Client Side Scripting
 - 2.1 JavaScript
3. Configuration of web servers
 - 3.1 Apache Web Server
 - 3.2 Internet Information Server (IIS)
4. Experiments in Servlet
 - 5.1 Implementing MVC Architecture using Servlets
 - 5.2 Data Access Programming (using ADO)
 - 5.3 Session and Application objects
 - 5.4 File System Management
5. Write programs in Java to create three-tier applications using servlets
 - for conducting on-line examination.
 - for displaying student mark list. Assume that student information is available in a database which has been stored in a database server.

CORE 20 - OPEN ELECTIVE (Any one)**OPEN ELECTIVE – I : DISTRIBUTED SYSTEM**

Prerequisite: Knowledge of operating systems, DBMS and Computer Networks

Objective:

- To make the students to understand the collaborative operations of collections of computer systems.

MODULE I

Introduction – Examples of Distributed Systems–Trends in Distributed Systems – Focus on resource sharing – Challenges - Case study: World Wide Web.

MODULE II

System Model – Inter process Communication - the API for internet protocols – External data representation and Multicast communication - Network virtualization: Overlay networks. Case study: MPI

MODULE III

Remote Invocation – Introduction - Request-reply protocols - Remote procedure call - Remote method invocation - Group communication - Publish-subscribe systems - Message queues - Shared memory approaches -Distributed objects - Case study: CORBA -from objects to components

MODULE IV

Peer-to-peer Systems – Introduction - Napster and its legacy - Peer-to-peer – Middleware - Routing overlays - Overlay case studies: Pastry, Tapestry

MODULE V

- Distributed File Systems –Introduction - File service architecture - Distributed mutual exclusion – Elections

Text Book:

George Coulouris, Jean Dollimore, Tim Kindberg, “Distributed Systems Concepts and Design”, Addison Wesley, 5th edition, 2011.

OPEN ELECTIVE II : COMPUTER GRAPHICS

Prerequisite: Knowledge of computers and programming

Objectives:

- Gain knowledge about graphics hardware devices and software used.
- Understand the two dimensional graphics and their transformations.
- Understand the three dimensional graphics and their transformations.
- Be familiar with understand clipping technique

MODULE - I

Overview of Computer Graphics System: Video Display Devices – Raster Scan Systems – Random – Scan Systems - Graphics Monitors and Workstations – Input Devices – Hardcopy Devices – Graphics Software.

MODULE - II

Output Primitives: Line Drawing Algorithms – Loading the Frame Buffer – LineFunction – Circle – Generating Algorithms - Attributes of Output Primitives: Line Attributes – Curve Attributes – Color and Gray scale levels– Area fill Attributes – Character Attributes – Bundled Attributes – Inquiry Functions.

MODULE - III

2D Geometric Transformations: Basic Transformation – Matrix Representations – Composite Transformations – Window to View port Co-Ordinate Transformations - Clipping: Point Clipping – Line Clipping – Cohen-Sutherland Line Clipping – Liang Barsky Line Clipping – Polygon Clipping – Sutherland – Hodgman Polygon Clipping – Curve Clipping – Text Clipping.

MODULE - IV

Graphical User Interfaces and Interactive Input Methods: The User Dialogue – Input of Graphical Data – Input Functions – Interactive Picture Construction Techniques – Three Dimensional Concepts: 3D-Display Methods – #Three Dimensional Graphics Packages

MODULE - V

3D Geometric and Modeling Transformations: Translation – Scaling – Rotation – Other Transformations.Visible Surface Detection Methods: Classification of Visible Surface Detection Algorithm –Backface Detection – Depth-Buffer Method – A-Buffer Method – Scan-Line Method –Applications of Computer Graphics.

Text Book:

Donald Hearn M. Pauline Baker, Computer Graphics C Version, 2nd edition, Pearson Education, 2014.

OPEN ELECTIVE – III: ARTIFICIAL INTELLIGENCE

Prerequisite: Knowledge of predicate calculus and programming

Objectives:

- To study the concepts of Artificial Intelligence and Methods of solving problems using Artificial Intelligence
- To understand the basic techniques of knowledge representation and their use and components of an intelligent agent
- To be able to implement basic decision making algorithms, including search based and problem solving techniques, and first-order logic.
- To know the basic issues in machine learning

MODULE - I

Introduction to AI & Production Systems - Introduction - AI problems, foundation of AI and history of AI intelligent agents - Agents and Environments - the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

MODULE - II

Searching Techniques - Searching-Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Greedy best first search- A* search Game Playing- Adversial search, Games, minimax, algorithm, optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions, cutting of search.

MODULE - III

Representation of Knowledge - Knowledge Representation & Reasons logical Agents, Knowledge – based Agents, the Wumpus world, logic, propositional logic, Resolution patterns in propositional logic, Resolution, Forward & Backward Chaining

MODULE - IV

First order logic - Inference in first order logic, propositional vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution - Learning - Learning from observations – forms of learning

MODULE - V

An Overview of Prolog - An example program: defining family relations - Extending the example program by rules -A recursive rule definition - How Prolog answers questions - Declarative and procedural meaning of programs - Syntax and Meaning of Prolog Programs - Lists, Operators, Arithmetic - Using Structures: Example Programs

Text Books:

1. Rich E, Knight K, “Artificial Intelligence”, 2nd edition, TMH, 2005.
2. Stuart Russel, Peter Norvig “AI – A Modern Approach”, 2nd edition, Pearson Education, 2007.
3. Ivan Bratka, “PROLOG Programming for Artificial Intelligence”, Addison Wesley, 1986.

OPEN ELECTIVE – IV: INTRODUCTION TO E-COMMERCE

Prerequisite: Knowledge of computer networks

Objectives:

- To learn both the technical and business-related implications of electronically mediated commerce.
- To learn the development of electronic business from its origins in electronic data interchange to its current growing importance.
- To learn the potential of electronic business for future development and the development of the 'Information Society' and ethical issues facing business organizations in their daily use of the Internet

MODULE – I

Introduction to e-commerce – benefits of e-commerce – impact of e-commerce – classification of e-commerce – Web 2.0 based social networking platform for social media e-commerce – application of e-commerce technologies

MODULE –II

Electronic commerce: Business models - Electronic data interchange conventional trading process – Defining EDI – building blocks of EDI systems: Layered Architecture – Value added networks – benefits of EDI – application of EDI

MODULE – III

Electronic commerce: Architectural framework - Electronic commerce: Information Publishing Technology – Information publishing – web browsers – Hypertext Markup Language – Common Gateway Interface – multimedia content – Other multimedia objects – virtual reality modeling language

MODULE - IV

Electronic commerce: Securing the Business on Internet – Security policies, procedures & practices – site security – protecting the network – firewalls – securing the Web (HTTP) service - Electronic commerce: securing network transaction – transaction security – cryptology - cryptographic algorithms – public key algorithms – authentication protocols – digital signatures – electronic mail security – security protocols for web commerce

MODULE – V

Electronic Payment Systems – introduction to payment systems – online payment systems – pre-paid electronic payment systems – post-paid electronic systems requirement metrics of a payment system - Mobile commerce – Introduction, framework, and models- benefits of m-commerce – impediments in mobile commerce – mobile commerce framework

Text Book:

Bharat Bhasker, “Electronic Commerce: Framework, Technologies and Applications”, McGraw Hill Education (India), 4th edition, 2013.

CORE 21: MICROPROCESSORS AND MICROCONTROLLERS

Prerequisite: Knowledge of computer organization

Objectives:

- To understand the architectures and the instruction set of 8085 microprocessor
- To understand the architectures and the instruction set of 8086 microprocessor
- To understand the architectures and the instruction set of 8051 microcontroller
- To learn the assembly language program using 8085, 8086 and 8051 instructions
- To learn interfacing of microprocessors and microcontrollers with various devices

MODULE – I

Intel 8085 Microprocessor: Introduction - Need for Microprocessors – Evolution – Intel 8085 Hardware - Architecture – Pin description - Internal Registers – Arithmetic and Logic Unit – Control Unit – Instruction word size - Addressing modes – Instruction Set – Assembly Language Programming - Stacks and Subroutines - Timing Diagrams. Evolution of Microprocessors – 16-bit and 32-bit microprocessors.

MODULE – II

Intel 8085 Interrupts and DMA: 8085 Interrupts – Software and Hardware Interrupts – 8259 Programmable Interrupt Controller - Data Transfer Techniques – Synchronous, Asynchronous and Direct Memory Access (DMA) and 8237 DMA Controller- 8253 Programmable Interval Timer.

MODULE – III

Memory & I/O Interfacing: Types of memory – Memory mapping and addressing – Concept of I/O map – types – I/O decode logic – Interfacing key switches and LEDs – 8279 Keyboard/Display Interface - 8255 Programmable Peripheral Interface – Concept of Serial Communication – 8251 USART – RS232C Interface.

MODULE – IV

Intel 8086 Microprocessor: Introduction-Intel 8086 Hardware – Pin description – External memory Addressing – Bus cycles – Interrupt Processing. Addressing modes - Instruction set – Assembler Directives.

MODULE – V

Microcontroller: Intel 8051 Microcontroller: Introduction – Architecture – Memory Organization – Special Function Registers – Pins and Signals – Timing and control – Port Operation – Memory and I/O interfacing – Interrupts – Instruction Set and Programming.

Text Books:

Krishna Kant, “Microprocessors and Microcontrollers – Architectures, Programming and System Design 8085, 8086, 8051, 8096”, PHI, 2008.

CORE 22: COMPUTER LAB & PROJECT

Lab -IX: MICROPROCESSOR LAB

LIST OF EXERCISES

1. Basic Arithmetic and Logical Operations 16 Bit Addition
2. Basic Arithmetic and Logical Operations 16 Bit Subtraction
3. Basic Arithmetic and Logical Operations 16 Bit Multiplication
4. Basic Arithmetic and Logical Operations 16 Bit Division
5. Move a Data Block Without Overlap
6. Code Conversion, Decimal Arithmetic and Matrix Operations.
7. Code Conversions –Decimal to Hexadecimal
8. Code Conversion – Hexadecimal to Decimal
9. Floating Point Operations- String Manipulations, Sorting and Searching,
Copying a String
10. Ascending & Descending

PROJECT

The objective of the project is to motivate them to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

The project is of 2 hours/week for one semester duration and a student is expected to do planning, analyzing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:

- Title
- Objectives
- Input and output
- Details of modules and process logic
- Limitations of the project
- Tools/platforms, Languages to be used
- Scope of future application

The project work should be either an individual one or a group of not more than three members and submit a project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce examinations.

B.A.,B.Ed.

PART III

SPECIALIZATION OF THE SUBJECTS

(MAIN)

HISTORY

GEOGRAPHY

ENGLISH

HINDI

PART III
HISTORY

B.A., B.Ed. LIBERAL OPTIONS**PART III: B.A.B.ED.****Branch: HISTORY**

| SEM | No. | Sub | Name of the course | CCE | UE | Total |
|------------|---------------------------|------------|---|------------|-----------|--------------|
| I | Core 1 | Main 1 | History of India up to 650 C.E. | 30 | 70 | 100 |
| | Core 2 | Main 2 | History of India 650 –1526 C.E. | 30 | 70 | 100 |
| | Core 3 | Main 3 | Introduction to Ancient Civilizations | 30 | 70 | 100 |
| | Core 4 (Supportive 1) | Anci 1-1 | Civics I: Indian Constitution | 30 | 70 | 100 |
| II | Core 5 | Main 4 | History of India 1526- 1707 C.E. | 30 | 70 | 100 |
| | Core 6 | Main 5 | Middle Ages in Europe 476- 1453 C.E. | 30 | 70 | 100 |
| | Core 7 | Main 6 | History of Europe 1453- 1789 C.E. | 30 | 70 | 100 |
| | Core 8 (Supportive 2) | Anci 1-2 | Civics II: Introduction to Human Rights | 30 | 70 | 100 |
| III | Core 9 | Main 7 | History of India 1707- 1857C.E. | 30 | 70 | 100 |
| | Core 10 | Main 8 | History of India 1858- 1947 C.E. | 30 | 70 | 100 |
| | Core 11 | Main 9 | History of Europe 1789- 1871 C.E. | 30 | 70 | 100 |
| | Core 12 (Supportive 3) | Anci 2-1 | Economics I: Indian Economy | 30 | 70 | 100 |
| IV | Core 13 | Main 10 | History of the World 1871 – 1945 C.E. | 30 | 70 | 100 |
| | Core 14 | Main 11 | History of South India upto 1335 C.E. | 30 | 70 | 100 |
| | Core 15 | Main 12 | History of USA From Colonization to 1865 C.E. | 30 | 70 | 100 |
| | Core 16 (Supportive 4) | Anci 2-2 | Economics II: Money and Banking | 30 | 70 | 100 |
| V | Core 17 | Main 13 | History of China 1839- 1950 C.E. | 30 | 70 | 100 |
| | Core 18 | Main 14 | India Since Independence 1947 –2000 C.E. | 30 | 70 | 100 |
| VI | Core 19 | Main 15 | International Relations 1945 – 2000 C.E. | 30 | 70 | 100 |
| | Core 20 | Main 16 | History of South India 1336- 1800 C.E. | 30 | 70 | 100 |
| VII | Core 21 | Main 17 | History of USA 1865 –1945 C.E. | 30 | 70 | 100 |
| VIII | Core 22 | Main 18 | History of Japan 1868-1951 C.E. | 30 | 70 | 100 |

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CORE 1: HISTORY OF INDIA UP TO 650 C.E.**Unit I**

Sources of Early Indian History- Literary, Archaeological: Epigraphy, Numismatic, Greco- Roman textual Sources- Pre-Historic period- Harappan Culture- Town Planning, Society, Economy and Belief systems

Unit II

The Vedic Period –Polity, Society, Economy and Religious beliefs- Rise of Buddhism and Jainism- Mahajanapadas - Rise of Magadha- Campaigns of Alexander –Socio-economic impact.

Unit III

The Mauryan Empire- Chandragupta Maurya, Asoka and his policy of Dhamma–Mauryan Administration, Society and Economy.

Unit IV

Post- Mauryan Period- The Indo-Greeks, Minanader -The Satavahanas,Western Satraps– Sakas Kushanas, Kanishka- Socio-economic changes in Post-Mauryan Period

Unit V

Gupta Empire- Samudra Gupta, Chandra Gupta II- Society, Economy, Education, Religious revival, Architecture and Literature- Hunas, Mihirakula- Harsha Vardhana

Reference Books

1. Basham, A.L., (Ed). A Cultural History of India. Delhi,1987. Basham, A.L., The Wonder that was India , Delhi, 1982.
2. Jha, D.N. Ancient India in Historical Outline, New Delhi, 1977. Keay, John. A History of India, London, 2000
3. Kosambi .D.D., An Introduction to the Study of Indian History, Bombay, 1975. Majumdar, R.C., Ancient India, Calcutta, 1982.
4. Sharma, R.S., India's Ancient Past, New Delhi, 2009.
5. Sharma, R.S., Perspectives in Social and Economic History of Early India. Thapar, Romilla, A History of India I, London, 1966.
6. Thapar, Romilla, Early India, New Delhi, 2002 Thapar, Romilla, History and Beyond, New Delhi, 2000
7. Upender Singh, History of India upto 13th Century (Pearson)

CORE 2: HISTORY OF INDIA 650 –1526 C.E.**Unit I**

India on the Eve of Arab Invasion- Arab Conquest of Sind –The invasions of Mohammad of Ghazani –The invasions of Mohammad of Ghur - Causes for the defeat of the Indian rulers

Unit II

The Mamluk Sultans - Iltutmish, Sultana Razia, Balban- Khaljis- Alluddin Khilji, Malik Kafur- Tughlaks- Mohammed bin Tughlak, Firoz Shah Tughlaq

Unit III

Timur Invasion- Sayyids- Khizar Khan Sayyid - Lodis- Sikander Lodi, Ibrahim Lodi- First Battle of Panipat

Unit IV

Establishment of Vijayanagara Kingdom, Bahamani Kingdom- Nayankara System Vijayanagara- Bahamani Relations

Unit V

Administration of Delhi Sultanate- Concept of Sovereignty- Central administration- Iqta system- Economic and Social life under the Delhi Sultanate- Art and Architecture- Bhakti Movement

Reference Books

1. Ashraf, K.M., Life and conditions of the People of Hindustan, 1200- 1500, Delhi, 1959
Banerjee, A. C., New History of Medieval India, New Delhi, 1993
2. Banerjee, A. C., The State and Society in North India 1206- 1526, New Delhi, 1993
Chandra, Satish, History of Medieval India, Hyderabad, 2007
3. Chandra, Satish, Medieval India I, New Delhi, 1998
4. Chitnis.K.N., Socio- Economic Aspects of Medieval India, Poona, 1979.
5. Jackson, Peter, The Delhi Sultanate: A Political and Military History, Cambridge, 1999
Lal. K.S. Twilights of the Sultanate, Bombay, 1963
6. Moreland. W.H., Agrarian System of Moslem India, Cambridge, 1929
7. Raychaudari, Tapan and Irfan Habib, Ed., The Cambridge Economic History of India. I, Hyderabad, 1982.
8. Sewell, Robert, A Forgotten Empire, Delhi, 1990
Srivatsava, A.L., The Sultanate of Delhi, Agra, 1984

CORE 3: INTRODUCTION TO ANCIENT CIVILIZATIONS**Unit 1**

Mesopotomian Civilization–Sumeria and Akkad –Sumerian city states –Polity, Socio- economic life– Script and Monuments- Sumerian influence on other civilizations

Unit II

Egyptian Civilization– Political Dispensation–Polity, Socio-economic life- Contribution to science- Religion- Script and Monuments

Unit III

The Babylonian Empire –Code of Hammurabi, Rule of Nebuchadnezzar- Babylonian gods- Assyrian conquerors, Asur Banipal

Unit IV

Chinese civilization; Society, economy and Religion

Unit V

Greek and Roman civilizations- Roman Society and Culture- Rise of Christianity

Reference Books

1. Bury J.P, A History of Greece to the Death of Alexander the Great.
2. Esmond Wright , (ed.) History of the World –Pre History to the Renaissance.
3. Gokhale, B.K, Introduction to Western Civilization.
4. Joshi P.S, Pradhan J.V, Kaisare A.G, Introduction to Ancient Civilization (up to 1000 A.D).
5. Michael Giant and Rachel Kit Zinger (ed.) , Civilization of the Ancient Mediterranean:
6. Greece and Rome, Vol - I - Civilization up to 1300 A.D. Printice Hall, Engiewoor Cliffs.
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CORE 4: (SUPPORTIVE 1) CIVICS I - INDIAN CONSTITUTION

Unit I

Indian Constitution: Salient Features - Preamble –Fundamental Rights –Directive Principles of State policy–Fundamental Duties.

Unit II

Indian Executive- President–Powers and Functions – Prime Minister and Council of Ministers, Powers and functions –Relation with the council of Ministers and Parliament.

Unit III

Indian Legislature: Composition, Powers and Functions –Legislative procedures- Indian Judiciary– Powers of the Supreme Court

Unit IV

Relation between the Union and States –Sarkaria Commission and its recommendation and Implementation –Important Amendments

Reference Books

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CORE 5: HISTORY OF INDIA 1526- 1707 C.E.**Unit I**

Babur's Conquests and Founding of the Mughal Empire- Humayun- Sher Shah's rise to power and administration

Unit II

Akbar- Conquests, Administration, Mansabdari System, Land Revenue system- Religious policy- Rajput policy- Jahangir's career- Nurjahan

Unit III

Shajahan- conquests - War of succession- Aurangzeb- Religious Policy- Deccan Policy- Reasons for the Decline of the Mughul Empire

Unit IV

Socio- Economic conditions under the Mughuls- Bhakti Movement- Architecture and Literature under the Mughls

Unit V

Sikhism- Rise of Sikh Militancy, Guru Gobind Singh- Rise of Maratha Power- Sivaji Conquests and Administration

Reference Books

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CORE 6: MIDDLE AGES IN EUROPE 476- 1453 C.E.**Unit I**

Causes for the decline of the Roman Empire- Characteristic features of Medieval period – Merovingian Dynasty - Clovis- Carolingian dynasty - Charlemagne

Unit II

Feudalism –Nature, Origin and functions of European Feudalism –Manorial system –Craft Guilds and Merchant Guilds

Unit III

Papacy - Monasticism- Education and Rise of Medieval Universities

Unit IV

Medieval Contacts: Rise of Islam—Ummayyids and Abbasids- State, Society and Economy under Caliphs—Education

Unit V

Islam and Europe- Crusades- Effects- Fall of Constantinople- Technological and Military Revolution

Reference Books

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CORE 7: HISTORY OF EUROPE 1453- 1789 C.E.**Unit I**

Fall of Constantinople; Renaissance

Unit II

Reformation–Counter Reformation- Ignatius Loyola

Unit III

Geographical Discoveries, Europe and the Wider World

Unit IV

Rise of Nation States, Enlightened Despotism, Revolutions: Glorious Revolution 1688, Industrial Revolution and Factory System

Unit V

Louis XVI and Europe on the Eve of French Revolution

Reference Books

1. B.K. Gokhale –Introduction to Western Civilization.
2. B.V. Rao –World History.
3. Brendan Simms- Europe: The Struggle for Supremacy from 1453 to the Present David Maland –Europe in the 17th Century.
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CORE 8: (SUPPORTIVE 2) CIVICS II - INTRODUCTION TO HUMAN RIGHTS

Unit I

Definition and classification –Universal Declaration of Human Rights –Constitutional Guarantees on human rights –Fundamental rights –Directive Principles of State policy

Unit II

Civil and political Rights –Social and Economic Rights –Women’s Rights- Children’s Rights

Unit III

Contemporary issues in Human Rights –Violation of Human Rights of Women, Children, Dalits- Child labour –Bonded labour and wages.

Unit IV

National Human Rights Commission (NHRC) - State Human Rights Commission (SHRC) - Non Governmental Organizations- International Human Rights Organizations (UN).

Reference Books

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CORE 9: HISTORY OF INDIA 1707- 1857C.E.**Unit I**

Disintegration of Mughal Empire –Later Moghuls- Sayyid Brothers- Invasions of Nadir Shah and Ahamad Shah Abdali- Third Battle of Panipat

Unit II

Eighteenth Century India - The rise of regional powers- Bengal, Oudh, Hyderabad, Mysore and Carnatic.- European Trading Companies- Portuguese, Dutch, English, Danes and French

Unit III

English expansion in India- Carnatic Wars- Conquest of Bengal- Subsidiary Alliance- Maratha wars- Mysore wars- Sikh wars- Doctrine of Lapse

Unit IV

Colonial Construction of India- Administrative structure- Land Revenue settlements, Zamindari, Ryotwari and Mahalwari systems- Introduction of Western Education and its impact- Religious Reform- Brahma Samaj- Social Legislation- Abolition of Sati, Widow Remarriage Act

Unit V

The Great Revolt of 1857- Causes, Nature, Course and Consequences

Reference Books

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CORE 10: HISTORY OF INDIA 1858- 1947 C.E.**Unit I**

Queen's Proclamation- Economic Impact –Anti-Colonial Resistance –Tribal and Peasant Revolts- British policies after 1858 –Cultural Awakening

Unit II

Rise of National Consciousness- Foundation of the Indian National Congress: Objectives- Moderates and their Achievements- Rise of Extremism- Partition of Bengal- Swadeshi Movement- Minto –Morley Reforms of 1909

Unit III

Home Rule Movement- Montague- Chelmsford Reforms of 1919 - Gandhi's entry into the Indian Politics- Khilafat Question- Jallian Wallabagh Incident

Unit IV

Non-Cooperation Movement- Simon Commission Agitation - Nehru Report- Civil Disobedience Movement- Round Table Conferences- 1935 Act

Unit V

Rise of Communalism- Demand for Pakistan- Cripps Mission- Quit India Movement- Subhash Chandra Bose and the INA- Naval Mutiny- Cabinet Mission Plan- Partition and Freedom

Reference Books

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CORE 11: HISTORY OF EUROPE 1789- 1871 C.E.

Unit I

French Revolution- Causes, Course and Consequences- Rise and Fall of Napoleon Bonaparte- Reforms and foreign policy, Continental System, Battle of Waterloo

Unit II Congress of Vienna 1815- Metternich- Revolutions of 1830 and 1848 and ripples on other European Countries

Unit III

The Eastern Question- Decline of Ottoman Empire- Serbian Revolutions- Greek war of Independence- Crimean war- Treaty of Frankfurt

Unit IV

Paris Commune –1871 and its significance

Unit V

Unification of Italy and Germany

Reference Books

1. Anderson, M.G., The Eastern for Question, London, 1968. Fisher, H.A.L., A History of Europe
2. Gooch, G.P., History of Modern Europe
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CORE 12: (SUPPORTIVE 3) ECONOMICS I - INDIAN ECONOMY**Unit 1: Indian Economy during the Colonial Period**

People, resources and institutions in the pre-independent India – Structure of Indian villages, land and agriculture, traditional industries and handicrafts, infrastructure – urban centres, roadways, railways and ports, economic consequences of the Colonial rule and the theory of drains.

Unit 2: Indian Economy at the time of Independence

Structure of the Indian economy – natural resources – land, forest, mineral resources, fisheries; national income and contributions from various sectors; theory of demographic transition, age and sex ratio, density of population, social infrastructure.

Unit 3: Planning in India

Need for planning in India, objectives, overview of plans in India – approaches, outlays, targets and priorities, broad achievements and failures, new-economic reforms, Liberalization, Privatisation, and Globalisation – rationale behind new economic reforms, progresses during the post-reform period.

Unit 4: Planning and Indian Agriculture

Land and agriculture in India – land, climate and irrigational infrastructure; land reforms and its implementation across states, green revolution and the advent of HYV seeds, green revolution in retrospect – pros and cons; Nationalization of banks and farmers' access to formal credit and its social implications.

Unit 5: Indian Industries

Role of Indian industries – industrial development during the planning period – industrial policies – licensing policy – growth and problems of some large scale industries: iron and steel, cotton, jute, sugar and cement – growth and problems of small scale enterprises – role, growth and problems of public sector enterprises in India.

Reference Book:

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CORE 13: HISTORY OF THE WORLD 1871 – 1945 C.E.

Unit I

Militarism in Germany - Diplomatic Isolation of France- Triple Alliance and Triple Entente- Scramble for Africa- Balkan Wars

Unit II

First World War- Causes and Results- Bolshevik Revolution in Russia 1917- Peace Settlements- League of Nations, Achievements and Failures

Unit III

Nazism in Germany and Hitler- Fascism in Italy and Mussolini- Militarism in Japan and Tanaka Memorial

Unit IV

Break Down of Collective Security- Causes and Results of Second World War- Attack on Pearl Harbour- Entry of USA in the Second World Affairs - Bombardment of Hiroshima and Nagasaki- Atlantic Charter

Unit V

Birth of UNO- Important Organs- Allied Agencies- Achievements and Failures

Reference Books

1. Arjun Dev, History of Modern World Fisher, H.A.L., A History of Europe Gooch, G.P., History of Modern Europe
2. Grant and Temperley, Europe in 19th and 20th century Hazen, Charles Downer, Modern Europe
3. Heyes, C.J.H., Europe since 1870
4. Ketelbey, C.D.M., A History of Modern Times
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CORE 14: HISTORY OF SOUTH INDIA UPTO 1335 C.E.

Unit I

Sources for the History of South India –South India under the Mauryas – Satavahanas- Ikshavakus

Unit II

Sangam Age – Five Eco Zones (Tinai), Sangam Polity, Society and Economy, Kalabhra Rule

Unit III

Pallavas of Kanchi–Chalukyas of Badami- Contribution to Art, Architecture and Literature – Bakti Movement

Unit IV

The Imperial Cholas–Political Geography-Administration- Art and Architecture–Maritime Contacts – Trade Guilds

Unit V

Pandyas of Madurai-Second Pandyan Empire - Contribution to Architecture

Reference Books

1. R. Champakalakshmi, Trade, Ideology and Urbanization : South India 300 BC to AD 1300 (1996)
2. Chopra P.N., T.K. Ravindra & N. Subramanian, History of South India Vol: I, S. Chand & Co, New Delhi, 1979
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8. Subbarayalu, South India under Cholas
9. Vedachalam, South India under Cholas

CORE 15: HISTORY OF USA FROM COLONIZATION TO 1865 C.E.**Unit I**

Establishment of Thirteen Colonies –American War of Independence –Treaty of Paris- American Constitution –Bill of Rights

Unit II

Hamilton and the shaping of National Government- Jeffersonian Democracy- War of 1812 and its consequences

Unit III

Monroe Doctrine –Jacksonian Democracy- Westward Movement

Unit IV

Early expansions –Admission of States till 1829 –Manifest Destiny - The Mexican War

Unit V

Slavery - Abolition Movement –The Compromise of 1850- Kansas- Nebraska Act- Road to the civil war –Abraham Lincoln- Causes and Significance of Civil War

Reference Books

1. Alden, John Richard Et.al- A History of the United States Bailey, Thomas A., A Diplomatic History of American People.
2. Bailyn, Bernard, et al. The Great Republic: A History of the American People (2 vols.) Boorstein, Daniel J. The Americans. (3 vols.). Vol. 3: The National Experience
3. Degler, Carl. N., Out of Our Past: The Forces that Shaped Modern America Dullas, History of United States of America
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7. Parkes, Henry Bamford, The United States of America –A History.
8. Williams, Current & Freidel, A History of United States to 1877

CORE 16: (SUPPORTIVE 4) ECONOMICS II - MONEY AND BANKING**Unit 1: Concept of Money and Banking Definition, Functions and Theories of Money**

Money and its function – the concepts and definitions of money – measurement of money – advantages of money – banking – nature and functions of banks – process of credit creation – Gurley and Shaw hypothesis – NBFIs - money and banking in the era of globalisation.

Unit 2: Demand for Money

Theories of demand for money: classical approach, the transactions and cash balance approach, Keynesian analysis, post-Keynesian developments, monetarist approach.

Unit 3: Money Supply

Theories of money supply – mechanistic model of money supply determination – high powered money and behavioral model of money supply determination – methods of monetary control – Interest rates in closed and open economies.

Unit 4: Central Banking

Functions of a central bank – quantitative and qualitative methods of credit control – bank rate policy, open market operations, cash reserve ratio, selective methods – banking regulation and supervision – Basel prudential norms on capital adequacy and NPA management .

Unit 5: Conduct of Monetary Policy in India Monetary Policy

Role and functions of Reserve Bank of India (RBI) – evolution of RBI's monetary policy – Objectives, Instruments and targets of monetary policy in India – operating procedure – lags in monetary policy – rules versus discretion debate – limitations of monetary policy with special reference to India.

Reference

1. Pierce, D G and P J Tysome (1985), Monetary Economics: Theories, Evidence and Policy, Butterworths, London.
2. Carl E Walsh (1998), Monetary Theory and Policy, MIT Press, Cambridge.
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CORE 17: HISTORY OF CHINA 1839- 1950 C.E.**Unit I**

Early relations with the West –Manchu Dynasty –First Opium war –Taiping Rebellion – Second Opium war –Foreign relations upto 1894

Unit II

First Sino-Japanese war 1894-95 –Open-door policy –The Hundred Days Reform–Boxer Uprising – China from Empire to Republic

Unit III

The Manchu Reform programmes –Dr. Sun-yat-Sen- Three Principles- The Revolution of 1911- Yuan Shikai's Presidency

Unit IV

China and the First World War –21 Demands- The Washington Conference –The Kuomintang and Chinese nationalism –Manchurian Crisis –Second Sino-Japanese war.

Unit V

China and II World War –Communist Revolution - Mao-Tse-Tung –The Long March- The Peoples Republic of China

Reference Books

1. Chatteriji B.R. , Modern China
2. Chesneaux, Jean Et.al, China from Opium War to 1911 Revolution Chesneaux, Jean Et.al, China from the 1911 Revolution to Liberation Clubb, O.E., Twentieth Century China”
3. Clyde and Beers, The Far East Fairbank, J.K., History of China Gupta, R.S., History of Modern China.
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6. Shivkumar Jain, History of the Far East in Modern Times. Wright, David Curtis, The History of China

CORE 18: INDIA SINCE INDEPENDENCE 1947 –2000 C.E.

Unit I

Partition and its impact - The integration of Princely States –Birth of Republic- Reorganization of States

Unit II

Nehruvian Foreign Policy - India -China War- Role of India in the Non-Alignment Movement- Indo-Pak War of 1965 and 1971- Creation of Bagladesh

Unit III

Five Year Plans - Agrarian Reforms- Zamindari Abolition- Land Ceiling- Bhoodan Movement- Industrial Development- Green Revolution - New Economic Policy and Globalization

Unit IV

Emergency of 1975-1977 - Janata Government and its achievements – Separatist Movements

–Khalistan and Kashmir

Unit V

Advancement in Science and Technology –Panchayat Raj –New Educational Policy –Mandal Commission –Kargil War

Reference Books

1. Acharya, K.R. & et.al, Perspectives on Indian Government and Politics, New Delhi, 1993
2. Basu, D.D., Commentary on the Constitution of India. Vol.1&2, New Delhi,1990
3. Bose, D.M., S.N. Sen and B.V. Subbarayappa.eds., A Concise History of Science in India, New Delhi, 1989
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CORE 19: INTERNATIONAL RELATIONS 1945 – 2000 C.E.

Unit I

Origins of Cold War- Causes and Consequences - NATO –Warsaw Pact –SEATO –CENTO – ANZUS- Berlin Crisis-

Unit II

Korean Crisis- Vietnam Crisis- Cuban Crisis- Berlin wall and its Demolition- Disintegration of USSR - End of Cold War

Unit III

Commonwealth - Non- Alignment- Disarmament- Nuclear non- proliferation –SALT I &II – CTBT

Unit IV

Oil diplomacy and impact on international Polity and Economy- Arab- Israel conflict –PLO – Gulf Wars

Unit V

Role of UNO in the Maintenance of World Peace –European Integration Programmes –EEC – EU - SAARC – Globalisation

Reference Books

1. A.K.Sen –Theory and practice of International Relations. Joseph Frankel- International Relations in the Changing World. Kail W. Deutseh -The Analysis of International Relations.
2. N.S Subramanian - International Relations . Palmer and Perkins –International Relations. Paul R. Viotti –International Relations Theory. Roy –International Relations.
3. Shreesh Jayal –The United Nations and World peace. Srivatsava and Prof. Joshi: International Relations (sterling).

CORE 20: HISTORY OF SOUTH INDIA 1336- 1800 C.E.**Unit I**

Political Conditions of South India–Hoyasalas –Yadavas - Kakathiyas –Kalachuri usurpation- South Indian Campaigns of Khaljis and Tughluqs

Unit II

Foundation of Vijayanagara Kingdom: Sangama, Saluva and Tuluva, dynasties –Krishna Devaraya- Conquests - the Battle of Talikota – Aravidu Dynasty - Administration–Nayankara System- Ayagar System

Unit III

Bahamani Kingdom–Polity and Administration

Unit IV

Marathas Incursions in South India and establishment of Maratha Rule in Tanjore

Unit V

Nayak Rule in Tamil Nadu - Poliagar system- Establishment of British Supremacy –Revolt of Kotta Bomman and Marudu Brothers

Reference Books

1. Chopra P.N., T.K. Ravindra & N. Subramanian, History of South India Vol: I, S. Chand & Co, New Delhi, 1979
2. Karashima, Noboru, A Concise History of South India: Issues and Interpretations, OUP, New Delhi, 2014
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CORE 21: HISTORY OF USA 1865 –1945 C.E.**Unit I**

Presidential Reconstruction- Congress Reconstruction and Radical Reconstruction

Unit II

Rise of Big Business- Growth of Industry- Railroads- Labour Movements- Growth of Agriculture- Growth of Imperialism- Spanish- American War

Unit III

Progressivism in the cities –the Muckrakers –Progressivism in the states- Progressive Presidents- Social Feminism and Black America

Unit IV

Theodore Roosevelt –Big Stick Diplomacy- Dollar Diplomacy- America in the First World War- Wilson’s Fourteen Points

Unit V

Causes and Effects of the Great Depression- Franklin D. Roosevelt- New Deal- Attack on Pearl Harbour- America in the Second World War- Planning for peace

Reference Books

1. Alden, John Richard Et.al- A History of the United States Bailey, Thomas A., A Diplomatic History of American People.
2. Bailyn, Bernard, et al. The Great Republic: A History of the American People (2 vols.)
3. Boorstin, Daniel J. The Americans. (3 vols.). Vol. 3: The National Experience
4. Degler, Carl. N., Out of Our Past: The Forces that Shaped Modern America
5. Dullas, History of United States of America
6. Hicks, Mowry & Burke, The American Nation.
7. Kelley, Robert., The Shaping of the American Past, Vol. I & II (Special Edition).
8. Morison and Commager, Growth of the American Republic, Vol. I & II.
9. Parkes, Henry Bamford, The United States of America –A History.
10. Paul Gilroy, Black Atlantic Williams, Current & Freidel, A History of United States since 1877
11. Williams, Current & Freidel, A History of United States to 1877

CORE 22: HISTORY OF JAPAN 1868-1951 C.E.**Unit I**

Decline of Shogunate- The Meiji Restoration of 1868 –The Constitutional Movement –Social and Economic Development- Modernization of Japan

Unit II

The territorial expansion –Sino –Japanese war -The Anglo-Japanese Alliance of 1902 - Russo- Japanese war and its consequences –Japan and Formosa, Korea and Manchuria

Unit III

Japan and the First World War –21 Demands- Washington Conference- Tanaka Memorial Unit IV

Rise of militarism in Japan –The Axis alliance –Second World War- Japan’s entry- course of the war and Consequences

Unit V

Allied occupation –Demilitarization - The San Francisco Treaty- Industrial Development in Japan

Reference Books

1. Alien George, A Short Economic History of Japan
2. Andressen, Curtis A., A short history of Japan: from samurai to Sony
3. Beasley W.G., A Modern History of Japan
4. Clyde and Bears, The Far East.
5. David, M.D., History of Modern Japan
6. John W. Hall and Others, Cambridge History of Japan, Vols 5 & 6
7. Kenneth G. Henshall, A History Of Japan: From Stone Age to Superpower
8. Majumdar R.C. & S.C. Roychoudry, History of Far East
9. Mason and Caiger, A History of Japan
10. Rajaram,V., History of China, Japan and South East Asian Countries
11. Roy,S.L., The Far East in Modern Times.
12. Shiv Kumar & Jain, History of Modern Japan.
13. Tewari, Archana, The Hsitory of China and Japan (1840-1949)

PART III

GEOGRAPHY

B.A./B.Sc. B.Ed. LIBERAL OPTIONS
PART III: B.A.B.ED.
Branch: GEOGRAPHY

| SEM | No. | Sub | Name of the course | CCE | UE | Total |
|------|---------------------------|----------|---|-----|----|-------|
| I | Core 1 | Main 1 | Physical Geography | 30 | 70 | 100 |
| | Core 2 | Main 2 | Cartographic Techniques | 30 | 70 | 100 |
| | Core 3 | Main 3 | Human Geography | 30 | 70 | 100 |
| | Core 4 (Supportive 1) | Anci 1-1 | Civics I: Indian Constitution | 30 | 70 | 100 |
| II | Core 5 | Main 4 | Map Projection (P) | 30 | 70 | 100 |
| | Core 6 | Main 5 | Economic Geography | 30 | 70 | 100 |
| | Core 7 | Main 6 | Thematic Mapping Techniques (P) | 30 | 70 | 100 |
| | Core 8 (Supportive 2) | Anci 1-2 | Civics II: Introduction to Human Rights | 30 | 70 | 100 |
| III | Core 9 | Main 7 | Climatology | 30 | 70 | 100 |
| | Core 10 | Main 8 | Statistics Methods in Geography. (P) | 30 | 70 | 100 |
| | Core 11 | Main 9 | Population Geography | 30 | 70 | 100 |
| | Core 12 (Supportive 3) | Anci 2-1 | Economics I: Indian Economy | 30 | 70 | 100 |
| IV | Core 13 | Main 10 | Urban Geography | 30 | 70 | 100 |
| | Core 14 | Main 11 | Geography of Health and Well beings | 30 | 70 | 100 |
| | Core 15 | Main 12 | Island Studies | 30 | 70 | 100 |
| | Core 16 (Supportive 4) | Anci 2-2 | Economics II: Money and Banking | 30 | 70 | 100 |
| V | Core 17 | Main 13 | Geography of Tourism | 30 | 70 | 100 |
| | Core 18 | Main 14 | Geography in India | 30 | 70 | 100 |
| VI | Core 19 | Main 15 | Agricultural Geography | 30 | 70 | 100 |
| | Core 20 | Main 16 | Political Geography | 30 | 70 | 100 |
| VII | Core 21 | Main 17 | Water Management | 30 | 70 | 100 |
| VIII | Core 22 | Main 18 | Climatic Change: Vulnerability & Adaptation | 30 | 70 | 100 |

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CORE 1: PHYSICAL GEOGRAPHY

1. Earth: Interior Structure and Isostasy. Origin of earth (Jean and Jeffery) Interior of Earth.
2. Earth Movements: Plate Tectonics, Types of Folds and Faults, Earthquakes and Volcanoes.(Types and Distribution)
3. Geomorphic Processes: Weathering, Mass Wasting, Cycle of Erosion (Davis and Penck).
4. Evolution of Landforms (Erosional and Depositional): Fluvial, Aeolian, Glacial.

Reading List

1. Bloom A. L., 2003: Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, New Delhi.
2. Bridges E. M., 1990: World Geomorphology, Cambridge University Press, Cambridge.
3. Christopherson, Robert W., (2011), Geosystems: An Introduction to Physical Geography, 8 Ed., Macmillan Publishing Company
4. Kale V. S. and Gupta A., 2001: Introduction to Geomorphology, Orient Longman, Hyderabad.
5. Knighton A. D., 1984: Fluvial Forms and Processes, Edward Arnold Publishers, London.
6. Richards K. S., 1982: Rivers: Form and Processes in Alluvial Channels, Methuen, London.
7. Selby, M.J., (2005), Earth's Changing Surface, Indian Edition, OUP
8. Skinner, Brian J. and Stephen C. Porter (2000), The Dynamic Earth: An Introduction to physical Geology, 4th Edition, John Wiley and Sons
9. Thornbury W. D., 1968: Principles of Geomorphology, Wiley.
10. Gautam, A (2010): Bhautik Bhugol, Rastogi Publications, Meerut
11. Tikkaa, R N (1989): Bhautik Bhugol ka Swaroop, Kedarnath Ram Nath, Meerut
12. Singh, S (2009):Bhautik Bhugol ka Swaroop, Prayag Pustak,Allahab

CORE 2: CARTOGRAPHIC TECHNIQUES(P)

1. Cartography – History and Importance of cartography
2. Scales – Concept and application; Graphical Construction of Plain, Comparative and Diagonal Scales.
3. Weather map interpretation, Mapping terrain & Climatic data (Hythergraph, Climograph, Isopleth), profile and Contours.
4. Topographical Map – Interpretation of a Mountain area with the help of Cross and Longitudinal Profiles.
5. Slope Analysis – Wentworth's method.

Practical Record:

A Project File in pencil, comprising one exercise each, on scale, map projection, interpretation of topographic sheet and slope analysis.

Reading List

1. Anson R. and Ormelling F. J., 1994: International Cartographic Association: BasicCartographic Vol. Pregmen Press.
2. Gupta K.K. and Tyagi, V. C., 1992: Working with Map, Survey of India, DST, New Delhi.
3. Mishra R.P. and Ramesh, A., 1989: Fundamentals of Cartography, Concept, New Delhi.
4. Monkhouse F. J. and Wilkinson H. R., 1973: Maps and Diagrams, Methuen, London.
5. Rhind D. W. and Taylor D. R. F., (eds.), 1989: Cartography: Past, Present and Future, Elsevier, International Cartographic Association.
6. Robinson A. H., 2009: Elements of Cartography, John Wiley and Sons, New York.
7. Sharma J. P., 2010: Prayogic Bhugol, Rastogi Publishers, Meerut.
8. Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.
9. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
10. Singh R L & Rana P B Singh(1991) Prayogtmak Bhugol ke Mool Tatva, Kalyani Publishers, New Delhi
11. Sharma, J P (2010) Prayogtmak Bhugol ki Rooprekha, Rastogi Publications, Meerut
12. Singh, R L & Dutta, P K (2012) PrayogtmakBhugol, Central Book Depot, Allahabad

CORE 3: HUMAN GEOGRAPHY

1. **Introduction:** Defining Human Geography; Major Themes, (Determinism, Possibilism, Neo determinism), emergence of man, Race of Mankind,
2. **Population:** Population Growth and Distribution; Population Composition; Demographic Transition Theory
3. **Settlements:** Types of Rural Settlements; Classification of Urban Settlements; Trends and Patterns of World Urbanization
4. **Population-Resource Relationship** (Population problems of developed & developing countries,

Reading List

1. Chandna, R.C. (2010) Population Geography, Kalyani Publisher.
2. Hassan, M.I. (2005) Population Geography, Rawat Publications, Jaipur
3. Daniel, P.A. and Hopkinson, M.F. (1989) The Geography of Settlement, Oliver & Boyd, London.
4. Johnston R; Gregory D, Pratt G. et al. (2008) The Dictionary of Human Geography, Blackwell Publication.
5. Jordan-Bychkov et al. (2006) The Human Mosaic: A Thematic Introduction to Cultural Geography. W. H. Freeman and Company, New York.
6. Kaushik, S.D. (2010) Manav Bhugol, Rastogi Publication, Meerut.
7. Maurya, S.D. (2012) Manav Bhugol, Sharda Pustak Bhawan. Allahabad.
8. Hussain, Majid (2012) Manav Bhugol. Rawat Publications, Jaipur.

CORE 4: (SUPPORTIVE 1) CIVICS I- INDIAN CONSTITUTION

Unit I

Indian Constitution: Salient Features - Preamble –Fundamental Rights –Directive Principles of State policy–Fundamental Duties.

Unit II

Indian Executive- President–Powers and Functions – Prime Minister and Council of Ministers, Powers and functions –Relation with the council of Ministers and Parliament.

Unit III

Indian Legislature: Composition, Powers and Functions –Legislative procedures- Indian Judiciary– Powers of the Supreme Court

Unit IV

Relation between the Union and States –Sarkaria Commission and its recommendation and Implementation –Important Amendments

Reference Books

1. Agarwal , R.C., Constitutional Development and National Movement of India,
2. S.Chand, 2005. Anand, C.L., The Constitution of India.
3. Banerjee ,A.C., The Constitutional Assembly of India. Basu, Constitutional Law of India.
4. Kappur, A.C., Constitutional History of India. Kappur, A.C., Select Committee.
5. Philip and Shivaji Rao,K.H., India Government and Politics.
6. Pylee, M.V., Indian Constitution, S.Chand, 1994.
7. Shah, K.T., Federal Structure.

CORE 5: MAP PROJECTION (P)

1. **Map Projection** : Definition, significance and types. Choices of map projections.
2. **Construction, properties, merits, demerits and uses of Conical Projections** : Conical Projection with two standard parallels, Polyconic Projection and Bonne's Projection.
3. **Construction, properties, merits, demerits and uses of Zenithal Projections:** Gnomonic, Stereographic, Orthographic, Equidistant and Equal Area Projection.\
4. **Construction, properties, merits, demerits and uses of Cylindrical Projections:** Simple Cylindrical Projection, Cylindrical Equal Area Projection and Mercator's Projection. Conventional Projections : Mollweide's Projection and International Projection.

Reading List:

1. Misra R.P and A Ramesh (2002) Fundamentals of Cartography. Concept Publishing House, New Delhi.
2. Sharma J.P (2008) Prayogik Bhugol, Rastogi Publications, Meerut.
3. Singh, G (2005) Map work and Practical Geography, Vikas Publishing House, New Delhi.
4. Singh, L.R (2006) Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.
5. Singh R.L and R.B.P Singh (2000) Elements of Practical Geography, Kalyani Publishers, New Delhi.
6. Tiwari, R.C and Tripathi, S (2007), Abhinav Prayothmak Bhugol, Prayag Pustak Bhawan, Allahabad.
7. Yadav, Hiralal (2010) Prayogathmak Bhugol, Radha Publications, New Delhi.

CORE 6: ECONOMIC GEOGRAPHY

1. **Introduction:** Concept and classification of economic activity
2. Factors Affecting location of Economic Activity with special reference to Agriculture (Von Thunen theory), Industry (Weber's theory).
3. **Primary Activities:** Subsistence and Commercial agriculture, forestry, fishing and mining.
4. **Secondary Activities:** Manufacturing (Cotton Textile, Iron and Steel), Concept of Manufacturing Regions, Special Economic Zones and Technology Parks.
5. **Tertiary Activities:** Transport, Trade and Services, & Quaternary activities

Reading List

1. Alexander J. W., 1963: *Economic Geography*, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
2. Coe N. M., Kelly P. F. and Yeung H. W., 2007: *Economic Geography: A Contemporary Introduction*, Wiley-Blackwell.
3. Hodder B. W. and Lee Roger, 1974: *Economic Geography*, Taylor and Francis.
4. Combes P., Mayer T. and Thisse J. F., 2008: *Economic Geography: The Integration of Regions and Nations*, Princeton University Press.
5. Wheeler J. O., 1998: *Economic Geography*, Wiley.
6. Durand L., 1961: *Economic Geography*, Crowell.
7. Bagchi-Sen S. and Smith H. L., 2006: *Economic Geography: Past, Present and Future*, Taylor and Francis.
8. Willington D. E., 2008: *Economic Geography*, Husband Press.
9. Clark, Gordon L.; Feldman, M.P. and Gertler, M.S., eds. 2000: *The Oxford*.

CORE 7: THEMATIC MAPPING TECHNIQUES (P)

1. Map Scale, Types
2. Map classification and Types; Principles of Map Design.
3. Diagrammatic Data Presentation – Line, Bar and Circle.
4. Thematic Mapping Techniques – Properties, Uses and Limitations; Areal Data -- Choropleth, Dot, Point Data – Isopleths.

Practical Record: A Thematic Atlas should be prepared on a specific theme with five plates of any state in India.

Reading List

1. Cuff J. D. and Mattson M. T., 1982: *Thematic Maps: Their Design and Production*, Methuen Young Books
2. Dent B. D., Torguson J. S., and Holder T. W., 2008: *Cartography: Thematic Map Design* (6th Edition), Mcgraw-Hill Higher Education
3. Gupta K. K. and Tyagi V. C., 1992: *Working with Maps*, Survey of India, DST, New Delhi.
4. Kraak M.-J. and Ormeling F., 2003: *Cartography: Visualization of Geo-Spatial Data*, Prentice-Hall.
5. Mishra R. P. and Ramesh A., 1989: *Fundamentals of Cartography*, Concept, New Delhi.
6. Sharma J. P., 2010: *Prayogic Bhugol*, Rastogi Publishers, Meerut.
7. Singh R. L. and Singh R. P. B., 1999: *Elements of Practical Geography*, Kalyani Publishers.
8. Slocum T. A., McMaster R. B. and Kessler F. C., 2008: *Thematic Cartography and Geovisualization* (3rd Edition), Prentice Hall.
9. Tyner J. A., 2010: *Principles of Map Design*, The Guilford Press.
10. Sarkar, A. (2015) *Practical geography: A systematic approach*. Orient Black Swan Private Ltd., New Delhi
11. Singh, L R & Singh R (1977): *Manchitra or Pryaogatamek Bhugol* , Central Book, Depot, Allahabad
12. Bhopal Singh R L and Duttta P K (2012) *Prayogatama Bhugol*, Central Book Depot, Allahabad.

CORE 8: (SUPPORTIVE 2) CIVICS II - INTRODUCTION TO HUMAN RIGHTS

Unit I

Definition and classification –Universal Declaration of Human Rights –Constitutional Guarantees on human rights –Fundamental rights –Directive Principles of State policy

Unit II

Civil and political Rights –Social and Economic Rights –Women’s Rights- Children’s Rights

Unit III

Contemporary issues in Human Rights –Violation of Human Rights of Women, Children, Dalits- Child labour –Bonded labour and wages.

Unit IV

National Human Rights Commission (NHRC) - State Human Rights Commission (SHRC) - Non Governmental Organizations- International Human Rights Organizations (UN).

Reference Books

1. Fleiner, Thomas, What is Human Rights, Federation Press, NSW, 1999
2. Griffin, James, On Human Rights, OUP, New Delhi, 2008
3. Muthirulandi, Raja, Human Rights, PHI Learning, New Delhi, 2000
4. Rameshwari Devi, Human Rights in the Modern World, Mahamaya, New Delhi, 2004
5. Selvam, S., Human Rights Education: Modern Approaches and Strategies, Concept, New Delhi, 1970
6. Subramanian, S., Human Rights (2 Volumes), Manas, New Delhi, 1997

CORE 9: CLIMATOLOGY

1. Composition and Structure of atmosphere – Variation with Altitude, Latitude and Season.
2. Insolation– Factors and Distribution, Heat Budget, Temperature Inversion.
3. Atmospheric Pressure and Winds – Planetary Winds, Forces affecting Winds, General Circulation, Jet Streams.
4. Atmospheric Moisture – Evaporation, Humidity, Condensation, Fog and Clouds, Precipitation Types, Air Mass, Climatic Regions (Koppen)
5. Cyclones and Related Phenomena- Cyclone, Anti cyclone, Tornado, Water Spouts.

Reading List

1. Barry R. G. and Carleton A. M., 2001: *Synoptic and Dynamic Climatology*, Routledge, UK.
2. Barry R. G. and Corley R. J., 1998: *Atmosphere, Weather and Climate*, Routledge, New York.
3. Critchfield H. J., 1987: *General Climatology*, Prentice-Hall of India, New Delhi
4. Lutgens F. K., Tarbuck E. J. and Tasa D., 2009: *The Atmosphere: An Introduction to Meteorology*, Prentice-Hall, Englewood Cliffs, New Jersey.
5. Oliver J. E. and Hidore J. J., 2002: *Climatology: An Atmospheric Science*, Pearson Education, New Delhi.
6. Trewartha G. T. and Horne L. H., 1980: *An Introduction to Climate*, McGraw-Hill.
7. Gupta L S(2000): *Jalvayu Vigyan*, Hindi Madhyam Karyanvay Nidishalya, Delhi Vishwa Vidhyalaya, Delhi
8. Lal, D S (2006): *Jalvayu Vigyan*, Prayag Pustak Bhavan, Allahabad
9. Vatal, M (1986): *Bhautik Bhugol*, Central Book Depot, Allahabad
10. Singh, S (2009): *Jalvayu Vigyan*, Prayag Pustak Bhawan, Allahabad

CORE 10: STATISTICS METHODS IN GEOGRAPHY. (P)

1. **Use of Data in Geography:** Geographical Data Matrix, Significance of Statistical Methods in Geography; Sources of Data.
2. **Tabulation and Descriptive Statistics:** Frequencies (Deciles, Quartiles), Cross Tabulation, Central Tendency (Mean, Median and Mode, Dispersion (Standard Deviation, Variance and Coefficient of Variation).
3. **Sampling:** Purposive, Random, Systematic and Stratified.
4. **Theoretical Distribution:** Probability and Normal Distribution.
5. **Association and Correlation:** Rank Correlation, Product Moment Correlation, and Simple Regression.

Class Record: Each student will submit a record containing five exercises:

1. Construct a data matrix of about (10 x 10) with each row representing an areal unit (districts or villages or towns) and about 10 columns of relevant attributes of the areal units.
2. Based on the above table, a frequency table, measures of central tendency and dispersion would be computed and interpreted for any two attributes.
3. Histograms and frequency curve would be prepared **on the entire data set** and attempt to fit a normal curve and interpreted for one or two variables.
4. From the data matrix a sample set (20 Percent) would be drawn using, random - systematic and stratified methods of sampling and locate the samples on a map with a short note on methods used.
5. Based on of the sample set and using two relevant attributes, a scatter and regression line would be plotted and residual and regression line would be mapped with a short interpretation.

Reading List

1. Berry B. J. L. and Marble D. F. (eds.): *Spatial Analysis – A Reader in Geography*.
2. Ebdon D., 1977: *Statistics in Geography: A Practical Approach*.
3. Hammond P. and McCullagh P. S., 1978: *Quantitative Techniques in Geography: An Introduction*, Oxford University Press.
4. King L. S., 1969: *Statistical Analysis in Geography*, Prentice-Hall.
5. Mahmood A., 1977: *Statistical Methods in Geographical Studies*, Concept.
6. Pal S. K., 1998: *Statistics for Geoscientists*, Tata McGraw Hill, New Delhi.
7. Sarkar, A. (2013) *Quantitative geography: techniques and presentations*. Orient Black Swan Private Ltd., New Delhi
8. Silk J., 1979: *Statistical Concepts in Geography*, Allen and Unwin, London.
9. Spiegel M. R.: *Statistics, Schaum's Outline Series*.
10. Yeates M., 1974: *An Introduction to Quantitative Analysis in Human Geography*, McGraw Hill, New York.
11. Shinha, Indira (2007) *Sankhyiki bhugol*. Discovery Publishing House, New Delhi

CORE 11: POPULATION GEOGRAPHY

1. Defining the Field – Nature and Scope; Sources of Data with special reference to India (Census, Vital Statistics and NSS).
2. Population Size, Distribution and Growth – Determinants and Patterns; Theories of Growth – Malthusian Theory and Demographic Transition Theory.
3. Population Dynamics: Fertility, Mortality and Migration – Measures, Determinants and Implications.
4. Population Composition and Characteristics – Age-Sex Composition; Rural and Urban Composition; Literacy.
5. Contemporary Issues – Ageing of Population; Declining Sex Ratio; HIV/AIDS.

Reading List

1. Barrett H. R., 1995: *Population Geography*, Oliver and Boyd.
2. Bhende A. and Kanitkar T., 2000: *Principles of Population Studies*, Himalaya Publishing House.
3. Chandna R. C. and Sidhu M. S., 1980: *An Introduction to Population Geography*, Kalyani Publishers.
4. Clarke J. I., 1965: *Population Geography*, Pergamon Press, Oxford.
5. Jones, H. R., 2000: *Population Geography*, 3rd ed. Paul Chapman, London.
6. Lutz W., Warren C. S. and Scherbov S., 2004: *The End of the World Population Growth in the 21st Century*, Earthscan
7. Newbold K. B., 2009: *Population Geography: Tools and Issues*, Rowman and Littlefield Publishers.
8. Pacione M., 1986: *Population Geography: Progress and Prospect*, Taylor and Francis.
9. Wilson M. G. A., 1968: *Population Geography*, Nelson.
10. Panda B P (1988): *Janasankya Bhugol*, M P Hindi Granth Academy, Bhopal
11. Maurya S D (2009) *Jansankya Bhugol*, Sharda Putak Bhawan, Allahabad
12. Chandna, R C (2006), *Jansankhya Bhugol*, Kalyani Publishers, Delhi.

CORE 12: (SUPPORTIVE 3) ECONOMICS I - INDIAN ECONOMY

Unit 1: Indian Economy during the Colonial Period

People, resources and institutions in the pre-independent India – Structure of Indian villages, land and agriculture, traditional industries and handicrafts, infrastructure – urban centres, roadways, railways and ports, economic consequences of the Colonial rule and the theory of drains.

Unit 2: Indian Economy at the time of Independence

Structure of the Indian economy – natural resources – land, forest, mineral resources, fisheries; national income and contributions from various sectors; theory of demographic transition, age and sex ratio, density of population, social infrastructure.

Unit 3: Planning in India

Need for planning in India, objectives, overview of plans in India – approaches, outlays, targets and priorities, broad achievements and failures, new-economic reforms, Liberalization, Privatisation, and Globalisation – rationale behind new economic reforms, progresses during the post-reform period.

Unit 4: Planning and Indian Agriculture

Land and agriculture in India – land, climate and irrigational infrastructure; land reforms and its implementation across states, green revolution and the advent of HYV seeds, green revolution in retrospect – pros and cons; Nationalization of banks and farmers' access to formal credit and its social implications.

Unit 5: Indian Industries

Role of Indian industries – industrial development during the planning period – industrial policies – licensing policy – growth and problems of some large scale industries: iron and steel, cotton, jute, sugar and cement – growth and problems of small scale enterprises – role, growth and problems of public sector enterprises in India.

Reference Book:

1. Ahluwalia. I.J. and I.M.D Little (Eds) (1999), India's Economic Reforms and Development, Oxford University Press (OUP), New Delhi.
2. Bardhan, P.K. (1999), The Political Economy of Development in India, OUP, New Delhi.
3. Bawa, R.S. and P.S. Raikhy,(1997), Structural Changes in Indian Economy, Gurunanak Dev University press, Amritsar.
4. Chakravarty, S. (1987), Development planning: The Indian Experience, OUP, New Delhi.
5. Datt R. (2001), Second Generation Economic Reforms in India, Deep & Deep Publications.
6. Ruddar Datt and K.P.M. Sundaram. (2008), Indian Economy, Sultan Chand and Co, New Delhi.
7. Harriss-White, Barabara (2003), India Working: Essays on Society and Economy, Cambridge University Press, Cambridge
8. Tirtankar Roy (2011), The Economic History of India, Oxford University Press, New Delhi.
9. Raychaudhuri, Tapan and Habib, Irfan (ed. 2004), The Cambridge Economic History of India Vol. 1, Reprint, Orient Longman Private Ltd, New Delhi.
10. Dharma Kumar (1983) edited The Cambridge Economic History of India, Volume 2, Cambridge University Press, Cambridge.
11. Dharma Kumar (1965), Land and Caste in South India: Agricultural Labour in Madras Presidency in the Nineteenth Century, Cambridge University Press, Cambridge.
12. Uma Kapila (Ed), Indian Economy since Independence, Academic Foundation, EPW articles.

CORE 13: URBAN GEOGRAPHY

1. Urban geography: Introduction, Origin of Urbanisation, Urban Morphology, major aspect of Urbanisation
2. Patterns of Urbanisation in developed and developing countries
3. Functional classification of cities: Quantitative and Qualitative Methods
4. Urban Issues: problems of housing, slums, civic amenities (water and transport)
5. Case studies of Delhi, Mumbai, Kolkata, Chennai, Chandigarh and Port Blair with reference to Land use and Urban Issues

Reading List

1. Fyfe N. R. and Kenny J. T., 2005: *The Urban Geography Reader*, Routledge.
2. Graham S. and Marvin S., 2001: *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition*, Routledge.
3. Hall T., 2006: *Urban Geography*, Taylor and Francis.
4. Kaplan D. H., Wheeler J. O. and Holloway S. R., 2008: *Urban Geography*, John Wiley.
5. Knox P. L. and McCarthy L., 2005: *Urbanization: An Introduction to Urban Geography*, Pearson Prentice Hall New York.
6. Knox P. L. and Pinch S., 2006: *Urban Social Geography: An Introduction*, Prentice-Hall.
7. Pacione M., 2009: *Urban Geography: A Global Perspective*, Taylor and Francis.
8. Sassen S., 2001: *The Global City: New York, London and Tokyo*, Princeton University Press.
9. Ramachandran R (1989): *Urbanisation and Urban Systems of India*, Oxford University Press, New Delhi
10. Ramachandran, R., 1992: *The Study of Urbanisation*, Oxford University Press, Delhi
11. Singh, R.B. (Eds.) (2001) *Urban Sustainability in the Context of Global Change*, Science Pub., Inc., Enfield (NH), USA and Oxford & IBH Pub., New Delhi.
12. Singh, R.B. (Ed.) (2015) *Urban development, challenges, risks and resilience in Asian megacities*. *Advances in Geographical and Environmental Studies*, Springer.

CORE 14: GEOGRAPHY OF HEALTH AND WELL BEINGS

1. Perspectives on Health: Definition; linkages with environment, development and health; driving forces in health and environmental trends - population dynamics, urbanization, poverty and inequality.
2. Pressure on Environmental Quality and Health: Human activities and environmental pressure land use and agricultural development; industrialisation; transport and energy.
3. Exposure and Health Risks: Air pollution; household wastes; water; housing; workplace.
4. Health and Disease Pattern in Environmental Context with special reference to India, Types of Diseases and their regional pattern (Communicable and Lifestyle related diseases).
5. Climate Change and Human Health: Changes in climate system – heat and cold; Biological disease agents; food production and nutrition.

Reading List:

1. Akhtar Rais (Ed.), 1990 : Environment and Health Themes in Medical Geography, Ashish Publishing House, New Delhi.
2. Avon Joan L. and Jonathan A Patzed.2001 : Ecosystem Changes and Public Health,Baltimin, John Hopling Unit Press(ed).
3. Bradley,D.,1977: Water, Wastes and Health in Hot Climates, John Wiley Chichester.
4. Christaler George and Hristopoles Dionissios, 1998: Spatio Temporal Environment Health Modelling , Boston Kluwer Academic Press.
5. Cliff, A.D. and Peter,H., 1988 : Atlas of Disease Distributions, Blackwell Publishers, Oxford.
6. Gatrell, A.,and Loytonen, 1998 : GIS and Health, Taylor and Francis Ltd, London.
7. Hardham T. and Tannav M.,(eds): Urban Health in Developing Countries; Progress, Projects, Earthgoan, London.
8. Murray C. and A. Lopez, 1996 : The Global Burden of Disease, Harvard University Press.
9. Moeller Dade wed., 1993: Environmental Health, Cambridge, Harward Univ. Press.
10. Phillips, D.and Verhasselt, Y., 1994: Health and Development, Routledge, London.
11. Tromp, S., 1980: Biometeorology: The Impact of Weather and Climate on Humans and their Environment, Heydon and Son.

CORE 15: ISLAND STUDIES

1. Introduction of Island studies: emerging interdisciplinary and comparative study of island and archipelagos-cultures-geography of islands and island states-historical development-environment issues.
2. Island biogeography-physical features-climate-ecosystem, biodiversity-flora and fauna ecosystem processes-island vulnerability-managing beach resource-coastal resource and island tourism-is sustainability possible?
3. Island migration dependency and in equality- globalisation, new labour migration and development of islands-government policy to support migrant workers-promoting sustainable rural coastal and island communities.
4. Island Issues: Social-political-economic issues-island urbanisation-poverty, climate change and social issues-strategic importance, environmental changes and challenges of the Andaman and Nicobar Islands.
5. Integrated Coastal zone management plan for India islands-existing management regulations and local level policy, coastal erosion and shore protection, conflicts and perceptions of the stakeholders in Islands.

(A field trip to any place in Andaman and Nicobar Islands and to submit a report of 25 marks)

References

1. peter M. Vitousek Lloyd L. Loope Henning Adersen, Islands Biological Diversity and Ecosystem Function, Springer-Verlag Berlin Heidelberg-1995.
2. T.N Prakash L. Sheela Nair T.S. Shahul Hameed Geomorphology and Physical Oceanography of Lakshadweep Coaral Islands in the Indian ocean, Springer Cham Heidelberg New York Dordrecht London-2015.
3. Stewart Firth, Globalisation and governance in the pacific Island University printing Services. ANU-2006.Geography of Islands, geography, 74,2, 106-116 A selction of essays from: Baldacchino G., Niles D. (eds), 2011, Island Futures. Conservation and development across the Asia-Pacific region, Springer, London.

CORE 16: (SUPPORTIVE 4) ECONOMICS II - MONEY AND BANKING**Unit 1: Concept of Money and Banking Definition, Functions and Theories of Money**

Money and its function – the concepts and definitions of money – measurement of money – advantages of money – banking – nature and functions of banks – process of credit creation – Gurley and Shaw hypothesis – NBFIs - money and banking in the era of globalisation.

Unit 2: Demand for Money

Theories of demand for money: classical approach, the transactions and cash balance approach, Keynesian analysis, post-Keynesian developments, monetarist approach.

Unit 3: Money Supply

Theories of money supply – mechanistic model of money supply determination – high powered money and behavioral model of money supply determination – methods of monetary control – Interest rates in closed and open economies.

Unit 4: Central Banking

Functions of a central bank – quantitative and qualitative methods of credit control – bank rate policy, open market operations, cash reserve ratio, selective methods – banking regulation and supervision – Basel prudential norms on capital adequacy and NPA management .

Unit 5: Conduct of Monetary Policy in India Monetary Policy

Role and functions of Reserve Bank of India (RBI) – evolution of RBI's monetary policy – Objectives, Instruments and targets of monetary policy in India – operating procedure – lags in monetary policy – rules versus discretion debate – limitations of monetary policy with special reference to India.

Reference

1. Pierce, D G and P J Tysome (1985), Monetary Economics: Theories, Evidence and Policy, Butterworths, London.
2. Carl E Walsh (1998), Monetary Theory and Policy, MIT Press, Cambridge.
3. Mishkin, Frederic S. (2004), Economics of Money, Banking and Financial Markets, Pearson Addison Wesley.
4. C Rangarajan (1999), Indian Economy: Essays in Money and Finance, UBSPD, New Delhi.
5. Samantaraya, Amaresh (2015), Conduct of Monetary Policy in India: Changing Dimensions in the Post-reform Period, TR Publications, Chennai.
6. Bennett McCallum (1989), Monetary Economics: Thoery and Policy, Macmillan.
7. Narendra Jadhav (1994), Monetary Economics for India, Macmillan.

CORE 17: GEOGRAPHY OF TOURISM

1. **Scope and Nature:** Concepts and Issues, Tourism, Recreation and Leisure Inter-Relations; Geographical Parameters of Tourism by Robinson.
2. **Type of Tourism:** Nature Tourism, Cultural Tourism, Medical Tourism, Pilgrimage
3. **Recent Trends of Tourism:** International and Regional; Domestic (India); Eco-Tourism, Sustainable Tourism, Meetings Incentives Conventions and Exhibitions (MICE)
4. **Impact of Tourism:** Economy; Environment; Society
5. **Tourism in India:** Tourism Infrastructure; Case Studies of Himalaya, Desert and Coastal Areas; National Tourism Policy, Andaman Islands: Factor influencing tourism, Structure, Mode of transport, Major tourist spots.

Reading List

1. Dhar, P.N. (2006) International Tourism: Emerging Challenges and Future Prospects. Kanishka, New Delhi.
2. Hall, M. and Stephen, P. (2006) Geography of Tourism and Recreation – Environment, Place and Space, Routledge, London.
3. Kamra, K. K. and Chand, M. (2007) Basics of Tourism: Theory, Operation and Practise, Kanishka Publishers, Pune.
4. Page, S. J. (2011) Tourism Management: An Introduction, Butterworth-Heinemann-USA. Chapter 2.
5. Raj, R. and Nigel, D. (2007) Morpeth Religious Tourism and Pilgrimage Festivals Management: An International perspective by, CABI, Cambridge, USA, www.cabi.org.
6. Tourism Recreation and Research Journal, Center for Tourism Research and Development, Lucknow
7. Singh Jagbir (2014) “Eco-Tourism” Published by - I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).

CORE 18: GEOGRAPHY IN INDIA

1. India in the context of the world and Asia. Relief, climate, drainage, soil and natural vegetation. Marine resources.
2. Mineral Resources: Ores of Iron, copper, aluminum, manganese and mica. Power Resources: Coal, petroleum and natural gas.
3. Human Resources: Distribution, density and growth. Socioeconomic implications.
4. Population Dynamics: Age and sex structure, Religious Structure. Literacy and occupational structure. Migration. Urbanization.

REFERENCES.

1. Dubey and Singh (2006) Jansankya Bhugol. Rawat Publications, Jaipur.
2. Gautam, A (2006) Advanced Geography of India. Sharda Pustak Bhawan, Allahabad.
3. Mamoria, C.B (2003) Economic Geography of India. Sahitya Bhawan Publishing Co., Agra.
4. Maurya, S.D (2007) Jansankya Bhugol. Sharda Pustak Bhawan, Allahabad.
5. Sharma T.C (2007) Economic and Commercial Geography of India. Vikas Publishing House., New Delhi.
6. Sharma, Y.K (2011) Geography of India. Laxmi Narayan Agarwal, Agra.
7. Tirtha, R (2004) Geography of India. Rawat Publications, Jaipur.
8. Tiwari, R.C (2008) Bharath ka Bhruhat Bhugol. Prayag Pustak Bhawan, Allahabad.
9. Tiwari, R. C (2008) Geography of India Prayag Pustak Bhawan, Allahabad.

CORE 19 : AGRICULTURAL GEOGRAPHY

1. Defining the Field: Introduction, nature and scope; Land use/ land cover definition and classification.
2. Determinants of Agriculture: Physical, Technological and Institutional
3. Agricultural Regions of India: Agro-climatic, Agro-ecological & Crop Combination Regions.
4. Agricultural Systems of the World (Whittlesey's classification) and Agricultural Land use model (Von Thuenen, modification and relevance).
5. Agricultural Revolutions in India: Green, White, Blue, Pink

Reading List

1. Basu, D.N., and Guha, G.S., 1996: *Agro-Climatic Regional Planning in India*, Vol.I & II, Concept Publication, New Delhi.
2. Bryant, C.R., Johnston, T.R., 1992: *Agriculture in the City Countryside*, Belhaven Press, London.
3. Burger, A., 1994: *Agriculture of the World*, Aldershot, Avebury.
4. Grigg, D.B., 1984: *Introduction to Agricultural Geography*, Hutchinson, London.
5. Ilbery B. W., 1985: *Agricultural Geography: A Social and Economic Analysis*, Oxford University Press.
6. Mohammad, N., 1992: *New Dimension in Agriculture Geography*, Vol. I to VIII, Concept Pub., New Delhi.
7. Roling, N.G., and Wageruters, M.A.E.,(ed.) 1998: *Facilitating Sustainable Agriculture*, Cambridge University Press, Cambridge.
8. Shafi, M., 2006: *Agricultural Geography*, Doring Kindersley India Pvt. Ltd., New Delhi
9. Singh, J., and Dhillon, S.S., 1984: *Agricultural Geography*, Tata McGraw Hill, New Delhi.
10. Tarrant J. R., 1973: *Agricultural Geography*, David and Charles, Devon.

CORE 20: POLITICAL GEOGRAPHY

1. Introduction: Concepts, Nature and Scope.
2. State, Nation and Nation State – Concept of Nation and State, Attributes of State – Frontiers, Boundaries, Shape, Size, Territory and Sovereignty, Concept of Nation State; Geopolitics; Theories (Heartland and Rimland)
3. Electoral Geography – Geography of Voting, Geographic Influences on Voting pattern, Geography of Representation, Gerrymandering.
4. Political Geography of Resource Conflicts – Water Sharing Disputes, Disputes and Conflicts Related to Forest Rights and Minerals.
5. Politics of Displacement: Issues of relief, compensation and rehabilitation: with reference to Dams and Special Economic Zones

Reading List

1. Agnew J., 2002: *Making Political Geography*, Arnold.
2. Agnew J., Mitchell K. and Toal G., 2003: *A Companion to Political Geography*, Blackwell.
3. Cox K. R., Low M. and Robinson J., 2008: *The Sage Handbook of Political Geography*, Sage Publications.
4. Cox K., 2002: *Political Geography: Territory, State and Society*, Wiley-Blackwell
5. Gallaher C., et al, 2009: *Key Concepts in Political Geography*, Sage Publications.
6. Glassner M., 1993: *Political Geography*, Wiley.
7. Jones M., 2004: *An Introduction to Political Geography: Space, Place and Politics*, Routledge.
8. Mathur H M and M M Cernea (eds.) *Development, Displacement and Resettlement – Focus on Asian Experience*, Vikas, Delhi
9. Painter J. and Jeffrey A., 2009: *Political Geography*, Sage Publications.
10. Taylor P. and Flint C., 2000: *Political Geography*, Pearson Education.
11. Verma M K (2004): *Development, Displacement and Resettlement*, Rawat Publications, Delhi
12. Hodder Dick, Sarah J Llyod and Keith S McLachlan (1998), *Land Locked States of Africa and Asia* (vo.2), Frank Cass.

CORE 21: WATER MANAGEMENT

1. Sources of water, Atmospheric relationship of water: rainfall and temperature, evop-transpiration, rainfall and runoff relationship, hydrological cycle. Rain harvesting as strategies of water resource conservation, other strategies of water conservation; water recycling.
2. Hydrological, hydro-morphological and hydro-pedagogical assessment. Morphological units and drainage classifications assessment of surface and sub surface (ground water) discharge and recharge condition and water table relationship. Measurement of soil moisture, soil classification and water quality; Water logging and salinization, floods and droughts.
3. Watershed management; concept of watershed; morphological units, morphogenetic classification, morphometric analysis, importance of watershed protection and approaches to watershed protection, watershed management.
4. Impact of modern development on water resource: - need of water for domestic and non-domestic use. Irrigation development and water resource management, Big and Small irrigation project and their impact on water resource, Tank and Well irrigation and their impact on water resource. Industrialization and its impact on water resource, Urbanization and its impact on water resource. Demand and supply position of water resource, contemporary water crisis.

Reading List:

1. Bruce J.P. & R.H. Clerk, Introduction to hydrometeorology, pergamon press, Oxford, 1996.
2. David Keith todd, Ground water hydrology, John Willy and sons, New York, 1959.
3. Robert J. Reimold, watershed management, practice, policies and co-ordination, McGraw-Hill, New Delhi, 1998.
4. B.D.Dhawan, Indian water resource management for Irrigation : Issues Critiques reiews, Commonwealth publishers, New Delhi, 1993.
5. Ravi Misra, Fresh water Environment, Anmol publication pvt.LTD, New Delhi, 2002.
6. Ramaswamy R. Iyer, water perspective, Issues, concerns, SAGE publications, New Delhi, 2003.

CORE 22: CLIMATIC CHANGE: VULNERABILITY & ADAPTATION

1. Science of Climate Change: Understanding Climate Change; Green House Gases and Global Warming; Global Climatic Assessment- IPCC
2. Climate Change and Vulnerability: Physical Vulnerability; Economic Vulnerability; Social Vulnerability
3. Impact of Climate Change: Agriculture and Water; Flora and Fauna; Human Health
4. Adaptation and Mitigation: Global Initiatives with Particular Reference to South Asia.
5. National Action Plan on Climate Change; Local Institutions (Urban Local Bodies, Panchayats)

Further Readings

1. IPCC. (2007) *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.*
2. IPCC (2014) *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
3. IPCC (2014) *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
4. Palutikof, J. P., van der Linden, P. J. and Hanson, C. E. (eds.), Cambridge University Press, Cambridge, UK.
5. OECD. (2008) *Climate Change Mitigation: What Do we Do? Organisation and Economic Cooperation and Development.*
6. UNEP. (2007) *Global Environment Outlook: GEO4: Environment for Development, United Nations Environment Programme.*
7. Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014) *Climate change and biodiversity: Proceedings of IGU Rohtak Conference, Volume 1. Advances in Geographical and Environmental Studies, Springer*
8. Sen Roy, S. and Singh, R.B. (2002) *Climate Variability, Extreme Events and Agricultural Productivity in Mountain Regions, Oxford & IBH Pub., New Delhi*

PART III

ENGLISH

B.A., B.Ed. LIBERAL OPTIONS**PART III: B.A.B.ED.****Branch: ENGLISH**

| SEM | No. | Sub | Name of the course | CCE | UE | Total |
|------------|---------------------------|------------|--------------------------------------|------------|-----------|--------------|
| I | Core 1 | Main 1 | Indian Writing in English | 30 | 70 | 100 |
| | Core 2 | Main 2 | Prose | 30 | 70 | 100 |
| | Core 3 | Main 3 | Poetry | 30 | 70 | 100 |
| | Core 4 (Supportive 1) | Anci 1-1 | Communication Skills | 30 | 70 | 100 |
| II | Core 5 | Main 4 | Fiction | 30 | 70 | 100 |
| | Core 6 | Main 5 | History of English Literature | 30 | 70 | 100 |
| | Core 7 | Main 6 | English Language and Linguistics | 30 | 70 | 100 |
| | Core 8 (Supportive 2) | Anci 1-2 | English for Competitive Examinations | 30 | 70 | 100 |
| III | Core 9 | Main 7 | British Drama | 30 | 70 | 100 |
| | Core 10 | Main 8 | Literary Forms | 30 | 70 | 100 |
| | Core 11 | Main 9 | Literary Criticism | 30 | 70 | 100 |
| | Core 12 (Supportive 3) | Anci 2-1 | Translation Studies | 30 | 70 | 100 |
| IV | Core 13 | Main 10 | Shakespeare | 30 | 70 | 100 |
| | Core 14 | Main 11 | American Literature | 30 | 70 | 100 |
| | Core 15 | Main 12 | New Literatures in English | 30 | 70 | 100 |
| | Core 16 (Supportive 4) | Anci 2-2 | Indian Culture Through Literature | 30 | 70 | 100 |
| V | Core 17 | Main 13 | English for Mass Media | 30 | 70 | 100 |
| | Core 18 | Main 14 | Literature in Translation | 30 | 70 | 100 |
| VI | Core 19 | Main 15 | Contemporary Literary Theories | 30 | 70 | 100 |
| | Core 20 | Main 16 | Advanced English Grammar | 30 | 70 | 100 |
| VII | Core 21 | Main 17 | Women Writing | 30 | 70 | 100 |
| VIII | Core 22 | Main 18 | Green Literature | 30 | 70 | 100 |

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CORE 1: INDIAN WRITING IN ENGLISH

| | |
|------------------------------------|--|
| Objectives: | To introduce students to different genres of Indian writing in English |
| UNIT- 1: Poetry | 1. Sri Aurobindo, 'The Tiger and the Deer' 2. Sarojini Naidu, 'Palanquin Bearers' 3. Nissim Ezekiel, 'Enterprise' 4. Kamala Das, 'The Old Play House' 5. Shiv. K.Kumar, 'Indian Women' |
| UNIT – 2 & 3: Prose | 1. Swami Vivekananda, 'Work and its Secret' 2. Dr.Abdul Kalam, "My Visions for India" |
| UNIT 4: Drama | Manjula Padmanabhan, <i>Harvest</i> |
| UNIT – 5: Short Stories | R.K.Narayan – 'An Astrologer's Day' Sudha Murthy, 'Humility in Sahyadri Hills' |

CORE 2: PROSE

| | |
|--------------------|---|
| Objectives: | To Introduce British prose writings of various periods |
| UNIT – 1 | Francis Bacon, 'Of Studies' |
| UNIT – 2 | Oliver Goldsmith, 'Man in Black' Joseph Addison, "Sir Roger at Church" |
| UNIT – 3 | Charles Lamb, 'Dream Children' William Hazlitt, "On Reading Old Books" |
| UNIT – 4 | Russell, 'An Ideal Individual' G.K. Chesterton, 'Advantages of Having One Leg' |
| UNIT – 5 | Doris Lessing, 'The Golden Book' Orwell, 'Sporting Spirit' |

CORE 3: POETRY

| | |
|--------------------|--|
| Objectives: | To introduce students to the poetic thought down the ages. Selections from the 'The Winged Word (Ed. David Greene, Macmillan) |
| UNIT – 1 | 1. William Shakespeare, Sonnet 116 'Let me not to the marriage of true minds' 2. John Donne, 'The Sun Rising' 3. John Milton, 'How Soon Hath Time' |
| UNIT – 2 | 4. John Dryden, 'A Song for St. Cecilia's Day' 5. William Blake, 'Chimney Sweeper' |
| UNIT – 3 | 6. William Wordsworth, 'On Westminster Bridge' 7. S.T.Coleridge, 'Kubla Khan' 8. P.B.Shelley, 'Ode to the Sky Lark' 9. John Keats, 'Ode to a Nightingale' |
| UNIT – 4 | 10. Robert Browning, 'My Last Duchess' 11. Lord Tennyson, 'Lotus Eaters' |
| UNIT – 5 | 12.W. B. Yeats, 'The Second Coming' 13. Ted Hughes, 'Thought Fox' 14. W.H. Auden, 'Musee De Beaux Arts' |

CORE 4: (SUPPORTIVE 1) - COMMUNICATION SKILLS

| | |
|--------------------|--|
| Objectives: | To familiarize the students with the patterns of English Language. |
| UNIT – 1 | To impart speaking skills. Effective communication / miscommunication The secrets of good conversation |
| UNIT – 2 | Talking to strangers Talking to familiar people |
| UNIT – 3 | Telephone conversation Interviews |
| UNIT – 4 | Group Discussion |
| UNIT – 5 | Public Speech - Compering |
| | Grand Taylor- English Conversation Practice. Tata McGraw Hill, Radhakrishna Pillai, G.K Rajeevan- Spoken English for You, Emerald Publishers. |

CORE 5: FICTION

| | |
|--------------------|---|
| Objectives: | to familiarize students with some master pieces of British Fiction. |
| UNIT – 1 | Introducing Fiction |
| UNIT – 2 | Jane Austen, Mansfield Park |
| UNIT – 3 | Charlotte Bronte, Jane Eyre |
| UNIT – 4 | Charles Dickens, Christmas Carol |
| UNIT – 5 | Virginia Woolf, Mrs. Dalloway |

CORE 6: HISTORY OF ENGLISH LITERATURE

| | |
|--------------------|--|
| Objectives: | To facilitate an appreciation of literature by providing a brief survey of British literature through ages and to introduce students to the best works of each age |
| UNIT – 1 | Elizabethan Age. |
| UNIT – 2 | Augustan Age. |
| UNIT – 3 | Romantic Age. |
| UNIT – 4 | Victorian Age |
| UNIT – 5 | Modern Age |
| Reference: | 1. History of English Literature by E.Albert 2. History of English Literature by Hudson. |

CORE 7: ENGLISH LANGUAGE AND LINGUISTICS

| | |
|--------------------|---|
| Objectives: | To introduce students to the sound system and the structure of English Language. |
| UNIT – 1 | Introduction |
| UNIT – 2 | Phonetics |
| UNIT – 3 | Phonology |
| UNIT – 4 | Morphology |
| UNIT – 5 | Syntax |
| Reference: | A Text book of English Phonetics and Structure for Indian Students by V.Shyamala (Sharath Ganga Publishers, Trivandrum) |

CORE 8: (SUPPORTIVE 2) - ENGLISH FOR COMPETITIVE EXAMINATIONS

| | |
|------------------|--|
| UNIT – 1 | Basics of English Spotting Errors |
| UNIT – 2 | Sentence Completion |
| UNIT – 3 | Reading comprehension Précis Writing |
| UNIT – 4 | Foreign Expressions Idioms and Phrases |
| UNIT – 5 | Letter Writing Writing Reports General Essays |
| Reference | 1. F T Wood: <i>A Remedial English Grammar for Foreign Students.</i> (Macmillan) 2. R.P.Bhatnagar and RajulBhargava: <i>English for Competitive Examinations</i> (Macmillan) |

CORE 9: BRITISH DRAMA

| | |
|--------------------|---|
| Objectives: | To introduce students to British Drama |
| UNIT – 1 | Introducing Drama - Origin and development of British Drama |
| UNIT – 2 | Marlowe, <i>Doctor Faustus</i> |
| UNIT – 3 | Oscar Wilde, <i>The Importance of Being Earnest.</i> |
| UNIT – 4 | T.S. Eliot, <i>Murder in the Cathedral</i> |
| UNIT – 5 | Osborn, <i>Look Back in Anger</i> |

CORE 10: LITERARY FORMS

| | |
|--------------------|---|
| Objectives: | To Introduce students to various types of Drama and Literary Terms. |
| UNIT – 1 | Literary Terms |
| UNIT – 2 | Poetry |
| UNIT – 3 | Prose |
| UNIT – 4 | Drama |
| UNIT – 5 | Fiction |
| Reference: | 1. English Literary Forms: A Background to the Study of English Literature by Prasad 2. The Oxford Dictionary of Literary terms. |

CORE 11: LITERARY CRITICISM

| | |
|--------------------|--|
| Objectives: | To introduce students to the evolution of critical thoughts. |
| UNIT – 1 | Classical – Aristotle, Horace, Longinus |
| UNIT – 2 | Dr. Johnson – Preface to Shakespeare, |
| UNIT – 3 | Matthew Arnold -“The Study of Poetry” . |
| UNIT – 4 | I. A. Richards - “Four Kinds of Meaning” |
| UNIT – 5 | T S Eliot:“Tradition and Individual Talent” |
| Reference | M.S Nagarajan, <i>English Literary criticism and theory: An Introductory History</i> , 2006. |

CORE 12: (SUPPORTIVE 3)- TRANSLATION STUDIES

| | |
|--------------------|---|
| Objectives: | To acquaint the students with theories of Translation. |
| UNIT – 1 | Introduction to Translation Theories |
| UNIT – 2 | History of Translation |
| UNIT – 3 | Key concepts in Translation Studies |
| UNIT – 4 | Problems of Translation |
| UNIT – 5 | Recent Translation Theories |
| Reference | <i>A Handbook of Translation Studies</i> , B. K. Das, Atlantic, 2008. |

CORE 13: SHAKESPEARE

| | |
|--------------------|---|
| Objectives: | To introduce students to the works of Shakespeare |
| UNIT – 1 | Introduction to Shakespeare |
| UNIT – 2 | <i>Macbeth</i> |
| UNIT – 3 | <i>Julius Caesar</i> |
| UNIT – 4 | <i>As You Like it</i> |
| UNIT – 5 | <i>Measure for Measure</i> |

CORE 14: AMERICAN LITERATURE

| | |
|--------------------|--|
| Objectives: | To give an overview of American writings. |
| UNIT – 1 | 1. Emerson – ‘Self Reliance’ |
| UNIT – 2 | 1. Walt Whitman – “O Captain My Captain” 2. Emily Dickinson – “Success is counted sweetest” 3. Robert Frost – “Birches” 4. Sylvia Plath – “Lady Lazarus” 5. Maya Angelou – “When the Caged Bird sings” |
| UNIT – 3 | Eugene O’neil – Hairy Ape |
| UNIT – 4 | Hemingway – <i>Old Man and the Sea</i> |
| UNIT – 5 | Alice Walker – <i>In search of My Mother’s Garden</i> |

CORE 15: NEW LITERATURES IN ENGLISH*Post-Colonial Literature*

| | |
|-----------------------------|---|
| Objectives: | To introduce the literature of the marginalized and the subaltern. |
| UNIT – 1 PROSE | 1. Chapter 1 in <i>New Literatures in English: Cultural Nationalism in a Changing World</i> by Bruce King. 2. Introduction in <i>Empire Writes Back</i> by Bill Ashcroft, Garreth Griffith and Helen Tiffins, Routledge, London, 2003. |
| UNIT – 2 POETRY | 1. Atwood – ‘Photograph of me’. 2. Emily Liang – ‘United We Stand’. 3. A.D. Hope – ‘Australia’ 4. Allen Curnow – ‘House and Land’ |
| UNIT – 3 DRAMA | Douglas Stewart – <i>Ned Kelly</i> |
| UNIT – 4 FICTION | Chimamanda Adichi – <i>Purple Hibiscus</i> |
| UNIT – 5 SHORT STORY | Chinua Achebe – ‘Marriage is a Private Affair’ |

CORE 16: (SUPPORTIVE 4)- INDIAN CULTURE THROUGH LITERATURE

| | | |
|--------------------|---|--|
| Objectives: | To Introduce the students to notions of Culture and familiarize them with the history of Indian Culture through Literature. | |
| UNIT – 1 | PROSE | Sri Aurobindo-‘The Renaissance in India’ A.K Ramanujan- ‘Where Mirrors are Windows’ Michel Danino- ‘Effects of Colonisation’ |
| UNIT – 2 | POETRY | Swami Vivekananda-“Angel Unawares” Rabindranath Tagore –“Freedom” Toru Dutt –“Lakshman” |
| UNIT – 3 | DRAMA | Girish Karnad - <i>Nagamandala</i> |
| UNIT – 4 | FICTION | Neela Padmanaban- <i>Generations</i> |
| UNIT – 5 | SHORT STORIES | Devdutt Pattanaik - <i>Indian Mythology</i> |

CORE 17: ENGLISH FOR MASS MEDIA

1. James Glen Stovall – *Writing for the Mass Media*, Pearson, 1985.
2. Srivastava-*News reporting and Editing*, Sterling publishers, 2013.

CORE 18: LITERATURE IN TRANSLATION

| | |
|--------------------|---|
| Objectives: | To introduce students to the art of Translation through works of Literature To lead them to National and Global Literature through Translation |
| UNIT – 1 | A.K.Ramanujan – “Hymns for the Drowning” Pablo Neruda – “Ode to Hope” V.V.S.Iyer– “Thirukkural” Octavia Paz – “No More Clichés” |
| UNIT – 2 | Pushkin – “The Tale of Tsar Saltan” |
| UNIT – 3 | Jayamohan – “The Elephant Doctor” |
| UNIT – 4 | Thagazhi Sivasankaram Pillai – <i>Chemeen</i> |
| UNIT – 5 | Antoine de Saint-Exupéry- <i>The Little Prince</i> Herman Hesse – <i>Siddhartha</i> |

CORE 19: CONTEMPORARY LITERARY THEORIES

| | |
|------------------|---|
| UNIT – 1 | Marxism Subaltern Studies |
| UNIT – 2 | Post Colonialism |
| UNIT – 3 | Post Modernism |
| UNIT – 4 | Eco-criticism |
| UNIT – 5 | Gender Studies |
| Reference | Peter Barry – ‘Beginning Theory’ (Latest Edition) Bruce King, <i>New National and Post-Colonial Literature</i> ; Oxford University Press, 1996. (Chapter – 1: New Centres of Consciousness: New, Post-colonial, and International English Literature - Bruce King) |

CORE 20: ADVANCED ENGLISH GRAMMAR

Text: Advanced English Grammar by Raymond Murphy (O U P)

CORE 21: WOMEN WRITING

| | | |
|-----------------|--------------------|---|
| UNIT – 1 | POETRY | Elizabeth Bishop- 'I am in Need of Music' HalinaPoswiatowska- 'It's we who gave birth...' Adrienne Rich – 'Diving into the Wreck' Gaurie Desponde – 'Female of the Species' |
| UNIT – 2 | PROSE | Leila Seth - <i>Talking of Justice</i> (Chapter on women's rights) Chandra Talpade – "Under Western Eye" |
| UNIT – 3 | SHORT STORY | Mahaswetha Devi – <i>Rudali</i> |
| UNIT – 4 | FICTION | MonicaAli - <i>The Brick Lane</i> |
| UNIT – 5 | | <i>Lights and Shadows</i> (Collection of Short stories) |

CORE 22: GREEN LITERATURE

| | | |
|--------------------|--|--|
| Objectives: | To create Environmental Consciousness through a study of Literature. | |
| UNIT – 1 | POETRY | William Shakespeare – "Sonnet 20" John Keats – 'Bright Star, Would I Were' Wallace Stevens-'The Snow Man' Robert Frost – 'Stopping by Woods on a Snowy Evening' |
| UNIT – 2 | | Rabindranath Tagore – 'She Dwelt on the Hill side' Sarojini Naidu – 'Autumn Song' |
| UNIT – 3 | PROSE | Thoreau –'Where I lived and what I lived for' |
| UNIT – 4 | DRAMA | Chekhov – <i>The Cherry Orchard</i> |
| UNIT – 5 | FICTION | Indra Sinha - <i>Animal's People</i> |

PART III

HINDI

B.A., B.Ed. LIBERAL OPTIONS**PART III: B.A.B.ED.****Branch: HINDI**

| SEM | No. | Sub | Name of the course | CCE | UE | Total |
|------|---------------------------|----------|--|-----|----|-------|
| I | Core 1 | Main 1 | HINDI KATHA SAHITYA -1 (KAHANI) | 30 | 70 | 100 |
| | Core 2 | Main 2 | PRAYOJANMOOLAK HINDI- I (PATRAKARITHA AUR MEDIA LEKHAN) | 30 | 70 | 100 |
| | Core 3 | Main 3 | HINDI KATHA SAHITYA-II (UPANYAS) | 30 | 70 | 100 |
| | Core 4 (Supportive 1) | Anci 1-1 | ANUVAD SIKSHAN | 30 | 70 | 100 |
| II | Core 5 | Main 4 | PRAYOJANMOOLAK HINDI-II (KAMKAAJI HINDI AUR ANUVAD) | 30 | 70 | 100 |
| | Core 6 | Main 5 | AADHUNIK HINDI KAVYA-I | 30 | 70 | 100 |
| | Core 7 | Main 6 | HINDI SAHITYA KA ITHIHAS-I (RITIKAL TAK) | 30 | 70 | 100 |
| | Core 8 (Supportive 2) | Anci 1-2 | RAJBHASHA PRASIKSHAN | 30 | 70 | 100 |
| III | Core 9 | Main 7 | AADHUNIK HINDI KAVYA-II | 30 | 70 | 100 |
| | Core 10 | Main 8 | HINDI SAHITYA KA ITHIHAS-II (AADUNIK KAL) | 30 | 70 | 100 |
| | Core 11 | Main 9 | PRACHEEN HINDI KAVYA-I | 30 | 70 | 100 |
| | Core 12 (Supportive 3) | Anci 2-1 | KATHAKAR PREMCHAND | 30 | 70 | 100 |
| IV | Core 13 | Main 10 | KAVYANGA | 30 | 70 | 100 |
| | Core 14 | Main 11 | HINDI NATAK AUR AKAGI | 30 | 70 | 100 |
| | Core 15 | Main 12 | HINDI BHASHA | 30 | 70 | 100 |
| | Core 16 (Supportive 4) | Anci 2-2 | HINDI UPANYAS | 30 | 70 | 100 |
| V | Core 17 | Main 13 | NIBANDH AUR RACHANA | 30 | 70 | 100 |
| | Core 18 | Main 14 | PRACHEEN HINDI KAVYA-II | 30 | 70 | 100 |
| VI | Core 19 | Main 15 | SAHITYA SWAROOP AUR VIDHAYEM | 30 | 70 | 100 |
| | Core 20 | Main 16 | NIBANDH TATA ANYA GADHYA VIDAYEN | 30 | 70 | 100 |
| VII | Core 21 | Main 17 | BHSHA VIGYAN | 30 | 70 | 100 |
| VIII | Core 22 | Main 18 | BHARATIYA SAHITYA | 30 | 70 | 100 |

Core 1 - हिन्दी कथा साहित्य - I (कहानी)

पाठ्य विषय

खण्ड : 'क' कहानी की परिभाषा, स्वरूप, तत्व एवं प्रकार, कहानी और अन्य गद्य विधाओं अन्तर, हिन्दी कहानी उद्भव और विकास

खण्ड : 'ख' व्याख्या एवं विवेचन के लिए निर्धारित 'हिंदी की प्रतिनिधि कहानियाँ' सम्पा. डॉ. कृष्णा रैना, वाणी प्रकाशन, नई दिल्ली।

1. उसने कहा था – चंद्रधर शर्मा गुलेरी
2. पूस की रात - प्रेमचंद
3. पुरस्कार – जयशंकर प्रसाद
4. नारंगियाँ - अज्ञेय
5. अकेली – मन्नू भंडारी
6. वापसी – उषा प्रियंवदा

द्वुतपाठ हेतु निम्नलिखित कहानीकारों और उनका कहानियों पर लघुत्तरीय प्रश्न पूछे जाएंगे।

1. करवा का व्रत – यशपाल
2. मलबे का मालिक – मोहन राकेश
3. ऊपर उठता हुआ मकान – कमलेश्वर

अध्ययन के लिए सहायक पुस्तकें

- कहानी स्वरूप और संवेदना, राजेन्द्र यादव, नेशनल पब्लिशिंग हाउस, दिल्ली
- हिन्दी कहानी : उद्भव और विकास, सुरेश सिन्हा अशोक प्रकाशन, इलाहाबाद
- हिन्दी कहानी की शिल्प विधि का विकास, लक्ष्मीनारायण लाल साहित्य भवन, इलाहाबाद
- कहानी नयी कहानी, नामवर सिंह, लोकभारती प्रकाशन, इलाहाबाद
- हिन्दी कहानी का इतिहास, डॉ. लालचन्द्र गुप्त 'मंगल' राधाकृष्ण प्रकाशन दिल्ली
- हिन्दी कहानी का इतिहास, गोपाल राय, राजकमल प्रकाशन दिल्ली

Core 2 - प्रयोजनमूलक हिन्दी- I
(पत्रकारिता, मीडिया लेखन तथा व्याकरण)

पाठ्य विषय

खण्ड : 'क'

- पत्रकारिता : पत्रकारिता का स्वरूप और वर्तमान परिदृश्य, समाचार लेखन, शीर्षकीकरण, पृष्ठ विन्यास
- सम्पादन कला : प्रिंट मीडिया, इलेक्ट्रॉनिक मीडिया, फीचर लेखन, पृष्ठ सजा एवं प्रस्तुतिकरण
- मीडिया लेखन : संचार भाषा का स्वरूप और वर्तमान संचार व्यवस्था
- प्रमुख जनसंचार माध्यम : प्रेस, रेडियो, टी.वी. फिल्म, वीडियो तथा इन्टरनेट
- माध्यमोपयोगी लेखन प्रविधि

खण्ड : 'ख'

- हिंदी की ध्वनियाँ – स्वर और व्यंजन – परिचय तथा वर्गीकरण ।
- संज्ञा, सर्वनाम, विशेषण, क्रिया विशेषण, अव्यय – भेदोपभेद सहित ।
- लिंग और वचन
- कारक
- वाक्य रचना

अध्ययन के लिए सहायक पुस्तकें

- हिन्दी पत्रकारीता विविध आयाम (भाग 1 तथा भाग 2) सम्पा; वेदप्रताप वैदिक, हिन्दी बुक सेंटर, दिल्ली
- पत्रकारिता के विविध रूप, रामचन्द्र तिवारी, आलेख प्रकाशन, दिल्ली
- जन माध्यम और पत्रकारिता (भाग 1 तथा भाग 2) प्रवीण दीक्षित, सहयोगी, साहित्य संस्थान, कानपुर
- जनसंचार माध्यम, सम्प्रेषण और विकास, देवेन्द्र इस्सर, इन्द्रप्रस्थ प्रकाशन, दिल्ली
- प्रयोजनमूलक हिन्दी, विजयपाल सिंह, हिन्दी बुक सेंटर, दिल्ली
- आजीविका साधक हिन्दी, पुरनचन्द्र टण्डन, नमन प्रकाशन, दिल्ली

Core 3 - हिन्दी कथा साहित्य - II (उपन्यास)

पाठ्य विषय

व्याख्या एवं विवेचन के लिए निर्धारित

‘तमस’ – भीष्म साहनी

द्रुतपाठ के लिए निर्धारित

- उपन्यास : परिभाषा, स्वरूप, तत्व एवं प्रकार उपन्यास और अन्य गद्य विधाओं में अन्तर, हिन्दी उपन्यास उद्भव और विकास
- भीष्म साहनी – जीवन और कथा साहित्य तथा उनका जीवन दर्शन

अध्ययन के लिए सहायक पुस्तकें

- प्रेमचन्द और उनका युग - डॉ. रामविलास शर्मा, राजकमल प्रकाशन, दिल्ली
- कथाकार प्रेमचन्द, रामदरश मिश्र, नेशनल पब्लिशिंग हाउस, दिल्ली
- प्रेमचन्द के उपन्यासों का शिल्प विधान, कमलकिशोर गोयनका, सरस्वती प्रेस, दिल्ली
- कलम का सिपाही, अमृतराय हंस प्रकाशन, इलाहाबाद
- काव्य के रूप, गुलाबराय, आत्माराम एण्ड संस, दिल्ली

Core 4 (Supportive 1) - अनुवाद शिक्षण

विषय प्रतिपादन –

भाषा मनुष्य द्वारा स्वीकृत और संप्रेषण व्यवस्था है। अनुवाद और भाषा विज्ञान के संबंधों को रेखांकित करते समय यह ध्यान देना आवश्यक है कि भाषा विज्ञान से अनुवाद का संबंध मूलतः अनुवाद सिद्धांत से स्थापित होता है। अनुवाद मूलतः व्यवहार है और अभ्यास से ही साबित होता है। अनुवाद की विभिन्न परिभाषाओं के आधार पर विभिन्न सिद्धांत प्रतिपादित हुए हैं। निष्कर्ष के तौर पर यही कहा जाता है कि अनुवाद एक सतत अभ्यास की प्रक्रिया है। अभ्यास के साथ-साथ अनुवाद साधन भी है। इसमें जो जितना अभ्यासरत होगा वह उतना ही अधिक सफल एवं कुशल अनुवादक होगा। इन सिद्धांतों की सार्थकता सिद्ध करने के लिए अनुवादक को सुधी पाठक होना चाहिए।

| | | | |
|---------------------|--|---------|---|
| इकाई -1 | अनुवाद शब्द की व्युत्पत्ति अर्थ एवं इतिहास अनुवाद की परिभाषाएँ अनुवाद का महत्व | इकाई -2 | अनुवाद कला है या विज्ञान ? अनुवाद के प्रकार |
| इकाई -3 | अनुवाद के सामान्य सिद्धांत एवं नियम श्रेष्ठ अनुवादक के लक्षण अनुवादक की योग्यताएँ मशीनी अनुवाद का परिप्रेक्ष्य | इकाई -4 | साहित्यिक अनुवाद की समस्याएँ काव्यानुवाद नाट्यानुवाद कथानुवाद |
| इकाई -5 समस्याएँ | साहित्य के अनुवाद में शैली विषयक (मुहावरों और लोकोक्तियों के अनुवाद की समस्याएँ, अलंकारों के अनुवाद की समस्याएँ विज्ञान की पुस्तकों के अनुवाद की समस्याएँ उपन्यास के अनुवाद की समस्याएँ) | इकाई -6 | अनुवाद और भाषा विज्ञान अनुवाद और अनुप्रयुक्त भाषा विज्ञान अनुवाद और व्यतिरेकी भाषा विज्ञान अनुवाद और अर्थ विज्ञान अनुवाद और वाक्य विज्ञान |

संदर्भ ग्रंथ

1. हिन्दी भाषा – डॉ. भोलानाथ तिवारी
2. हिन्दी भाषा का उद्भव और विकास – डॉ. उदयनारायण तिवारी
3. व्यावहारिक हिन्दी – भाषा विज्ञान- शरदा भसीन, मनीषा प्रकाशन, दिल्ली
4. काव्यानुवाद की समस्याएँ – डॉ. भोलानाथ तिवारी
5. अनुवाद सिद्धान्त और समस्याएँ – रविन्द्रनाथ श्रीवास्तव और कृष्णकुमार गोस्वामी आलेख प्रकाशन, दिल्ली
6. व्यावसायिक हिन्दी – सं. डॉ. दिलीपसिंह, द. भा. हि. प्रचार सभा
7. व्यावसायिक हिन्दी – डॉ. भोलानाथ तिवारी, ओलेख प्रकाशन, दिल्ली।
8. अनुवाद विज्ञान – डॉ. भोला नाथ तिवारी – किताब घर प्रकाशन-, 24/4855, अंसारी रोड दरियांगज, नई, दिल्ली-110 002
9. अनुवाद कला, डॉ. एन. ई. विश्वनाथ अय्यर, प्रकाश प्रकाशन, 4/19, आसिफ-अली रोड, नई दिल्ली – 110 002
10. अनुवाद विज्ञान: सिद्धांत एवं अनुप्रयोग- डॉ. नरेंद्र, हिन्दी माध्यम कार्यालय निदेशालय, दिल्ली विश्वविद्यालय, दिल्ली – 110 007

11. अनुवाद : सिद्धांत और प्रयोग – जी. गोपीनाथन, लोकभारती प्रकाशन, पहली मंजिल, महात्मा गाँधी मार्ग, सिविल लाइंस, इलाहाबाद,- 211 001
12. अनुवाद विज्ञान की भूमिका – कृष्ण कुमार गोस्वामी, राजकमल प्रकाशन, प्राइवेट लिमिटेड, 1 बी. नेताजी सुभाष मार्ग, दरिया गंज, नई दिल्ली-110 002.
13. अनुवाद की समस्याएँ – श्री. गोपीनाथन, एस. कंदस्वामी, लोकभारती प्रकाशन, पहली मंजिल, महात्मा गाँधी मार्ग, सिविल लाइंस, इलाहाबाद,- 211 001.
14. अनुवाद के भाषिक पक्ष – निभा गुप्ता, वाणी प्रकाशन, 21-ए, दयानाद मार्ग, दरिया गंज, नई दिल्ली-110 002.
15. भारतीय भाषाएँ और हिन्दी अनुवाद, एवं समस्य समाधान – (सं) कैलाश, चन्द्र भाटिया, वाणी प्रकाशन, 21-ए, दयानाद मार्ग, दरिया गंज, नई दिल्ली-110 002.
16. अनुवाद क्या है – डॉ. राजमल बोरा- वाणी प्रकाशन, 21-ए, दयानाद मार्ग, दरिया गंज, नई दिल्ली-110 002.
17. अनुवाद विज्ञान सिद्धांत एवं प्रविधि - भोला नाथ तिवारी – किताब घर प्रकाशन-, 24/4855, अंसारी रोड दरियागंज, नई, दिल्ली-110 002.
18. अनुवाद सिद्धांत एवं व्यवहार- डॉ. जयन्ती प्रसाद नौटियाल, राधाकृष्ण प्रकाशन, 1 बी. नेताजी सुभाष मार्ग, दरिया गंज, नई दिल्ली-110 002.
19. अनुवाद अवधारणा एवं विमर्श – श्रीनारायण खमीर - लोकभारती प्रकाशन, पहली मंजिल, महात्मा गाँधी मार्ग, सिविल लाइंस, इलाहाबाद,- 211 001.
20. अनुवाद का व्याकरण – (सं) डॉ. गार्गी गुप्त, डॉ. लोकनाथ तिवारी, भारतीय अनुवाद परिषद्, 24 स्कूल लेन, बेससेन्ट, बंगाली मार्केट, नई दिल्ली-110 001.
21. अनुवाद भाषाएँ – समास्याएँ – एन. ई. विश्वनाथ अय्यर, ज्ञानगंगा, 205-सी चावडी बाज़ार, दिल्ली – 110 006.
22. अनुवाद प्रक्रिया एवं व्यावहारिकता – संतोष अलेक्स, Authorspress, Q-2A Hauz Khas, New Delhi.
23. Approaches to translation : Peter New Mark, Shanghai Foreign Language Education press, 558 Dalian W. road, Luxun Gong Yuan, Hongkow Qu., Shanghai Shi, China.
24. Essay on the Principle of Translation : A.F. Tylter, London : J.M. Dent and Co., New York : D.P. Dutton and Co.
25. Translation and Interpreting : R. Gargesh, K.K. Goswami, Orient Blackswan Pvt. Ltd., Shop No. : 1/24, Asaf Ali Road, Kucha Pati Ram Chandni Chowk, New Delhi, 110 006.
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Core 5 - प्रयोजनमूलक हिन्दी -II (कामकाजी हिन्दी और अनुवाद)

पाठ्य विषय

- प्रयोजनमूलक हिन्दी का अभिप्राय
- कामकाजी हिन्दी

पत्राचार : कार्यालयी पत्र, व्यावसायिक पत्रा, व्यावहारिक पत्र, संक्षेपण, पल्लवन, प्रारूपण, टिप्पण
भाषा कंप्यूटिंग : वर्ड प्रोसेसिंग, डाटा प्रोसेसिंग और फांट प्रबंधन
अनुवाद : स्वरूप और प्रक्रिया, कार्यालयी अनुवाद, वैज्ञानिक अनुवाद, तकनीकी अनुवाद, वाणिज्यिक अनुवाद, विधिक अनुवाद, परिभाषिक शब्दावली, वैटरिंग, आशु अनुवाद

अध्ययन के लिए सहायक पुस्तकें

- प्रयोजनमूलक हिन्दी, विजयपाल सिंह, हिन्दीबुक सेंटर, दिल्ली
- प्रयोजनमूलक हिन्दी, सम्पा. रवीन्द्रनाथ श्रीवास्तव, केन्द्रीय हिन्दी संस्थान, आगरा
- प्रयोजनमूलक कामकाजी हिन्दी डॉ. कैलाशचन्द्र भाटिया तक्षशिला प्रकाशन, दिल्ली
- अनुवाद विज्ञान, भोलानाथ तिवारी, शब्दाकार प्रकाशन, दिल्ली
- अनुवाद कला, डॉ. एन.ई. विश्वनाथ अय्यर, प्रभात प्रकाशन, दिल्ली
- अनुवाद समस्या एवं समाधान, डॉ. अर्जुन चण्हाण, अमनप्रकाशन रामबान, कानपुर
- अनुवाद : कला सिद्धान्त और प्रयोग, डॉ. कैलाशचन्द्र भाटिया, तक्षशिला प्रकाशन नई, दिल्ली

Core 6 - आधुनिक हिन्दी काव्य - I

पाठ्य विषय

‘हिन्दी भारती’ सम्पादक डॉ. शशिशेखर तिवारी, नेशनल पब्लिशिंग हाउस, 23, दरियागंज, नई दिल्ली (व्याख्या तथा आलोचनात्मक प्रश्नों के लिए निम्नलिखित तीन कवियों एवं उनकी कविताओं का अध्ययन किया जायेगा)

1. मैथिलीशरण गुप्त - ‘मातृभूमि’, राहुल-जननी’, ‘दोनों अप्रेम पलता है’, बहुजन-हिताय बहुजन-सुखाय’, ‘विश्वराज्य’
 2. जयशंकर प्रसाद - ‘तू बनकर प्रान समा जा रे’, ‘हिमाद्रि-तुंग श्रुंग से’, अरुण यह मधुमय देश हमारा’, ‘श्रद्धा’, ‘शिखर पर’
 3. सूर्यकान्त त्रिपाठी निराला - ‘वर दे वीणा वादिनी वर दे’, ‘जागो फिर एक बार’, ‘वह तोड़ती पत्थर’, ‘मानव जहाँ बैल-घोड़ा हैं’, ‘स्नेह निर्झर बह गया है’ द्रुत पाठ हेतु निम्नलिखित दो कवि जिनसे लघुत्तरी प्रश्न पूछे जायेंगे
1. सुमित्रानन्दन पंत
 2. महादेवी वर्मा

अध्ययन के लिए सहायक पुस्तकें

- आधुनिक हिन्दी कविता की प्रवृत्तियाँ - डॉ. नामवर सिंह, लोकभारती प्रकाशन, इलाहाबाद
- आधुनिक साहित्य की प्रवृत्तियाँ - डॉ. नगेन्द्र, नेशनल पब्लिशिंग हाउस, दिल्ली
- छायावाद के आधार स्तम्भ डॉ. गंगा प्रसाद, पाण्डेय लिपि प्रकाशन, नई दिल्ली
- हिन्दी के प्रतिनिधि कवि, डॉ. द्वारिका प्रसाद सक्सेना, विनोद पुस्तक मन्दिर, आगरा
- आधुनिक कवि: निराला, रघुवंश, लोकभारती प्रकाशन, इलाहाबाद
- प्रसाद का काव्य, प्रेमशंकर, वाणी प्रकाशन, दिल्ली
- छायावाद की परम्परा, श्याम किशोर मिश्र, लोकभारती प्रकाशन, इलाहाबाद

Core 7 - हिन्दी साहित्य का इतिहास - I (रीतिकाल तक)

पाठ्य विषय

- हिन्दी साहित्य का इतिहास : काल विभाजन, सीमानिर्धारण और नामकरण
- आदिकाल की पृष्ठभूमि, आदिकाल की विशेषतायें, प्रतिनिधि रचनाकार और उनकी रचनाएँ
- पूर्वमध्यकाल (भक्तिकाल) की पृष्ठभूमि, भक्ति के उद्भव के कारण, भक्तिकाल की विभिन्न काव्यधाराएँ (सन्तकाव्यधारा, सूफिकाव्यधारा, रामकाव्यधारा, कृष्णकाव्य धारा) की विशेषतायें, प्रतिनिधि रचनाकार और उनकी रचनायें ।
- उत्तरमध्यकाल (रीतिकाल) की ऐतिहासिक पृष्ठभूमि, नामकरण की समस्या, रीतिकालीन साहित्य की विभिन्न काव्यधारायों (रीतिबद्ध, रीतिसिद्ध और रीतिमुक्त) की विशेषतायें, प्रतिनिधि रचनाकार और उनकी रचनायें

अध्ययन के लिए सहायक पुस्तकें

- हिन्दी साहित्य का सुबोध इतिहास, बाबू गुलाबराय प्रकाशक लक्ष्मीनारायणलाल अग्रवाल, आगरा
- हिन्दी साहित्य का इतिहास, आचार्य रामचन्द्र शुक्ल, नागरी प्रचारणी सभा, वाराणसी
- हिन्दी साहित्य उद्भव और विकास, आचार्य हजारीप्रसाद द्विवेदी, राजकमल प्रकाशन, दिल्ली
- हिन्दी साहित्य का इतिहास सम्पा. डॉ. नगेन्द्र, नेशनल पब्लिशिंग हाउस, दिल्ली
- हिन्दी साहित्य का वैज्ञानिक इतिहास, गणपति चन्द्र गुप्त, लोकभारती प्रकाशन, इलाहाबाद
- हिन्दी साहित्य का इतिहास, विजयेन्द्र स्नातक, साहित्य अकादमी, दिल्ली

Core 8 (Supportive 2) – राजभाषापीशिक्षण

पुसितावना –

कार्यालय हिन्दी का एक नया स्वरूप इधर विकसित हुआ है। इसका व्यवस्थित ण, पूरित कर लेने पर रोजगार की संभावनाओं में अभिवृद्धि होगी और राजभाषा का स्तरोन्नयन भी होगा।

पाठ्यविषय

- प्रशासन – व्यवस्था और भाषा
- भारत की बहुभाषिकता और एक संपर्क भाषा की आवश्यकता
- राजभाषा : कार्यालयीन हिन्दी की प्रकृति।

इकाई -2

- राजभाषा विषयक संवैधानिक प्रवधान
- राजभाषा अधिनियम अनुच्छेद 343 से 351 तक, राष्ट्रपति के आदेश 1952, 1955, 1960 राजभाषा अधिनियम 1963 यथा संशोधित 1967, राजभाषा संकल्प 1968 यथानुमोदित 1969, राजभाषा नियम 1976, द्विभाषी नीति और त्रिभाषा सूत्र। हिन्दीतर राज्यों के प्रशासनिक क्षेत्रों में हिन्दी की स्थिति। अंतरराष्ट्रीय स्तर पर हिन्दी। हिन्दी के प्रचार प्रसार में विभिन्न हिन्दी संस्थाओं की भूमिका। हिन्दी और देवनागरी लिपि के मानकीकरण की समस्या।
- राजभाषा का अनुप्रयोगात्मक पक्ष हिन्दी आलेखन, टिप्पणी, संक्षेपण तथा पत्राचार।
- कार्यालयी अभिलेखों के हिन्दी अनुवाद की समस्या।
- हिन्दी कम्प्यूटीकरण
- हिन्दी में संक्षेपताक्षर और कूटपद निर्माण।
- हिन्दी में वैज्ञानिक और तकनीकी परिभाषिक शब्दावली।
- केन्द्र एवं राज्य शासन के विभिन्न मंत्रालयों में हिन्दी अनुप्रयोग की स्थिति।
- विविध क्षेत्र में हिन्दी।
- सूचना प्रौद्योगिक संचार माध्यमों के परिप्रेक्ष्य में हिन्दी और देवनागरी लिपि।
- भूमंडलीकरण के परिप्रेक्ष्य में हिन्दी का भविष्य।

संदर्भ ग्रंथ –

1. प्रयोजनमूलक हिंदी – डॉ. रामप्रकाश और दिनेश गुप्त
2. प्रशासनिक हिन्दी- डॉ. रामप्रकाश और दिनेश गुप्त
2. प्रयोजनमूलक हिंदी – डॉ.विनोद गोदरे
3. हिंदी में सरकारी कामकाज – डॉ. रामविनायक सिंह, हिन्दी प्रचारक संस्थान सी २१/३०, पिशाचमोचन, वारणासी
4. सरकारी कार्यालयों में हिंदी का प्रयोग – गोपीनाथ श्रीवास्तव, लोक भारती, इलाहाबाद
5. कार्यालयीन हिन्दी – कार्मिक एवं प्रशासनिक विभाग, गृह मंत्रालय, भारत सरकार
6. हिंदी आलेख और टिप्पणी – प्रो. विराज
7. अनुवाद कला – डॉ. विश्वनाथ अय्यर, प्रभात प्रकाशन, दिल्ली
8. अनुवाद कला सिद्धान्त और प्रयोग – कैलेशचन्द्र भाटिया, तक्ष्यशिला प्रकाशन, दिल्ली
9. अनुवाद सिद्धान्त और समस्याएं – रविन्द्रनाथ श्रीवास्तव और कृष्णाकुमार गोखगी – आप्रकाशन, दिल्ली
10. कार्यालयी अनुवाद की समस्यायें – भोलानाथ तिवारी, कृष्णकुमार गोस्वामी तथा गुलाटी.
11. अनुवाद – अवधारणा और अनुप्रयोग – चंद्रभानु रावत और दिलीपसिंह-द.भा. हिन्दी प्रचारसभा, चेन्नै
12. अनुप्रयुक्त भाषाविज्ञान – सं. श्रीवास्तव तिवारी और गोस्वामी-आलेख प्रकाशन, दिल्ली
13. व्यतिरेकी – भाषाविज्ञान – डॉ. भोलनाथ तिवारी आलेख प्रकाशन, दिल्ली
14. व्यतिरेकी भाषाविज्ञान – डॉ. विजयराधव रेड्डी, विनोद पुस्तक मंदिर, आगरा
15. अनुवाद विज्ञान – डॉ. भोलनाथ तिवारी, शब्दकार प्रसकाशन, गुरु अंगद नगर, दिल्ली
16. अनुवाद स्वरूप और आयाम – संपा. डॉ. त्रीभुवन राय, अनिल प्रकाशन, आलोपीबाग काकोनी, इलाहाबाद
17. कम्प्यूटर के भाषिक अनुप्रयोग- विजयकुमार मल्होत्रा
18. कम्प्यूटर और हिन्दी - हरिमोहन

Core 9 आधुनिक हिन्दी काव्य- II

पाठ्य विषय

‘हिन्दी भारती’ सम्पा. डॉ. शशिशेखर तिवारी, नेशनल पब्लिशिंग हाउस 23 दरियागंज नई दिल्ली व्याख्या तथा आलोचनात्मक प्रश्नों के लिए निम्नलिखित तीन कवियों एवं उनकी कविताओं का अध्ययन किया जाएगा

1. रामधारी सिंह दिनकर - ‘हिमालय के प्रति’, ‘बापू’, ‘चाँद और कवि’, ‘आशा की वंशी’
2. नागार्जुन - ‘वे और तुम’, ‘बहुत दिनों के बाद’, ‘कालिदास’, ‘अकाल और उसके बाद’
3. अज्ञेय - ‘हमारा देश’, ‘नदी के द्वीप’, ‘यह दीप अकेला’, ‘पत्थर का घोड़ा’, ‘सागर मुद्रा’

द्वितीय पाठ हेतु निम्नलिखित दो कवि जिनसे लघुत्तरी प्रश्न पूछे जायेंगे

1. धर्मवीर भारती
2. धूमिल

अध्ययन के लिए सहायक पुस्तकें

- दिनकर, डॉ. सावित्री सिन्हा, राजपाल एण्ड संस, दिल्ली
- दिनकर: एक पुनर्मूल्यांकन, डॉ. विजेयन्द्रनारायण सिंह, परिमल प्रकाशन, इलाहाबाद
- अज्ञेय और आधुनिक रचना की समस्या, रामस्वरूप चतुर्वेदी, भारतीय ज्ञानपीठ प्रकाशन, दिल्ली
- कविता के नये प्रतिमान, नमवर सिंह, राजकमल प्रकाशन, दिल्ली
- धर्मवीर भारती की साहित्य साधना, पुष्पा भारती, भारतीय ज्ञानपीठ प्रकाशन, दिल्ली
- धूमिल की काव्य यात्रा, मंजू अग्रवाल, ग्रन्थम प्रकाशन, कानपुर
- नागार्जुन-जीवन और साहित्य, प्रकाशचन्द्र भट्ट सेवासदन प्रकाशन, मंदसौरा

Core 10 - हिन्दी साहित्य का इतिहास - II (आधुनिक काल)

पाठ्य विषय

- आधुनिक काल की सामाजिक, राजनैतिक पृष्ठभूमि
- भारतेन्दु युग, द्विवेदी युग, छायावाद, प्रगतिवाद, प्रयोगवाद नयी कविता, समकालीन कविता की विशेषतायें, प्रमुख साहित्यकार और रचनाएँ
- हिन्दी गद्य की प्रमुख विधाओं (कहानी, उपन्यास, एकांकी, नाटक निबंध, रेखाचित्र, आलोचना संस्मरण, जीवनी, आत्मकथा, रिपोर्ताज) का उद्भव और विकास, प्रमुख साहित्यकार और रचनायें

अध्ययन के लिए सहायक पुस्तकें

- हिन्दी साहित्य का इतिहास, आचार्य रामचन्द्र शुक्ल, नागरी प्रचारिणी सभा, वाराणसी
- हिन्दी साहित्य का इतिहास सम्पा. डॉ. नगेन्द्र, नेशनल पब्लिशिंग हाउस, दिल्ली
- आधुनिक हिन्दी साहित्य का इतिहास, बच्चनसिंह, लोकभारती प्रकाशन, इलाहाबाद
- हिन्दी साहित्य का वैज्ञानिक इतिहास, डॉ. गणपतिचन्द्र गुप्त, भारतेन्दुभवन, चण्डीगढ़
- हिन्दी साहित्य का सुबोध इतिहास, बाबू गुलाबराय, प्रकाशक लक्ष्मीनारायण लाल अग्रवाल, आगरा
- हिन्दी साहित्य और संवेदना का विकास, रामस्वरूप चतुर्वेदी, लोकभारती प्रकाशन, इलाहाबाद
- हिन्दी साहित्य: विधाएँ और दिशाएँ, शशिभूषण सिंहल, प्रवीण प्रकाशन, महरौली दिल्ली

Core 11 - प्राचीन हिन्दी काव्य - I

पाठ्य विषय

- 'काव्य संचयन' सम्पा. डॉ. चमनलाल गुप्ता, वाणी प्रकाशन, नई दिल्ली
 - व्याख्या एवं आलोचनात्मक प्रश्नों के लिए निम्नलिखित तीन कवियों का अध्ययन किया जायेगा
1. विद्यापति – पद संख्या 1,4,5,6,10
 2. कबीर – ज्ञान विरह को अंग, परचा को अंग, सबद - 1 से 12 तक
 3. जायसी – बनिजारा खण्ड, कथा का आध्यात्मिक रूपक कवि की अन्तिम विनय

द्वुतपाठ हेतु निम्नलिखित 4 कवियों जिनसे लघुत्तरी प्रश्न पूछे जायेंगे

1. चंद बरदाई
2. अमीर खुसरो
3. गुरु नानक देव
4. रैदास

अध्ययन के लिए सहायक पुस्तकें

- कबीर, हजारीप्रसाद द्विवेदी, राजकमल प्रकाशन, नई दिल्ली
- सूरदास, ब्रजेश्वर वर्मा, हिन्दी साहित्य परिषद, प्रयाग
- गोस्वामी तुलसीदास, रामचन्द्रशुक्ल, नगरी प्रचारिणी सभा, काशी
- हिन्दी के प्राचीन प्रतिनिधि कवि, द्वारिकाप्रसाद सक्सेना, विनोदपुस्तक मन्दिर, आगरा
- प्राचीन हिन्दी काव्य - डॉ. ओमप्रकाश, राधाकृष्ण प्रकाशन, दिल्ली

Core 12 (Supportive 3) – कथाकार प्रेमचंद

पाठ्य विषय

- खण्ड : क
 1. प्रेमचन्द का व्यक्तित्व और कृतित्व, प्रेमचन्द का जीवन दर्शन, प्रेमचन्द का हिन्दी कथा साहित्य में पदार्पण, प्रेमचन्द के कथा साहित्य का विकास, प्रेमचन्द के साहित्य की विशेषतायँ और उपलब्धियाँ।
- खण्ड : ख व्याख्या एवं विवेचन के लिए निर्धारित उपन्यास और कहानियाँ
- उपन्यास
 1. सेवासदन
 2. प्रतिज्ञा
- कहानियाँ

| | |
|------------------|--------------------|
| 1. नमक का दारोगा | 2. बड़े घर की बेटी |
| 3. रामलीला | 4. आत्माराम |
| 5. ठाकुर का कुआँ | 6. दो बैलो की कथा |
| 7. पंचपरमेश्वर | 8. परीक्षा |

(प्रेमचन्द : प्रतिनिधि कहानियाँ सम्पा. भीष्म साहनी, राजकमल प्रकाशन दिल्ली)

अध्ययन के लिए सहायक पुस्तकें

- प्रेमचन्द विश्वकोश (भाग 1 तथा भाग 2) कमलकिशोर गोयनका, प्रभात प्रकाशन दिल्ली
- प्रेमचन्द और उनका युग, रामविलास शर्मा, राजकमल प्रकाशन दिल्ली
- प्रेमचन्द के उपन्यासों का शिल्प विधान, कमलकिशोर गोयनका, सरस्वती प्रेस दिल्ली
- प्रेमचन्द का कथा संसार, सम्पा. नरेन्द्र मोहन, सरस्वती विहार शाहदरा दिल्ली
- कथाकार प्रेमचन्द, रामदरश मिश्र, नेशनल पब्लिशिंग हाउस दिल्ली
- प्रेमचन्द के साहित्य सिद्धान्त, नरेन्द्र कोहली, अशोक प्रकाशन दिल्ली
- प्रेमचन्द आज के सन्दर्भ में, गंगाप्रसाद विमल, राजकमल प्रकाशन दिल्ली
- कलम का सिपाही, अमृतराय, हंस प्रकाशन इलाहाबाद
- प्रेमचन्द : जीवन कला और कृतित्व, हंसराज रहबर, साक्षी प्रकाशन शाहदरा दिल्ली

Core 13 - काव्यांग

पाठ्य विषय

- काव्य का स्वरूप, काव्य हेतु एवं प्रयोजन
- रस का स्वरूप, रस के विभिन्न अंग, रस का काव्य में महत्व, रस के विभिन्न भेद
- शब्दशक्ति : अभिधा, लक्षणा, व्यंजना
- अलंकार : अलंकार के लक्षण, अलंकारों के भेद, अलंकारों का काव्य में महत्व अनुप्रास, यमक, श्लेष,
- वक्रोक्ति, उपमा, रूपक व्यतिरेक, उत्प्रेक्षा, अतिशयोक्ति, अन्योक्ति
- छन्द : छन्द के लक्षण, छन्द के भेद, छन्द के विभिन्न अंग, छन्द का काव्य में महत्व, दोहा, चोपाई, छप्पय, कुण्डलिया, रोला मालिनी, बसंततिलका, इन्द्रवज्रा, उपेन्द्रवज्रा, मतगयंद सवैय । बिम्ब, प्रतीक कल्पना एवं मिथक

अध्ययन के लिए सहायक पुस्तकें

- काव्यांग विवेक - देवेन्द्र त्यागी, राधावृष्टण प्रकाशन, दिल्ली
- भारतीय काव्यशास्त्र के प्रतिमान, डॉ. जगदीश प्रसाद कौशिक, साहित्यगार, जयपुर
- काव्यसिद्धान्त - डां ओमप्रकाश शास्त्री, आर्यबुक डिपो करोलबाग, नई दिल्ली
- छन्दोलंकार प्रदीप - डॉ. संसारचन्द्र, उमेश प्रकाशन, नई सड़क, दिल्ली
- काव्य के अंग - लक्ष्मण दत्त गौतम, भारतपुस्तक भण्डार, दिल्ली
- भारतीय काव्य चिन्तन :शोभाकान्त मिश्र, अनुपम प्रकाशन, पटना

Core 14 - हिन्दी नाटक और एकांकी

पाठ्य विषय

- व्याख्या एवं विवेचन के लिए निर्धारित नाटक एवं एकांकी
 - i) नाटक - 'ध्रुवस्वामिनी' - जयशंकर प्रसाद
 - ii) एकांकी- 'सात एकांकी' - सम्पा. डॉ. सूर्यप्रसाद दीक्षित, प्रका- अमन प्रकाशन 104A/118
रामबाग, कानपुर - 12
- 1. कौमुदी महोत्सव - डॉ. रामकुमार वर्मा
- 2. पतित - भुवनेश्वर
- 3. सूखीडाली - उपेन्द्रनाथ अशक
- 4. सीमारेखा - विष्णु प्रभाकर
- 5. भोर का तारा - जगदीशचन्द्र माथुर

अध्ययन के लिए सहायक पुस्तकें

- प्रसाद : नाट्य और रंगशिल्प, डॉ. गोविन्द चातक, आत्माराम एण्ड संस, दिल्ली
- प्रसाद के नाटक, डॉ. सिद्धनाथ कुमार, दि मैकमिलन कम्पनी ऑफ इण्डिया लि., दिल्ली
- हिन्दी साहित्य का बृहत इतिहास (एकादश भाग) डॉ. सावित्री सिन्हा, नागरी प्रचारिणी सभा, वाराणसी
- हिन्दी के प्रतिनिधि एकांकीकार, डॉ. द्वारिकाप्रसाद सक्सेना, शारदा प्रकाशन, दिल्ली
- हिन्दी एकांकी साहित्य - डॉ. सत्येन्द्र, साहित्यरत्न भण्डार, आगरा
- हिन्दी एकांकी की शिल्पविधि का विकास, डॉ. सिद्धनाथ कुमार इन्द्रप्रस्थ प्रकाशन, दिल्ली

Core 15 - हिन्दी भाषा

पाठ्य विषय

- हिन्दी भाषा का उद्भव और विकास
- प्राचीन भारतीय आर्य भाषाएँ
- वैदिक तथा लौकिक संस्कृत और उनकी विशेषतायें
- मध्यकालीन भारतीय आर्य भाषाएँ - पाली, प्राकृत और अपभ्रंश तथा उनकी विशेषताएँ
- आधुनिक भारतीय आर्य भाषाएँ और उनकी विशेषताएँ
- हिन्दी की उपभाषाएँ
- पश्चिमी हिन्दी, पूर्वी हिन्दी, राजस्थानी, पहाड़ी तथा बिहारी और उनकी बोलियों का परिचय
- हिन्दी शब्द रचना : उपसर्ग, प्रत्यय, समास
- हिन्दी के विविध रूप : सम्पर्क भाषा, राष्ट्रभाषा और राजभाषा के रूप में हिन्दी । हिन्दी की सांविधानिक स्थिति, हिन्दी का अंतरराष्ट्रीय सन्दर्भ ।
- देवनागरी लिपि : उद्भव और विकास, देवनागरी लिपि की वैज्ञानिकता, देवनागरी की त्रुटियाँ और सुधार

अध्ययन के लिए सहायक पुस्तकें

- हिन्दी भाषा का उद्भव और विकास, डॉ. उदयनारायण तिवारी, भारतीभण्डार, इलाहाबाद
- हिन्दी भाषा की संरचना, भोलानाथ तिवारी, राजकमल प्रकाशन, वाराणसी
- भारतीय आभाषाएँ और हिन्दी, सुनिति कुमार चटर्जी, राजकमल प्रकाशन, दिल्ली
- भाषा विज्ञान की भूमिका, देवेन्द्रनाथ शर्मा, राधाकृष्ण प्रकाशन, दिल्ली
- भाषा विज्ञान, भोलानाथ तिवारी, किताब महल, इलाहाबाद
- नगरी लिपि उद्भव और विकास, डॉ. ओमप्रकाश, आर्यबुक डिपो, दिल्ली
- हिन्दी भाषा उद्भव और विकास, निखिल कुमार दुबे, जवाहर प्रकाशन, दिल्ली

Core 16 (Supportive 4) – हिन्दी उपन्यास

पाठ्य विषय

खण्ड : क - उपन्यास की परिभाषा और स्वरूप, हिन्दी उपन्यास का उद्भव और विकास, हिन्दी उपन्यास की प्रमुख शैलियाँ, हिन्दी के प्रतिनिधि उपन्यासकारों का वस्तुशिल्पगत वैशिष्ट्य ।

खण्ड : ख - व्याख्या एवं विवेचन के लिए निर्धारित उपन्यास

1. कर्मभूमि - प्रेमचन्द
2. मृगनयनी - वृन्दावनलाल वर्मा
3. सुनिता – जैनेन्द्र

द्वुतपाठ हेतु निम्नलिखित पाँच कवियों पर लघुत्तरी / अति लघुत्तरी प्रश्न पूछे जायेंगे

1. बाणभट्ट की आत्मकथा (हजारी प्रसाद द्विवेदी)
2. बलचनमा (नागार्जुन)
3. वे दिन (निर्मल वर्मा), 4. आपका बंटी (मन्नू भण्डारी), 5. सूरज का सातवाँ घोड़ा (धर्मवीर भारती)

अध्ययन के लिए सहायक पुस्तकें

- हिन्दी उपन्यास का इतिहास, गोपालराय, राजकमल प्रकाशन दिल्ली
- हिन्दी उपन्यास, डॉ. सुरेश सिन्हा, लोकभारती प्रकाशन, इलाहाबाद
- हिन्दी उपन्यास - डॉ. सुषमा धवन, राजकमल प्रकाशन दिल्ली
- प्रेमचन्द के उपन्यासों का शिल्प विधान, डॉ. कमल किशोर गोयनका, सरस्वती प्रेस, दिल्ली
- आधुनिक हिन्दी उपन्यास, सम्पा. भीष्म साहनी, राजकमल प्रकाशन दिल्ली
- वृन्दावनलाल वर्मा : उपन्यास और कला, शिवकुमार मिश्र, किताबघर कानपुर
- जैनेन्द्र और उनके उपन्यास - परमानन्द श्री वास्तव, मैकमिलन प्रकाशन, दिल्ली
- हिन्दी उपन्यास की प्रवृत्तियाँ, शशिभूषण सिंहल, विनोद पुस्तक मन्दिर आगरा

Core 17 - निबन्ध और रचना

पाठ्य विषय

- निबन्ध लेखन
 - i) साहित्यिक निबंध
 - ii) सामान्य निबंध
 - सार लेखन (Precise Writing)
 - कथा विस्तार (Story Elaboration)
(संकेत बिन्दुओं पर आधारित किसी कथा का विस्तार करना होगा)
 - पाठ बोधन (Comprehension)
 1. अपठित गद्यांश
 2. अपठित काव्यांश
- (अपठित गद्यांश एवं काव्यांश दोनों में से शीर्षक का चुनाव, विषयवस्तु का बोध, भाषिक बिन्दुओं। विशेषताओं आदि पर 5-5 अतिलघुत्तरी प्रश्न पूछे जायेंगे)

अध्ययन के लिए सहायक पुस्तकें

- निबन्ध सौरभ, तनसुखराम गुप्त, सूर्य भारती प्रकाशन, नई सड़क, दिल्ली 6
- निबन्ध सम्राट, श्रीशरण आधुनिक प्रकाशन मौजपुर, दिल्ली 53
- साहित्यिक निबन्ध, राजनाथ शर्मा, विनोद पुस्तक मन्दिर, आगरा
- साहित्यिक निबंध, रमेशचन्द्र शर्मा, अमन प्रकाशन, रामबाग, कानपुर
- व्यावहारिक हिन्दी और रचना, कृष्ण कुमार गोस्वामी, दि.वि. इन्टरनेशनल प्रकाशन दरियागंज, दिल्ली
- हिन्दी संक्षेपण, पल्लवन और पाठबोधन, डॉ. हरदेव बाहरी, ज्ञान भारती पुराना कटरा, इलाहाबाद

Core 18 - प्राचीन हिन्दी काव्य -II

पाठ्य विषय

‘काव्य संचयन’ सम्पादक – डॉ. चमन लाल गुप्ता, वाणी प्रकाशन, नई दिल्ली

1. सूरदास – विनय तथा भक्ति
2. तुलसीदास – वर्षा वर्णन, अजेयरथ, विनय पत्रिका, कवितावली
3. बिहारी – भक्तिभावना – 1 से 20 दोहे, श्रृंगार 41 से 56 दोहे, प्रकृति – 57 से 59 दोहे

द्रुतपाठ हेतु निम्नलिखित चार कवियों से लघुत्तरी प्रश्न पुछे जायेंगे

1. मीराबाई
2. पद्माकर
3. धनानन्द
4. भूषण

अध्ययन के लिए सहायक पुस्तकें

- हिन्दी के प्राचीन प्रतिनिधि कवि द्वारिका प्रसाद सक्सेना, विनोद पुस्तक मन्दिर, आगरा
- प्राचीन हिन्दी काव्य - डॉ. ओमप्रकाश, राधाकृष्ण प्रकाशन, दिल्ली
- रीतिकाव्य की भूमिका - डॉ. नगेन्द्र, नेशनल पब्लिशिंग हाउस, दिल्ली
- बिहारी काव्य का नया मूल्यांकन - डॉ. बच्चन सिंह, हिन्दी प्रचारक संस्थान, वाराणसी
- देव और बिहारी, कृष्णबिहारी मिश्र, गंगा पुस्तक माला कार्यालय, लखनऊ
- धनानन्द का काव्य, रामदेव शुक्ल, मैकमिलन कम्पनी ऑफ इंडिया लि., दिल्ली

Core 19 - साहित्य: स्वरूप और विधाएँ

पाठ्य विषय

(क) साहित्य का अर्थ, परिभाषा, साहित्य के तत्व

साहित्य और समाज

(ख) साहित्य की विविध विधाएँ : परिभाषा, तत्व, स्वरूप तथा प्रकार

दृश्यकला - नाटक, एकांकी

श्रव्यकला - पद्य, गद्य और चम्पू

पद्य - प्रबन्धकाव्य, मुक्तककाव्य

गद्य - उपन्यास, कहानी, निबन्ध, आलोचना, जीवनी,

रेखाचित्रा, आत्मकथा, संस्मरण, यात्रावृतान्त, रिपोर्ताज, डायरी

अध्ययन के लिए सहायक पुस्तकें

- काव्य के रूप, गुलाबराय, आत्माराम एण्ड संस कश्मीरी गेट दिल्ली
- साहित्य रूप, रामअवध द्विवेदी, भारती भण्डार, इलाहाबाद
- साहित्य तथा उसकी विविध विधाएँ, तारिणीचरणदास चिदानन्द, हिन्दी बुक सेंटर, दिल्ली
- हिन्दी साहित्य : विधाएँ और दिशाएँ, शशिभूषण सिंहल, प्रवीण प्रकाशन महरौली, नई दिल्ली
- हिन्दी साहित्य, भोलानाथ तिवारी, हिन्दी परिषद, प्रकाशन, प्रयाग
- आधुनिक गद्य की विविध विधाएँ, उदय भानु सिंह, वाणी प्रकाशन, दिल्ली
- साहित्यिक विधाएँ : पुनर्विचार, हरिमोहन, वाणी प्रकाशन, दिल्ली
- साहित्य में गद्य की नई विविध विधाएँ, कैलाशचन्द्र भाटिया, तक्षशिला प्रकाशन, दिल्ली
- हिन्दी गद्य प्रकृति और रचना सन्दर्भ, रामचन्द्र तिवारी, विश्वविद्यालय प्रकाशन, वाराणसी

Core 20 - निबन्ध तथा अन्य गद्म विधाएँ

पाठ्य विषय

‘निबंधायन’ सम्पा. डॉ. केशवदन्त रुवाली प्रका. विनोद पुस्तक मन्दिर रांगेय राघव मार्ग, आगरा - 2
व्याख्यात्मक एवं आलोचनात्मक प्रश्नों के लिए निम्नलिखित पाँच निबन्धों का अध्ययन किया जायेगा

1. आत्मगौरव - बालकृष्ण भट्ट
2. लज्जा और ग्लानि - रामचन्द्र शुक्ल
3. कुटज - हजारी प्रसाद द्विवेदी
4. नीलकंठ - हरिशंकर परसाई
5. बेतवा के तीर पर - विद्यानिवास मिश्र

द्वितीय पाठ के लिए निम्नलिखित तीन गद्यकार जिनसे लघुत्तरी प्रश्न पूछे जायेंगे

1. सरदार पूर्ण सिंह (मजदूरी और प्रेम)
2. राहुल सांकृत्यायन (यथातो घुकम्मड जिज्ञासा)
3. महादेवी वर्मा (सोना)

अध्ययन के लिए सहायक पुस्तकें

- हिन्दी साहित्य का बृहत् इतिहास (त्रायोदश भाग) सम्पा. लक्ष्मीनारायण संधाशु प्रका., नागरी प्रचारणी सभ, वारणसी
- प्रतिनिधि हिन्दी निबन्धकार, हरिमोहन, तक्षशिला प्रकाशन, दिल्ली
- हिन्दी निबन्ध का विकास, डॉ. ओंकारनाथ शर्मा, अनुसंधान प्रकाशन, कानपुर
- हिन्दी वाङ्मय बीसवी शती सम्पा. डॉ. नगेन्द्र, विनोद पुस्तक मन्दिर, आगरा

Core 21 - भाषा विज्ञान

पाठ्य विषय

भाषा की परिभाषा, भाषा की विशेषतायें और भाषा के विभिन्न रूप

- भाषा उत्पत्ति के सिद्धान्त
- भाषा विज्ञान : रूप शाखाएँ और उपयोगिता

रूप - एकाकालिक, ऐतिहासिक, तुलनात्मक और प्रायोगिक

शाखाएँ - वाक्यविज्ञान, रूपविज्ञान, शब्दविज्ञान, ध्वनिविज्ञान और अर्थविज्ञान

- स्वन विज्ञान : स्वन की अवधारणा, स्वनयंत्र और उनके कार्य, स्वनों का वर्गीकरण, स्वनिम विज्ञान का स्वरूप, स्वन परिवर्तन के कारण
- रूपविज्ञान : रूप या पद बनाने की प्रक्रिया, शब्द और रूप का भेद, रूपिम या रूपग्राम के भेद
- वाक्य विज्ञान : वाक्य की अवधारणा और वाक्य के भेद - अर्थ की दृष्टि से और रचना की दृष्टि से
- अर्थ विज्ञान : अर्थ की अवधारणा, अर्थ परिवर्तन के कारण और दिशाएँ - अर्थविस्तार, अर्थसंकोच, अर्थदिश, अर्थापकर्ष, अर्थोत्कर्ष

अध्ययन के लिए सहायक पुस्तकें

- भाषा विज्ञान, भोलानाथ तिवारी, किताब महल, इलाहाबाद
- सामान्य भाषा विज्ञान, बाबूराम सक्सेना, हिन्दी साहित्य सम्मेलन, इलाहाबाद
- भाषा विज्ञान की भूमिका, देवेन्द्रनाथ शर्मा, राधाकृष्ण प्रकाशन दिल्ली
- भाषा विज्ञान के सिद्धान्त और हिन्दी भाषा, डॉ. द्वारिका प्रसाद सक्सेना, मीनाक्षी प्रकाशन, दिल्ली
- भाषा विज्ञान कोश-भोलानाथ तिवारी, ज्ञानमण्डल प्रकाशन, वाराणसी

Core 22 - भारतीय साहित्य**पाठ्य विषय**

खड : क - भारतीय साहित्य का स्वरूप

- | | |
|----------------------------------|--|
| 1. भारतीय साहित्य की मूलभूत एकता | 2. भारतीय साहित्य के अध्ययन की समस्यायें |
| 3. भारतीय साहित्य में भारतीयता | 4. भारतीय साहित्य में आज के भारत का बिंब |
| 5. भारतीय साहित्य का समाजशास्त्र | 6. हिन्दी साहित्य में भारतीय मूल्यों की अभिव्यक्ति |

खण्ड ख :- एक उपन्यास, तथा दो कहानियों का अध्ययन मात्रा लघूत्तरी/अति लघूत्तरी प्रश्न हेतु

1. उपन्यास (मलयालम)

‘मछुआरे’ - तकषी शिवशंकर पिल्लै अनुवादक भारती विद्यार्थी साहित्य अकादमी, नई दिल्ली

2. कहानियाँ (बंगला)

काबुलीवाला - रवीन्द्रनाथ टैगोर, अभागीरस्वर्ग – शरतचन्द्र

3. कविता (उड़िया)

वर्षा की सुबह – सीताकांत महापात्र

नारी, हम, वस्त्रहरण, किस आदमी युग से, पृथ्वी

अंकविभाजन : पूर्णांक 100

| | |
|------------------------------------|-----------------|
| 8 में से 4 आलोचनात्मक प्रश्न | 4 x 15 = 60 अंक |
| 8 में से 4 लघूत्तरी प्रश्न | 5 x 4 = 20 अंक |
| 20 वस्तुनिष्ठ /अति लघूत्तरी प्रश्न | 20 x 1 = 20 अंक |

अध्ययन के लिए सहायक पुस्तकें

- भारतीय साहित्य सम्पा. डॉ. नगेन्द्र, प्रभात प्रकाशन दिल्ली
- भारतीय साहित्य दर्शन, डॉ. कृष्णलाल हंज, ग्रन्थम प्रकाशन, रामबाग कानपुर
- भारतीय साहित्य की समस्यायें, ई.पी.चेलीशेव, वाणी प्रकाशन, दिल्ली
- भारतीय भाषाओं के साहित्य का इतिहास, सम्पा. केन्द्रीय हिन्दी निदेशालय, शिक्षा तथा - समाज कल्याण मंत्रालय भारत सरकार, नई दिल्ली
- भारतीय भाषाओं के साहित्य का रूप दर्शन, गौरीशंकर पंडया, इन्द्रप्रस्थ, कृष्ण नगर, दिल्ली
- भारतीय साहित्य, डॉ. लक्ष्मीकान्त पाण्डेय, अमनप्रकाशन 1041/118 रागबाग कानपुर - 12
- भारतीय साहित्य, ब्रजकिशोर प्रसादसिंह, अमन प्रकाशन, रामबाग कानपुर
- शरतचन्द्र : व्यक्तित्व और साहित्यकार, मन्मथनाथ गुप्त, नेशनल पब्लिशिंग हाउस, दिल्ली
- बंगला साहित्य का इतिहास, सेनकुमार अनु निर्मला जैन साहित्य अकादमी, दिल्ली
- सती तथा अन्य कहानियाँ, भारत ज्ञान विज्ञान प्रकाशन, दिल्ली – 32

PART VI

EDUCATION COMPONENT

FOUR YEAR INTEGRATED B.Sc.,B.Ed. / B.A., B.Ed. COURSE

PART IV : EDUCATIONAL COMPONENTS

| Semester | CODE | | Name of the course | CCE | UE | Total |
|-----------------|-------------|-----------|--------------------------------------|------------|-----------|--------------|
| First | | Field | Yoga, Health & Physical Education | 50 | -- | 50 |
| Second | | C&PS | Language across Curriculum | 30 | 70 | 100 |
| | | EPC 1 | Reading and Reflecting on Texts | 50 | -- | 50 |
| Third | | PE | Childhood and Growing Up I | 30 | 70 | 100 |
| | | C & PS | Knowledge and Curriculum | 30 | 70 | 100 |
| | | EPC 2 | Drama and Art in Education | 50 | -- | 50 |
| Fourth | | PE | Childhood and Growing Up II | 30 | 70 | 100 |
| | | PE | Gender, School and Society | 30 | 70 | 100 |
| | | EPC 3 | Critical Understanding of ICT | 50 | -- | 50 |
| Fifth | | PE | Contemporary India and Education I | 30 | 70 | 100 |
| | | PE | Learning and Teaching I | 30 | 70 | 100 |
| | | C & PS | Pedagogy of School Subject I -1 | 30 | 70 | 100 |
| | | C & PS | Pedagogy of School Subject II -1 | 30 | 70 | 100 |
| | | Practicum | School Internship | 100 | -- | 100 |
| | | Practicum | Community Living Camp | 50 | -- | 50 |
| | | EPC 4 | Soft skills | 50 | -- | 50 |
| Sixth | | PE | Learning and Teaching - II | 30 | 70 | 100 |
| | | PE | Contemporary India and Education -II | 30 | 70 | 100 |
| | | PE | School Management - I | 30 | 70 | 100 |
| | | C&PS | Pedagogy of School Subject I -2 | 30 | 70 | 100 |
| | | C&PS | Pedagogy of School Subject II -2 | 30 | 70 | 100 |
| Seventh | | PE | Creating an Inclusive School | 30 | 70 | 100 |
| | | PE | School Management - II | 30 | 70 | 100 |
| | | C&PS | Assessment for learning - I | 30 | 70 | 100 |
| | | C&PS | Pedagogy of School Subject I -3 | 30 | 70 | 100 |
| | | C&PS | Pedagogy of School Subject II-3 | 30 | 70 | 100 |
| | | Field | Yoga, Health and Physical Edn II | 50 | -- | 50 |
| | | EPC 5 | Understanding Self | 50 | -- | 50 |
| Eighth | | C&PS | Pedagogy of School Subject I - 4 | 30 | 70 | 100 |
| | | C&PS | Pedagogy of School Subject II - 4 | 30 | 70 | 100 |
| | | C&PS | Assessment for learning - II | 30 | 70 | 100 |
| | | Practicum | Teaching Competency | | | |
| | | | Pedagogy of School Subject I -Prac | 100 | 100 | 200 |
| | | | Pedagogy of School Subject II - Prac | 100 | 100 | 200 |
| | | | | | | |

| | |
|--|-----------|
| FIRST YEAR - SEMESTER I..... | 1 |
| <i>Edn 1: EPC 1- YOGA, HEALTH AND PHYSICAL EDUCATION -I.....</i> | <i>1</i> |
| <i>AECC: A1: ENVIRONMENTAL STUDIES.....</i> | <i>4</i> |
| FIRST YEAR - SEMESTER II..... | 7 |
| <i>Edn 1: C&PS - LANGUAGE ACROSS THE CURRICULUM.....</i> | <i>7</i> |
| <i>Edn: EPC 2 - READING AND REFLECTING ON TEXTS.....</i> | <i>9</i> |
| SECOND YEAR - SEMESTER III..... | 11 |
| <i>Edn 2: PE - CHILDHOOD AND GROWING UP – I.....</i> | <i>11</i> |
| <i>Edn 3: C&PS - KNOWLEDGE AND CURRICULUM.....</i> | <i>13</i> |
| <i>Edn: EPC 3 - DRAMA AND ART IN EDUCATION.....</i> | <i>16</i> |
| SECOND YEAR - SEMESTER IV..... | 19 |
| <i>Edn 4: PE - CHILDHOOD AND GROWING UP – II.....</i> | <i>19</i> |
| <i>Edn 5: PE - GENDER SCHOOL AND SOCIETY.....</i> | <i>21</i> |
| <i>Edn: EPC 4 - CRITICAL UNDERSTANDING OF ICT.....</i> | <i>23</i> |
| THIRD YEAR - SEMESTER V..... | 27 |
| <i>Edn 6: PE - CONTEMPORARY INDIA AND EDUCATION -I.....</i> | <i>27</i> |
| <i>Edn 7: PE - LEARNING AND TEACHING-1.....</i> | <i>29</i> |
| <i>Edn 8: C&PS - PEDAGOGY OF SCHOOL SUBJECT I.....</i> | <i>32</i> |
| 8(i): Pedagogy of Tamil I – Part 1..... | 32 |
| 8(ii): Pedagogy of English I – Part 1..... | 34 |
| 8(iii): Pedagogy of Hindi I – Part 1..... | 37 |
| 8(iv): Pedagogy of Malayalam I – Part 1..... | 41 |
| 8(v): Pedagogy of Telugu I – Part 1..... | 44 |
| 8(vi): Pedagogy of French – Part 1..... | 45 |
| 8(vii): Pedagogy of Mathematics I – Part 1..... | 47 |
| 8(viii): Pedagogy of Physical Science I – Part 1..... | 50 |
| 8(ix): Pedagogy of Biological Science I – Part 1..... | 53 |
| 8(x): Pedagogy of Social Science I – Part 1..... | 56 |
| 8(xi): Pedagogy of Computer Science I – Part 1..... | 58 |
| <i>Edn 9: C&PS - PEDAGOGY OF SCHOOL SUBJECT II.....</i> | <i>60</i> |
| 9(i): Pedagogy of Tamil II – Part 1..... | 60 |
| 9(ii): Pedagogy of English II – Part 1..... | 62 |
| 9(iii): Pedagogy of Hindi II – Part 1..... | 65 |
| 9(iv): Pedagogy of Malayalam II – Part 1..... | 67 |
| 9(v): Pedagogy of Telugu II – Part 1..... | 70 |
| 9(vi): Pedagogy of Mathematics II – Part 1..... | 70 |
| 9(vii): Pedagogy of Physical Science II – Part 1..... | 70 |
| 9(viii): Pedagogy of Biological Science II – Part 1..... | 70 |
| <i>Edn: Int 1 - SCHOOL INTERNSHIP.....</i> | <i>71</i> |
| <i>Edn: Int 2 - COMMUNITY LIVING CAMP.....</i> | <i>71</i> |
| <i>Edn: EPC 5: SOFT SKILL.....</i> | <i>72</i> |
| THIRD YEAR - SEMESTER VI..... | 74 |
| <i>Edn 10: PE - LEARNING AND TEACHING – II.....</i> | <i>74</i> |
| <i>Edn 11: PE - CONTEMPORARY INDIA AND EDUCATION -II.....</i> | <i>77</i> |
| <i>Edn 12: PE - SCHOOL MANAGEMENT – I.....</i> | <i>80</i> |
| <i>Edn 13: C&PS - PEDAGOGY OF SCHOOL SUBJECT I.....</i> | <i>82</i> |

| | |
|---|------------|
| 13(i): Pedagogy of Tamil I – Part 2 | 82 |
| 13(ii): Pedagogy of English I – Part 2 | 84 |
| 13(iii): Pedagogy of Hindi I – Part 2 | 88 |
| 13(iv): Pedagogy of Malayalam I – Part 2 | 91 |
| 13(v): Pedagogy of Telugu I – Part 2 | 94 |
| 13(vi): Pedagogy of French I – Part 2 | 95 |
| 13(vii): Pedagogy of Mathematics I – Part 2 | 97 |
| 13(viii): Pedagogy of Physical Science I – Part 2 | 100 |
| 13(ix): Pedagogy of Biological Science I – Part 2 | 102 |
| 13(x): Pedagogy of Social Science I – Part 2 | 105 |
| 13(xi): Pedagogy of Computer Science I – Part 2 | 107 |
| Edn 14: C&PS - PEDAGOGY OF SCHOOL SUBJECT II | 109 |
| 14(i): Pedagogy of Tamil II – Part 2 | 109 |
| 14(ii): Pedagogy of English II – Part 2 | 111 |
| 14(iii): Pedagogy of Hindi II – Part 2 | 114 |
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FIRST YEAR - SEMESTER I**Edn: EPC 1- YOGA, HEALTH AND PHYSICAL EDUCATION -I****Practicum****Credits 2****Essence of the course:**

Sound Body with a sound mind has always been the concern of India. With the changing conditions there are many a health hazards. All of us need to learn how to observe sound health. This course offers the opportunity to learn the yoga and produce the health. It also deals with good food habit, nutrition, physical exercise and sports

Objectives:

At the end of the course, the student teacher will be able to

- acquire the knowledge of Yoga, exercise, health & fitness
- understand the nature and structure of human bodies, injuries during emergencies and to provide first aid.
- apply discipline, rules and regulations to organize sports and games in schools.
- develop skills in organizing the physical education, health and yoga programmes in schools.
- develop interest in yoga, physical and health education,
- develop positive attitude towards the participation in yoga and health activities.

CONTENT OUTLINE**Unit 1: Yoga and Health**

Meaning of yoga – need and importance of yoga – Kriyas – physical exercises – types of exercises: aerobic, anaerobic on various systems (circulatory, muscular, digestive & respiratory systems) – yoga in present life – role of India in yoga – yoga in global awareness. Branches of Yoga: Bakthi Yoga, Karma Yoga, Raja Yoga and Gnanayoga – Eight limbs of Yoga: Eyama, Niyama, Asana, Pranayama, Prathiyagara, Dharana, Dhiyana and Samathi.

Unit 2: Health education

Health needs of children and adolescents, including differently abled children – understanding of the body system: skeleton, muscular, respiratory, circulatory and digestive in relation to health fitness – bones, muscles, joints and their functions. – Status of Health Education in India from Pre-Natal Education through Higher Education, Yoga & Yag, Health & Hygiene, Mess & Toilets, Disease & Dispensary, Work & Leisure. Health Observation Programs in schools – Body Mass Index ratio.

Unit 3: First Aid- Principles and Uses

Structure and function of human body and the principles of first aid – First aid equipment's – Fractures-causes and symptoms and the first aid related to them – Muscular sprains causes, symptoms and remedies – First aid related to haemorrhage, respiratory discomfort – First aid related to Natural and artificial carriage of sick and wounded person – Treatment of unconsciousness – Treatment of heat stroke – General disease affecting in the local area and measures to prevent them.

Unit 4: Food and safety

Food and nutrition, food habits, timing of food, nutrients and their functions – Fast Food Problems, understanding and practice sanitation – handling of drinking water, disposal of solid and liquid waste – safety and security – disasters in and outside schools, ways of prevention – safety from snake and dog bites, animal attacks, prevention and treatment.

Unit 5: Physical exercise and sports

concept and objectives of physical education, physical fitness, strength, endurance and flexibility, its components, sports skills, indigenous and self-defense activities – games & sports – athletes – general physical fitness exercises – games – (lead-up Games, relays and major games) rhythmic activity, gymnastics and their impact on health.

Mode of Transaction

Lecture, workshop, discussion, field visit, play ground work, demonstration, practice.

Practicum: Task and Assignment

1. Prepare month wise self-reports based on the development of your physical fitness – height, weight-Strength, speed, endurance, flexibility and body composition.(Walking, Running, Throwing and Jumping etc.)
2. Prepare a record for yoga learning and performing basic yogic activities along with your reflection and your yoga practice photographs.
3. Write a report based on visit and interview with the personals in yoga and health centres.
4. Prepare an album for yoga, health and physical education (minimum 10 pictures in each aspect).
5. Demonstration of Yogic exercises.
6. Make a portfolio of various Games for school children and their advantages.
7. Preparation of inventories on myths on exercises and different type of food
8. Make an inventory of energy rich food and nutritious food(locally available) indicating its health value
9. Make an inventory of artificial food and provide critical observations from health point of view
10. Prepare inventory of Medicinal plants and their medicinal values.
11. Select yoga practices for persons of average health for practical yoga sessions: *Supine position, Prone position, Sitting position, Standing position, Kriyas, Mudras, Pranayamas*

Mode of Assessment:

Yoga practice, filed visit report, written test and presentation

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4. Mangal , S.K – (2005) Health & Physical education. Ludhiyana: Tandon Publications, Book market.

5. Hedge (1997) How to maintain good health, NewDelhi: UBPSD Publishers
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8. Dhananjoy. S & Seema.K.(2007) Lesson Planning : Teaching methods and class management in physical education. NewDelhi: Khal Sathiya Kendra
9. Physical Education Lessons: Dr. J. P. Thomas
10. Dr. J. P. Thomas (1954) Organization of Physical education, Chennai: Y.M.C.A. College of physical education.
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19. [www.http://greatist.com/health/19-worst-tech-related-health-risks](http://greatist.com/health/19-worst-tech-related-health-risks)

AECC: A1: ENVIRONMENTAL STUDIES**Theory****Credits 4****Essence of the course:**

This course enables the teachers to develop knowledge about the environment and make them to understand and cope with nature which very essential for human beings. Keep in this in mind, it helps the student teacher to use the various resources for sustainability. It also intends them to develop interest towards the ecosystem and conservation of biodiversity. It would help them to find the solution for reducing various kinds of pollution and make them to involve towards environment and various issues.

OBJECTIVES:

At the end of the course, the student teacher will be able to

- know about the environment
- understand the surrounding
- know about biotic interaction.
- develop concern towards protecting the various resources
- plan and organise in ecological activities
- sensitize the cause and effects of various pollution
- develops positive attitudes to minimize solid wastes
- practice environmental friendly life style

Unit 1 : Introduction to environmental studies

- Multidisciplinary nature of environmental studies;
- Scope and importance; Concept of sustainability and sustainable development.

Unit 2 : Ecosystems

- What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems :
 - a) Forest ecosystem
 - b) Grassland ecosystem
 - c) Desert ecosystem
 - d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 3 : Natural Resources : Renewable and Non---renewable Resources

- Land resources and landuse change; Land degradation, soil erosion and desertification.
- Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
- Water : Use and over---exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter---state).
- Energy resources : Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

Unit 4 : Biodiversity and Conservation

- Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots
- India as a mega---biodiversity nation; Endangered and endemic species of India

- Threats to biodiversity : Habitat loss, poaching of wildlife, man---wildlife conflicts, biological invasions; Conservation of biodiversity : In---situ and Ex---situ conservation of biodiversity.
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

Unit 5 : Environmental Pollution

- Environmental pollution : types, causes, effects and controls; Air, water, soil and noise pollution
- Nuclear hazards and human health risks
- Solid waste management : Control measures of urban and industrial waste.
- Pollution case studies.

Unit 6 : Environmental Policies & Practices

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
- Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
- Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

Unit 7 : Human Communities and the Environment

- Human population growth: Impacts on environment, human health and welfare.
- Resettlement and rehabilitation of project affected persons; case studies.
- Disaster management : floods, earthquake, cyclones and landslides.
- Environmental movements : Chipko, Silent valley, Bishnois of Rajasthan.
- Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
- Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

Practicum: Task and Assignment

1. Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc.
2. Visit to a local polluted site---Urban/Rural/Industrial/Agricultural.
3. Study of common plants, insects, birds and basic principles of identification.
4. Study of simple ecosystems---pond, river,
5. Visit to a local area to document environment assets – river/ forest/ grassland /hill/ mountain
6. Visit to a local polluted site – Urban/ Rural/ Industrial/ Agricultural- analyze and report
7. Study of simple ecosystems – pond, river, hill slopes, etc.
8. Preparation of a scrap book based on environmental issues from collection of articles and daily newspaper.
9. Prepare a list of Eco friendly, bio-degradable products and write its advantages.
10. Write a report on depletion of ozone layer, Acid rain, and acts related to conservation of environment.
11. Write a report on environmental issues and role of any agencies in protecting that issues.
12. Arrange a programme for environmental awareness and write a reflective report.

Mode of Assessment

Written test, Task and Assignment, Field visit

References:

1. Carson, R. 2002. *Silent Spring*. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. *This Fissured Land: An Ecological History of India*. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999. *Global Ethics and Environment*, London, Routledge.
4. Gleick, P. H. 1993. *Water in Crisis*. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. *Principles of Conservation Biology*. Sunderland: Sinauer Associates, 2006.
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7. McCully, P. 1996. *Rivers no more: the environmental effects of dams* (pp. 29---64). Zed Books.
8. McNeill, John R. 2000. *Something New Under the Sun: An Environmental History of the Twentieth Century*.
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14. Sengupta, R. 2003. *Ecology and economics: An approach to sustainable development*. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.
16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. *Conservation Biology: Voices from the Tropics*. John Wiley & Sons.
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18. Warren, C. E. 1971. *Biology and Water Pollution Control*. WB Saunders.
19. Wilson, E. O. 2006. *The Creation: An appeal to save life on earth*. New York: Norton.

World Commission on Environment and Development. 1987. *Our Common Future*. Oxford University Press.

FIRST YEAR - SEMESTER II**Edn 1: C&PS - LANGUAGE ACROSS THE CURRICULUM****Theory****Credits 2****Essence of the course:**

This course is for the development of linguistic and communicative competencies of student teachers in a multicultural and multilingual environment. It is designed by keeping in mind that the language is an integral part of subject learning and competence which will have an impact on classroom interaction. It emphasizes on how language skills like listening, speaking, reading and writing play an important role in various subjects across the curriculum.

Objectives:**At the end of the course the student teachers will be able to**

- acquire knowledge about language and literacy and principles of language teaching.
- understand the importance of language and literacy background of the learners with reference to spelling and vocabulary development
- apply the acquired knowledge in methods and approaches of teaching language.
- develop skills in reading and writing which pave the way to attain optimal learning of the subject areas.
- develop interest towards language learning from language diversity and multilingualism point of view.
- develop a positive attitude towards language to realise that learning and teaching cannot take place in a language free environment.

CONTENT OUTLINE**Unit 1: Nature and Functions of Language**

Language – Meaning, Nature, Characteristics, Purposes, Role and Functions - Language as the base for the construction of meaning and thinking - Modes of Language expression: (i) Verbal modes - Listening, Speaking, Reading, Writing (ii) Non-verbal Modes – Viewing, Shaping, Watching, Moving - Place of language in the school curriculum – Essentials of Language for optimal learning of other subjects- Contribution of Linguistics and psychology in understanding language acquisition.

Unit 2: Language Diversity in Classrooms

First Language and Second Language Acquisition – using of First and Second Language in the classroom – multilingualism in the class – meaning and concept- dialects – understanding language diversity of students – home language and school language

Unit 3: Methods of learning language in school subject areas

Methods: definition, types, traditional and modern methods – bilingual method – classroom discourse to oral language – questioning – methods for reading comprehension in specific subject areas – methods for writing in specific subject area – spelling methods, in learning to spell words correctly, philosophy of teaching of spelling, computer use and spelling vocabulary: definition, developing vocabularies, vocabulary acquisition and application.

Unit 4: Fluency in the Language

Communication – meaning and concept – process of communication – types of communication – nonverbal communication – functions and types.

Unit 5: Language assessment in school subjects

Assessment: definition, types, principles and classroom practice – tools: quizzes, projects, test – current reviews and practices – testing auditory comprehension – test the four skills – use of language lab and electronic devices for testing.

Mode of transaction:

Dialogue, seminars, discussions, group-work, language games, exercises and assignments

Practicum: Task and Assignment

1. Get a two-page writing from the school students in English and Mother tongue learning and analyse them from language point of view
2. Observe any five classes of subject teaching and analyse from the point of language teaching
3. Write a critical report on the opinion of subject teacher on the weightage for language aspects in valuation of subject test papers.
4. School visit to find out communication problem / Apprehension in students
5. Designing games and exercises for developing Listening, Speaking, Reading and Writing Skills
6. Assignments on Developing speaking skills – oral presentations, debate, elocution, discussion, brain-storming
7. Assignments on developing listening skills – listening to speech, directions

Mode of assessment: Written test and Task and assignment**References:**

1. Begum, Jahitha, A. (2011), *English Language Education*. Hyderabad: Neelkamal Publications Pvt. Ltd.
2. Ediger, Marlow and Bhaskara Rao D. (2003), *Language Arts Curriculum*. Discovery Publishing House.
3. Lado, Robert. (1964), *Language Teaching*. New York: Mc Graw Hill Publisher:
4. Rajeswari N. (2008), *Teaching of English*. Chennai: G Publishers.
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7. Darian, S. (2003), *Understanding the Language of Science*. Austin: University of Texas Press.
8. Vollmer, Helmut Johannes & Beacco, Jean-Claude (2006): “Towards a Common Instrument for Language(s) of (School) Education”, Preliminary Study: Council of Europe, Language Policy Division, and Strabourg. [www.coe.int/lang]
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Edn: EPC 2 - READING AND REFLECTING ON TEXTS**Theory****Credits 2****Essence of the course:**

The course is designed to enhance the reading capacity of the student teachers. It will enable them to develop meta-cognitive awareness. The course offers opportunities to student teachers to read a variety of texts and respond to it creatively and critically.

Objectives:**At the end of the course, the student teacher will be able to**

- Understand the meaning, process, importance and characteristics of reading.
- Understand and apply different levels, types, techniques and methods of reading.
- Acquaint with the skills of reading different types of texts.
- Develop different types of reading skills through various activities and met cognition
- Learn the skills of reading comprehension and to enhance vocabulary.
- Acquaint with the problems of reading across curriculum

CONTENT OUTLINE**Unit 1: Introduction to Reading**

Reading – Meaning and Process – Importance of Reading across Curriculum – Characteristics of Reading.

Unit 2: Reading Skills

Levels of Reading: literal, interpretative, critical and creative – Types of Reading – intensive and extensive reading, Oral & Silent Reading – Reading Techniques – Skimming and Scanning. – Methodology of Reading

Unit 3: Reading the Text

Types of Texts – Narrative, expository, descriptive, suggestive, empirical, conceptual, ethnography, policy documents, field notes – Importance of Different Texts in Curriculum

Unit 4: Developing Reading Skills

Developing Critical Reading Skills – Developing Reflective Skills – Activities for Developing Reading Skills – Developing Metacognition for Reading

Unit 5: Reading Comprehension

Developing Reading Comprehension – Developing Vocabulary for Reading – Problems of Reading

Mode of Transaction

Lecture, Discussion, Exercises, Games

Practicum: task and assignment

1. Divide the class in small group and provide different kinds of texts and instruct them to read and reflect according to the nature of text
2. Divide the group and provide one text and suggest students to make different interpretations
3. Design vocabulary games to enhance your vocabulary

4. Read the text and provide a five words summary to each paragraph
5. Reading and comprehension exercises
6. Skim through the text and give suitable title to the text
7. Complete given text in stipulated time and summarize it in 6/7 lines with a suitable title.
8. Individual reading and writing reflective report (5 books)
9. Presentation of reflective report for class review and modification of the report
10. Group reading and writing reflective group report (5 documents)
11. Constructive and creative presentation of ideas and pictures like poster on any one of the idea

Mode of Assessment:

Written test, Tasks and assignments

References:

1. Bright, J. A., and McGregor, G. P. (1970). *Teaching English as a Second Language*. ELBS: Longman.
2. Doff, A. (1988). *Teach English: Training Course for Teachers*. Cambri: Cambridge Univ. Press.
3. Hill, L. A., and Dobbyn, M. A. (1979). *Training Course, Trainer's Book*. London: Cassell.
4. Hubbard, P., and Hywel, J. et al. (1983). *A Training Course for TEFL*. Oxford University Press.
5. Joseph, K. S. (2004). *Self Instruction in English Grammar and Figures of Speech*. Vadodara: Gold Rock Publications.
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7. Mukalel, J. C. (1998). *Creative Approaches to Classroom Teaching*. New Delhi: Discovery publishing house.
8. Nagaraj, G. (1996). *English Language Teaching Approaches, Methods and Techniques*. Calcutta: Orient Longman.
9. Richard, J., and Theodore, S., and Rodgers, T. S. (1968). *Approaches and Methods in Language*. Cambridge University Press.
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11. Wilkins, D. A. (1982). *Linguistics in Language Teaching*. London: Edward Arnold
12. Willis, J. (1981). *Teaching English through English ELBS*. England: Longman Ltd.
13. Yule, G. (1985). *The Study of Language*. Cambridge: Cambridge University Press.
14. **Recognizing Different Types of Text**
<http://www.bbc.co.uk/skillswise/factsheet/en03text-11-f-different-types-of-text>
15. **Models of Reading Process**
<http://people.ucalgary.ca/~mpeglar/models.html>
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3001687/>
<http://www.tarleton.edu/Faculty/gentry/reading%20models.html>
16. **Reflective Skills**
<http://www.skillsyouneed.com/ips/reflecting.html>
<http://www.skillsyouneed.com/ps/reflective-practice.html>

SECOND YEAR - SEMESTER III**Edn 2: PE - CHILDHOOD AND GROWING UP – I**

Theory

Credits 4

Essence of the course:

This course makes student- teacher to understand the systematic study of childhood, adolescence and their development, make them to learn children at different ages through theoretical and interaction with learners in school. The main focus of this course is to prepare student- teachers to accept different constructivist nature of different children which is influenced by their family, school, neighbourhood and community background in particular and political, social, and cultural dimension in general. It gives them knowledge about various theories of child development.

Objectives:**At the end of the course the student teachers will be able to**

- acquire the knowledge of Childhood, Adolescence and their development
- to understand the Multiple childhood and developmental feature of childhood and adolescence under different socio-economic and cultural factors
- apply the theory of development to understand learners
- develop skill in measuring behaviour of childhood and adolescence
- understand about the various socio-cultural impact on learners

CONTENT OUTLINE**Unit 1: Childhood, Adolescence and their development**

Meaning of Childhood, Adolescence and Their Development – distinguish between growth and development -characteristics of growth and development –principles of development – developmental feature (physical, mental, emotional, social, and moral)

Unit 2: Psycho- Social Perspective of Childhood & Adolescence

Childhood in different stages (Multiple Childhood) – Mental health of childhood & adolescence - period of high protection & struggle of childhood and adolescence (social, cultural and economic background) –present scenario of childhood and adolescence in India.

Unit 3: Status of Childhood & Adolescence

Nature of childhood and adolescence in different cultures – peak in development (Motor, Speech, Play, Creativity, Interest, Leadership, Group Behavior) – gender bias – sex role stereotypes, status of girl child (especially in under privilege) – exploitation of child in urban slum.

Unit 4: Theories of development

Social developmental – Urie Bronfenbrenner's Ecological system theory, Vygotsky's Social Development and Erikson Psycho social development theories - Mental development– Piaget's cognitive development, Bruner's concept formation, Gardner's multiple intelligence theory - Emotional development - John Bowlby's attachment theory

Unit 5: Heterogeneous nature of adolescence

Transitional stage – critical age – characters of adolescence – dissimilarity of adolescence – population levels, group levels, cultural difference, and individual difference – developmental task is determinants of socio-economic & cultural factors.

Modes of Transaction:

Lecture, Assignment, Seminar, Group discussion, Workshop, Film Show, Audio – Video

Practicum: Task and Assignment

1. To prepare study report on the development of (Physical, Social, Emotional, Mental) of urban and rural adolescence in a specific standard (from VIII to XII)
2. Give your view about the present scenario of childhood and Adolescence
3. Prepare an interview schedule based on the Social development indicators of adolescence and study the social development of the class students
4. Write auto-biography about once your childhood and adolescence period discuss with his/her peer.

Modes of Assessment:

Written test, seminar, presentation, Field Visit

References:

1. Taylor Shelley. E. Latitia Anne Peplau and Sears David .O. (2006). Social Psychology. New Delhi: Pearson.
2. Hurlock.B. Personality Development, Tata McGraw –Hill Publishing Company LTD, New Delhi. (1976)
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Edn 3: C&PS - KNOWLEDGE AND CURRICULUM**Theory****Credits 2****Essence of the course:**

In the 21st century knowledge society, knowledge explosion is compelling the educational administrators to enrich the curriculum to develop the human resources according to the requirements of the world community. Therefore, this course is focusing on the knowledge and curriculum aspects. The purpose of knowledge and curriculum is to be understood from the epistemological and sociological perspectives of education. The course can enable the student teachers to gain confidence in curriculum design and evaluation by focusing the future directions.

Objectives:**At the end of the course the student teachers will be able to**

- acquire knowledge of terms and concepts of curriculum and epistemology used in the field of education.
- understand the types and process of curriculum, importance of social and epistemological basis of education
- apply the appropriate strategies for curriculum transaction and curriculum development
- develop the skills to use the concepts, practices and roles play in curriculum evaluation with the aims of education
- develop the skills on critically analysis of various samples of textbooks, children's literature, and teachers' handbooks
- develop interest on go through discovery of various philosophers
- develop the attitude towards concepts of nationalism, universalism and secularism and their interrelationship with education

CONTENT OUTLINE**Unit 1: Knowledge and Curriculum**

Knowledge, wisdom –meaning – distinction between knowledge and wisdom– knowledge with skill, Information - Meaning of and need for curriculum – Domains of curriculum – Epistemological basis of Curriculum – forms of knowledge–logical grammar of disciplines – Curriculum organization - subject matter and curriculum organization – types of curricula: subject centred, co-related, fused, core and student centered – their relative values and weaknesses – Differentiating curriculum framework, curriculum and syllabus; their significance in school education – role of the textbook

Unit 2: Principles of Curriculum

Aims, goals and objectives of curriculum –curriculum design and its components –curriculum development: technical-scientific approach and Nontechnical- Nonscientific approach – curriculum implementation and its models - Differentiating curriculum framework, curriculum and syllabus; their significance in school education

Unit 3: Curriculum Transaction

Strategies for curriculum transaction –Selection and organisation of learning situations – models of teaching: individual and team teaching, distance learning modes –Activity Based

Learning (ABL)- Activity Learning Methodology (ALM)- resources for curriculum transaction – computer and internet – role and importance.

Unit 4: Curriculum evaluation

Stages of programme evaluation - The curriculum cycle - nature and purpose of evaluation – approaches of evaluation – validity and significance of course content- evaluation models Taylor's, Stane's and CIPP model - practices and roles play in evaluation – peer evaluation - goal free evaluation – critical analysis of textbooks, children's literature and teachers' handbooks

Unit 5: Issues in Curriculum Development

Critical issues: teacher centred to learner centred, subject centred to practical knowledge – Environmental concerns, gender differences, inclusiveness, value concerns and issues, social sensitivity- centralized Vs decentralized curriculum – diversity among teachers in their competence-problem of curriculum load as many concerns are to be included in curriculum – participants in curriculum Development – role of state in the curriculum development – makers of curriculum – role of curriculum in national development. – Curriculum makes an intellectual society – curriculum for 21st century – UNESCO's concept of four pillars of education

Mode of transaction:

Group discussion, lecture, discussion, symposium, Peer group, Debates, Workshop, Seminar, Project work

Practicum: Task and Assignment

1. Select a primary school, observe and report about the implementation of ABL method.
2. Search in the internet about ALM method, and prepare an interview tool and interview 10 teachers who are using ALM method.
3. Write a comparative report based on the curriculum development in India and any other countries by referring internet.
4. Design a syllabi for a course at B.Ed., level /school level.
5. Write a report based on the curriculum of CBSE and Samacheer.

Mode of assessment:

Written test, Task and assignment

References:

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3. Diamond Robert M. (1986) Designing and Improving Courses in Higher Education: A Systematic Approach, California: Jossey –Bass Inc. Publication.
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5. Olive, Peter F.(1988) Developing the Curriculum. Scott, and Foresman and Co.
6. Reddy, B (2007): Principles of Curriculum Planning and Development.

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8. Dewey, John (1966). The Child and the Curriculum. The University of Chicago Press.
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16. Marlow Ediger and Digumarti Bhaskara rao. (2007). Curriculum Organization. New Delhi: Discovery Publishing House.
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19. Marlow Ediger and Digumarti Bhaskara rao. (2007). Reading Curriculum and Instruction. New Delhi: Discovery Publishing House.
20. Mirudulla pandey. (2007). Theory of Core Curriculum. New Delhi: Rajat Publication.
21. Reddy.R.S. (2004) Curriculum Development for Learning to Live Together. New Delhi: Rajat Publication.
22. UNESCO(1996)– ‘Learning the Treasure within’, Report to UNESCO of the Delors International Commission on Education for the 21st Century, UNESCO Publications

Edn: EPC 3 - DRAMA AND ART IN EDUCATION**Practicum****Credits 2****Essence of the course:**

This course is designed to enhance the creativity of student teachers and sharpen their aesthetic sensibilities. It aims to make student teacher aware of the role of art, music and drama in education. It will enable the student teacher to use the various forms of drama, art and music in the teaching learning to improve learning.

Objectives:**At the end of the course, the student teacher will be able to**

- Understand the use of 'Drama' as a Pedagogy.
- Use 'Role play' technique in the teaching learning process.
- Understand the importance of dramatic way of presentation.
- Integrate singing method in teaching learning process.
- Understand various 'Dance forms' and their integration in educational practices.
- Use art of drawing and painting in teaching learning process.
- Develop creativity through different creative art forms.
- Understand the efficacy of different art forms in education.

CONTENT OUTLINE**Unit 1: Drama and its Fundamentals**

Drama as a tool of learning – Different Forms of Drama – Role play and Simulation – Use of Drama for Educational and social change (Street play, Dramatization of a lesson) – Use of Drama Techniques in the Classroom: voice and speech, mime and movements, improvisation, skills of observation, imitation and presentation

Unit 2: Music (Gayan and Vadan)

Sur, Taal and Laya (Sargam) – Vocal - Folk songs, Poems, Prayers – Singing along with "Karaoke" – Composition of Songs, Poems, Prayers –Integration of Gayan and Vadan in Educational practices.

Unit 3: The Art of Dance

Various Dance Forms - Bharat Natyam, Kathakali, Folk dance: Garba, Bhavai, Bhangada, Bihu and various other dances – Integration of Dance in educational practices (Action songs, Nritya Natika)

Unit 4: Drawing and Painting

Colours, Strokes and Sketching - understanding of various means and perspectives – **story telling:** comics, cartoon **non-story telling:** illustration, figure, gesture, line art, portrait, scratchboard, silhouette, silverpoint – Different forms of painting- Worli art, Madhubani art, Glass painting, Fabric painting and various forms of painting –Use of Drawing and Painting in Education -Chart making, Poster making, match-stick drawing and other forms.

Unit 5: Creative Art

Creative writing -Story writing, Poetry writing – Model making - Clay modeling, Origami, Puppet making – Decorative Art - Rangoli, Ekebana, Wall painting (Mural) – Designing - Computer graphics, CD Cover, Book cover, Collage work – The use of different art forms in Education

Mode of Transaction:

Lecture, lecture cum Discussion, Workshop schedule, Slide / Film show, Project work, Demonstration, Visit , Group work and its Presentation

Practicum: Task and Assignment

1. Develop a script of any lesson in any subject of your choice to perform a Play / Drama.
2. Develop a script for the street play focusing on “Girl’s education and Women empowerment”.
3. Prepare a script of Bhavaibased on some Socio-political issues.
4. Prepare a pictorial monograph on “Various folk dance of Gujarat”.
5. Prepare a pictorial monograph on “Various Dance forms in India”.
6. Prepare a calendar chart on “Various Musical Instruments in India”.
7. Develop an Audio CD based on newly composed Poems of Gujarati / Hindi language.
8. Prepare some useful, productive and decorative models out of the waste materials.
9. Visit the Faculty of Performing Arts in your city and prepare a detailed report on its multifarious functioning.
10. Organize a competition on some Decorative / Performing Art forms in the school during your School Internship programme and prepare a report on it.
11. Organize a workshop on some selected Creative Art forms in the school during your School Internship programme and prepare a report on it.
12. Develop a creative design based on your choice for CD Cover or Book cover.
13. Develop a design or picture based on collage work.
14. The work based on visits to places of art, exhibitions and cultural festivals and Perception, reflection, and dramatic/artistic expression (presentation) of any five art, drama and music items relating to any five areas included in the EPC 2 course content
15. Individual visits and writing perception and reflective report (2 items)
16. Group visits (two) and writing perception and reflective report based on class review
17. Individual Expression (presentation) of any two art, drama and music items
18. Group expression (presentation) of any two items

Mode of Assessment

Written test and Tasks and assignments

References:

1. Theory of Drama by A.Nicoll
2. Natya Kala by DhirubhaiThakar
3. Natyalekhan by DhananjayThakar
4. Natakdeshvidesman by HasmukhBaradi
5. Gujarati theatre no Itihas by BaradiHas mukh
6. Acting is Believing by Charls McGaw
7. Art of Speech by Kethlin Rich
8. NatyaSahityinaswaroopo by Nanda kumarpathak

9. Bhavai by Sudahaben Desai
10. Bhavai by KrishnakantKadkiya
11. NatyaManjarisaurabh by G.K.Bhatt
12. Bharat aurBhartiyaNatya Kala by Surendranath Dixit
13. Ekanki nu swarupane Gujarati Ekanki by Jayant Kothari.
14. The History of Gujrati Theatre- vinodMeghani.
15. Japan niRangbhumi by C.C.Mehta.
16. *Nakrani, H. (1988). GamtaGaaGeet. Rajkot, PravinPrakashan.*
17. Deva, B.C.(1981). An Introduction to Indian Music. Publication Division, Ministry of Information and Broadcasting, Government of India.
18. Abhinav Raga Manjari by Pt. Bhatkhande
19. KramikPustak Malika by Pt. Bhatkhande
20. Abhinav Geet Manjari by Ratanjankar
21. NCERT, (2006). Position Paper by National Focus Group on Arts, Music, Dance and Theatre

SECOND YEAR - SEMESTER IV**Edn 4: PE - CHILDHOOD AND GROWING UP – II****Theory****Credits 4****Essence of the course:**

This course makes student- teacher to understand the systematic study of childhood, adolescence and their development, make them to learn children at different ages through theoretical and interaction with learners in school. This course makes student-teachers to understand the developmental nature of the adolescences and it helps them to realize the child exploitation in different aspects, marginalization & stereotyping nature in our culture. In addition to that, it focuses on child labour and how do media focus their realities.

Objectives:**At the end of the course the student teachers will be able to**

- develop interest to know more about the process of Marginalisation of social difference
- develop a desirable positive attitude towards society stereotype, child law and media of childhood & adolescence
- appreciate the transitional and critical age of childhood and adolescence
- apply the various socio-assessment tools in their real life
- analyse about self

CONTENT OUTLINE**Unit 1: Socio-cultural impact on learner**

Social Stratification – dimension of stratification–factors of family, school and media influence –social norms–social acceptance – socio-metric status, socio empathic ability–nature of prejudice – socio cultural impact on learning difficulties and Learning disabilities- cultural space of the learner –leadership influence in behaviour.

Unit 2: Representing the realities

Notion of stereotype –gender, class, poverty–Childhood &adolescence in media & Social media – realities of present age children– different Socio-economic status of society–child labour in household , unorganized factories, bondage labour in remote villages–Child Abuse and child trafficking-child law–interpretation of significant events.

Unit 3: Marginalization of social difference

Underprivileged sector of society–(Girl child, children in dalit household and differently abled) –present status of underprivileged in India- delinquency child –measures to eradicate marginalization –community involvement, implementation of laws, internalizing values

Unit 4: Personality and Social Cognition

Meaning of personality – self-concept, self-acceptance, self-actualization, self-confidence, self-interest, self-disclosure, self-development, self-help– symbols of self –culture and the self –self discrepancies – threats to self-esteem –social Cognition.

Unit 5: Transfer of Learning & Developing Socio - Assessment ability.

Transfer of Learning – its types- Meaning of socio-assessment – Social assessment in different context – social assessment tools: biographies, stories, observation, journal(portfolio)– measures in group relation:– Genograms and Eco–maps.

Modes of Transaction:

Lecture, Assignment, Seminar, Group discussion, Workshop, Film Show, Audio – Video

Practicum: Task and Assignment

1. Prepare a Socio-metric matrix in a classroom
2. Conduct a study on teacher's knowledge about the cultural space of the learner in a classroom
3. Write a critical study report on portrayal about adolescence in media - particularly Language based
4. Make a survey and write a report based on child Labour status in your Locality
5. Select 30 Girl Child in your village/city and study their social status
6. Interview at least 10 teachers, parents and students about marginalization of social difference and report their suggestions
7. A study on the relational status about self and his/her socio-economic background
8. Conduct a study among the class students' family members relationship with the help of Genogram & Eco map

Modes of Assessment:

Written test, seminar, presentation, Field Visit

References:

1. Taylor Shelley. E. Latitia Anne Peplau and Sears David .O. (2006). Social Psychology. New Delhi: Pearson.
2. Hurlock.B. Personality Development, Tata McGraw –Hill Publishing Company LTD, New Delhi. (1976)
3. De CeccoJohn.P., and William Crawford. (1988). The Psychology of Learning and Instruction (E2), New Delhi: Prentice Hall of India PVT LTD.
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Edn 5: PE - GENDER SCHOOL AND SOCIETY**Theory****Credits 2****Essence of the course:**

The course is humble effort made to sensitize gender equality in society and school. The course will enable the student to identify the gender crisis, create awareness on gender equality, refine women's students being prey to untold atrocities of home and society and equip students with available laws.

Objectives:**At the end of the course the student teachers will be able to**

- acquire knowledge on Terms and concepts Gender, school and society.
- understand the challenges faced by the Gendered roles in society through a variety of institutions.
- apply the knowledge to critically analyse the gendered roles, relationships and ideas in textbooks and curricular to nurture or challenging gender disparity of gender inequalities prevailing in the society.
- develop the life skills courses in schools and to deal with some issues of gender identity roles.
- develop interest in studying gendered roles, relationships and ideas in textbooks and curricular.
- develop a positive attitude towards roles and institutions in society.

CONTENT OUTLINE**Unit 1: Gender identity construction**

Gender: meaning, definition – in various perspectives: biological, functionalist, integrationist, conflict – current status – inequality in India – gender studies–education of the girl child – agencies for women education and development – Research project and studies – evaluation of text books and media from the gender perspectives – global perspective on gender

Unit 2: Gender in society and groups

Gender in society – definition, elements of society – agencies of education in society (formal, informal and non-formal) –social system – social structure – social groups –social stratification – social institution (family, caste, religion, culture, media, law and state) and their influence on gender roles.

Unit 3: Gender, sexuality, sexual harassment and abuse

Gender roles and male/ female interaction –men and women in the public world – sex segregation in occupations – linkages and differences between reproductive rights and sexual rights – development of sexuality including primary influences in the lives of children (gender, body image, role models) –sites of conflict: social and emotional understanding – importance of addressing sexual harassment in family, neighbourhood, other formal and informal institutions –agencies perpetuating violence: family, school, work place and media (print and electronic) – Institutions redressing sexual harassment and abuse.

Unit 4: Gender and Law

Gender perspectives in policy and planning – incentive for girls – improving the quality of government schools – gender inputs in school curricular and text books – women teachers in

school– introduction to law related to women (Rape, Dowry, Re-marriage, Divorce, Property, Inheritance- women reservation bill- history and current status. The Indian Constitution and provisions according to women-human rights and women rights.

Unit 5: Gender and quality education

Gender disparity and gender parity – quality education for girls – curricular and co-curricular activities to achieve gender parity – life skill course to deal with gender issues – critical analysis on co-education – strategies to develop parity, gender equality and empowerment – support services for girl’s education – sustainability approach to equality and empowerment – construction of ideas on gender in school framework during post independence period –gender and the hidden curriculum – Teacher as an agent of change– women empowerments through social reform movements

Mode of Transaction:

Lecture, Discussion, Team Teaching, Case Study, Film Show

Practicum: Task and Assignment

1. Conduct a gender ratio survey in a village and write a report.
2. Analyse and report the differential treatment between the gender in family and neighbourhood.
3. Write a critical report on challenges faced by different women groups in present society based on valid published reports.
4. Organizing drama and debate to develop awareness for sexual abuse.
5. Women day celebration and projects related to women personalities.

Mode of Assessment:

Written test and Task and assignment

References:

1. Larsen Randy .J. and Buss David. M. (2011). Personality Psychology .New Delhi: Tata Mcgraw hill Companies.
2. Sullivan Thomas. J. (2001): Sociology (E5), Allyn and Bacon.
3. Kammeyer.C.W. George Ritzer and Yetman.R. (1987): Sociology (E5), Allyn and Bacon, London.
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5. Aggrawal.N (2002) Women and Law in India.New Delhi: New Century Publications.
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Edn: EPC 4 - CRITICAL UNDERSTANDING OF ICT**Practicum****Credits 2****Essence of the course:**

The ultimate aim of teaching ICT in the discipline of Education is to disseminate the ICT skills across the disciplines and aspire for multiple trajectories of best practices as per needs of the special discipline. The constantly developing field of ICT will always need exploration of new technological advancements in the context of teaching-learning. This course aims to give an understanding of ICT and its potentials in changing social contexts. It will give a broad understanding of ICT that include computing and communication technologies. The students will be able to use basic office automation, Software and other utilities for supporting teaching-learning. This course focuses on equipping the student teachers with

1. A social perspective on the implications of ICT for larger society.
2. skills of basic computer literacy and ICT-aided learning; and
3. skills of applications of ICT in administrative and academic support systems;

Objectives:**At the end of the course, the student teacher will be able to**

- acquire knowledge about information and communication technology with its educational aims and principles
- understand effective uses of ICT in teaching- learning, administrative and academic support systems
- apply ICT knowledge in build the 'digital public' and explore software for ICT Integration and Evaluation Procedures
- develop skill in creating 'learning and teaching resources' based on ICT
- create interest in ICT Integration with Pedagogy practices
- understand the social, economic, security and ethical issues associated with the use of ICT
- acquire the skill of maintaining the computer system and the skill of trouble shooting with the help of Anti-Virus and Other tools.
- elucidate the application of ICT for Teaching Learning
- develop various skills to use computer technology for sharing the information and ideas through the Blogs and Chatting groups

CONTENT OUTLINE**Unit 1: Digital Technology and Socio-economic Context**

Concepts of information and communication technology; Universal access VS Digital Divide - issues and initiatives; – Challenges of Integration of ICT in School; Aims and objectives of National Policy on Information and Communication Technology (ICT) in School Education in India; IT@ School Project; – Components and Objectives of National Mission on Education through ICT (NMEICT), Spoken Tutorials, Gyan Darshan, Gyanvani, Sakshat Portal, eGyanKosh; Virtual laboratory and Haptic technology.

Unit 2: Creation of digital resources

creation of teaching resources using Microsoft word, spreadsheet and presentation software: creating and opening documents, saving and sharing documents, text basis, formatting text/cell, unicode fonts, inserting tables, charts, picture etc., page layout, printing and presenting (slide show) documents – MS Publishing Interactive learning with whiteboards

Unit 3: ICT Integration with Pedagogy Practices and Educational Resources

Introduction to Internet: E-mail, Search Engines, Info-Savvy Skills; Digital Age Skills, safe surfing mode; – Internet resources for different disciplines like natural sciences, social sciences, Humanities and Mathematics. – General Introduction to E-learning, Mobile-learning, distance learning, On-line learning, Virtual University, Wikipedia, Massive Open Online Courses (MOOCs); – Social networking

Unit 4: Techno-Pedagogic Skills

Media Message Compatibility – Contiguity of Various Message Forms – Message Credibility & Media Fidelity – Message Currency, Communication Speed & Control – Sender-Message-Medium-Receiver Correspondence – exploration of software for learning and Assessment in CCE. Using social Media as a Learning Tool – homework through emailing

Unit 5: ICT and General Administration in Educational Institutions

Use of ICTs to simplify record keeping, information management in education administration – ICT infrastructure – automated and ICT managed school processes – school management information system (school MIS) – learning management systems – human resource systems – timetabling and resource allocation – student record systems – library systems – finance systems

Mode of Transaction

Project method, CAI, smart board, visual excursion, Discussion, LCD Projection, Demonstration, Lecture, Web Surfing

Practicum: Task and Assignment**Software:**

1. Create and present micro or macro lesson for the pedagogical subject using power point presentation and submit in the form of CD and Handouts.
2. Creating and using Blogs and Google Groups, for teaching and learning purpose.
3. Develop digital - learning video resources (using like Camtasia software) and upload to YouTube or any streaming site for educational purpose.
4. Create and present voice narration for any one topic related to your pedagogical subject.
5. List and use any two social media for publishing your article related to education.
6. Develop a report on preparing a lesson plan on any topic from your methods while using internet resources. The report should mention the details of navigating, searching, selecting, saving and evaluating the authenticity of the material and also mention how it adds or justify the facts, figures (data), graphics, explanation and logic of the topic.
7. Projects that may involve the hardware like LCD Projector, digital camera, camcorder, scanner, Printer, interactive white board and software like word processors (MS Word/Libre Office), spread sheet and Slide Presentation (PPT/impress); and/or Creating and using Blogs and Google Groups, Google Docs

8. Integrating technology tools for material production and use in teaching learning
9. Ownership of digital resources created and used in education and developing collaborative networks for sharing and learning
10. Use of ICTs for record keeping, information management in education administration, communication and information sharing/ storing

Hardware:

1. Write a report about how to install software like word processors, spreadsheet and Slide Presentation (with pictures of installation process)
2. Make a inventory to Installation of Operating systems, Windows, installation of essential Software and Utilities; (with pictures of installation process)
3. Connect a computer with various devices including printers, scanners, external storage devices, LCD projector etc. and draw the structure and function of peripheral used.
4. Use of pre-made digital resources such as CDs, Videos available, or download from website and integrate it into meaningful lessons.
5. Practice to present the lesson using interactive whiteboard or LCD projector.

Mode of Assessment

Written test, Task and assignment

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1. Benkler, Y. (2006). The wealth of networks: How social production transforms markets and freedom. Yale University Press.
2. Brian K. Williams, Stacey Sawyer (2005) Using Information Technology, 6th Edition Tata Macgrow hill _ Curtin, Dennis, Sen, Kunal, Foley, Kim, Morin, Cathy(1997)
3. Information Technology: The Breaking Wave, Tata Macgrow hill
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6. E-book: Getting Started with Libre Office 3.4 available at [ttp://wiki.documentfoundation.org](http://wiki.documentfoundation.org)
7. Free Software, Free Society: Selected Essays of Richard M. Stallman, digital book available on www.notabug.com/2002/rms-essays.pdf
8. Information and Communication Technologies in School: A Handbook for Teachers or How ICT Can Create New, Open Learning Environments.
9. Information and Communication Technology Policy in School Education 2010. www.mhrd.gov.in/sites/upload_files/mhrd/files/ReviesICT_School.pdf
10. Castells, M. (2011). The rise of the network society: The information age: Economy, society, and culture (Vol. I, II and III). John Wiley and Sons.
11. National Mission in Education through ICT
www.iitg.ernet.in/cet/MissionDocument_20Feb09.pdf
12. Rosenberg, M.J. (2001) e-learning New York: McGraw Hill.
13. Schank, R.C. (2001) Virtual Learning New York: McGraw Hill.
14. Tamsyn Imison, Philip Hampson Taylo. (2001), *Managing ICT in the Secondary School*: Heinemann Publishing Ltd.

15. Stephen Doyle. (2008), *Essential ICT A Level: AS Student Book for AQA*. United Kingdom: Folens publishers.
16. MHRD. (2012), *National Policy on Information and Communication Technology (ICT) in School Education*. New Delhi.
http://mhrd.gov.in/sites/upload_files/mhrd/files/upload_document/revised_policy%20document%20ofICT.pdf
17. Kulsum Umme.(2008),*Information communication Technology in Education*. Agra: H. P. Bhargave Book Honse.
18. NCERT. (2013), *Information and Communication technology for the School System Curricula for ICT in Education Version 1.02*. Delhi.
http://ictschoools.gov.in/sites/default/files/pdf/ict_curricula_final2.pdf
19. <http://www.gesci.org/assets/files/ICT,%20Education,%20Development,%20and%20the%20Knowledge%20Society.pdf>
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21. Jon Audain. (2014), *The Ultimate Guide to Using ICT Across the Curriculum (For Primary Teachers)*. Bloomsbury publishing. ISBN: ePDF: 9781441195852
22. Claire Wyatt-Smith, Joy Cummin. (2009), *Educational Assessment in the 21st Century: Connecting Theory and Practice*. London: springer. ISBN 9781402099632
23. Gary Beauchamp. (2013), *ICT in the Primary School: From Pedagogy to Practice*. USA: Routledge publishing.
24. Chen, Irene. (2012), *Technology Application Competencies for K-12 Teachers*. California: ABC-CLIO ISBN: 9781586835378 eISBN:9781586835385
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THIRD YEAR - SEMESTER V**Edn 6: PE - CONTEMPORARY INDIA AND EDUCATION -I****Theory****Credits 4****Essence of the course:**

This course provides deep and penetrating analysis of socio-economic concerns in contemporary India and the role of education in suitably meeting the challenges. All the emerging concerns are discussed in their sociological, philosophical, values, cultural, economical, constitutional, and global perspectives.

The knowledge on education, philosophy of education; educational thinkers and their contributions in education, National integration and socialization, international understanding, Indian constitution, the education policies, inclusive education and the role of education in secularism, socialism, democracy etc. will enable the student teachers to emerge as a successful teacher.

It can prove as an effective course to student teachers to understand the challenges of education in the contemporary Indian society and it will surely show the students, the right path in the field of teaching.

Objectives:**At the end of the course the student teachers will be able to**

- acquire knowledge of terms and concepts used in Indian society, communities and groups with focus on government policy frame work socialisation and sociological aims of Education
- understand Inequality and the importance of equality, stratification, causes of diversity, marginalised society
- apply the constitutional values related to Education and social diversity
- develop the skills to respect collective living, resolution of tension peacefully and justly
- develop interest on language policies, multilingual education to understand contemporary India and education
- develop the attitude towards plebianisation, liberalisation, privatisation and stratification in Education from global point of view.

CONTENT OUTLINE**Unit 1: Concept and aims of education**

Meaning of Education – Formal, non-formal and informal education – Various Agencies of Education – Aims of Education in Contemporary Indian society – Determinants of Aims of Education

Unit 2: Education and Philosophy

Relationship between Education and Philosophy - Educational Thinkers and their Contributions: Tagore, Gandhi, Swami Vivekananda, Aurobindo, J. Krishnamoorthi, Pndit Madan Mohan Malaviya, John Dewey, Rousseau, Montessori and Froebel – New vision of education - Emerging India for a new renaissance.

Unit 3: Education and Sociology

Meaning and Scope of educational sociology – Social Realities of Indian Society and their educational implications: Diversity in Indian Society; Inequality and Marginalization –Schisms in terms of Caste, Religion, Language, Region and their demands on Education.

Unit 4: Education, Social Change, Social Stratification and Social Transformation

The concepts of social change – Factors of social change – Role of education in the process of social change – Limitations of Education in the process of Social Change – Socialization process – agencies – role of school and family; school as a miniature society; – Social Stratification – Conceptualizing Social Stratification – Forms and Bases of Social Stratification – Impact of social stratification on education and vice versa

Unit 5: Education and Indian constitution

Fundamental rights and duties of citizens and the directive principles of state policies – critical understating of constitutional values related to aims of education – Indian constitution and education – freedom, justice, equality and fraternity– democracy – secularism– socialism.

Mode of transaction of the course:

Lecture method, Peer group, Discussion method, Team teaching, Debates, Brain storming, Workshop, Seminar, Project work, e-learning (edmoda.com)

Practicum activities: Task and Assignment

Planning and Implementation of Activities

- a. field visit to vocational institutes to make reports,
- b. awareness development about population explosion in rural / slum areas,
- c. Preparing a presentation on rich cultural heritage of India

Mode of Assessment

Written test and Task and assignment

References:

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2. Bhattacharya, S. (2006). Sociological Foundation of Education: Atlantic Publishers. New Delhi
3. Dhankar, N. (2010). Education in Emerging Indian Society. New Delhi: APH Publishing Corporation.
4. Dhiman, O. P. (1973). Principles and Techniques of Education. Ludhiana: Sharda Brothers.
5. Fagerling, I., and Saha, L. J.O. (1989). Education and National Development (2nd Ed.). England: Pergamon Press.
6. Kakkar, S. B. (1995). Changing Perspectives in Education. New Delhi: Vikas Publishing House.
7. Mehta D. D. (2009). Education in Emerging Indian Education, Indian Education. Ludhiyana: Tondan Publications, Books Market.
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9. Murthy, S. K. (2009). Philosophical and Sociological Foundation of Education. Ludhiyana: Tondan Publication, Books Market.
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12. National Policy and Education. (1986). MHRD. New Delhi: Govt. of India.

Edn 7: PE - LEARNING AND TEACHING-1**Theory****Credits 4****Essence of the course:**

Modern world is marching towards technology and scientific innovations. Keeping these changes in mind, this course tries to enable the student teachers to be aware of learning and teaching deeply. This also intends to develop a positive attitude towards the process of teaching and learning which would help the trainees to adopt various strategies of learning and teaching with reference to various levels of learning. It also enables the trainees to adopt various modern tools and techniques for facilitating learning and teaching.

Objectives:**At the end of the course, the student teacher will be able to**

- Understand the concept of learning and its importance for human excellence
- Apply the learning theories in their teaching
- Understand the processes that facilitate construction of knowledge
- Create facilitative learning environments in schools
- Understand the concept and different levels of teaching
- Adopt different teaching strategies
- Understand the models of teaching
- Adopt ICT tools for facilitating teaching and learning
- Adopt innovative practices of teaching and learning
- Understand teaching as a profession.

CONTENT OUTLINE**Unit 1: Development of learner and learning**

Learning –Domains of learning for holistic development – Phases of learning – influence of peer group, group cohesion and group dynamics on learning – Development of learner as a resultant of interactions between individual potential (innate, acquired) and external environment (physical, socio-cultural, ecological, economic and technological) – Nature and nurture, continuity and discontinuity issues, growth and maturation – Implications for teachers to develop holistic understanding of the learner in context.

Unit 2: Theoretical perspectives on learning

Perspectives on human learning: Behaviourist (conditioning paradigm in brief), cognitivist, information-processing view, humanist, social-constructivist (drawing selectively on the ideas of Skinner, Piaget, Rogers, Vygotsky). – Concepts and principles, applicability and Relevance, Role of learner in various learning situations, Role of teacher in teaching-learning situations:

Unit 3: learning in 'constructivist' perspective

Distinctions between learning as 'construction of knowledge' and learning as 'transmission and reception of knowledge' – Social-constructivist perspective and applications of Vygotsky's ideas in teaching – processes of construction of knowledge: Experiential learning and reflection, Social mediation, Cognitive negotiability, Situated learning and cognitive apprenticeship, Meta-cognition – Creating facilitative learning environments, teachers' attitudes, expectations – enhancing motivation, positive emotions, self-efficacy, collaborative and self-regulated learning.

Unit 4: Methods of learning

Types - individual and group methods – innovative methods, new trends in learning use of computer and networking – Influence of methods on active engagement and inquiry in Learning – activity based learning – social learning – constructivism in learning – problem solving, discovery learning, mastery learning, individual and peer group learning – factors affecting learning

Unit 5: Individual differences among learners

Differential learning needs of the learners with regard to abilities: intelligences, interest, aptitude, creativity, personality, values – learning styles – language (home language and language of instruction) – sociocultural differences (cultural capital), learning difficulties, and their implications for classroom practices and teaching

Mode of transaction: Lecture, discussion, Project work, field trip, assignment, seminar, workshop

Practicum: Task and Assignment

1. Identify the learning styles of the learners and report.
2. Report based on the visit to any two types of schools regarding the records of teaching and learning
3. A case study on the success story of any one school in teaching and learning
4. Write a narrative on teaching learning process in a classroom based on observing a teacher

Mode of Assessment:

Written test and Task and assignment

References:

1. Anastasi, Anne (1989) *Psychology Testing*, Macmillan Publishing Company.NY.
2. Ausubel David, P and Floyd, G.Robinson (1985). *Educational Psychology*, Holt Rinehart and WinstonInc.
3. Chauhan S.S., (1988). *Advanced Educational Psychology*, Vikas Publishing House Pvt Ltd.Clifford.
4. Dunlop, F. (1971). *The Education of Feeling and Emotions*, London: George Allen and Unwin.
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7. Eysenck, H.J. (1997). *Dimensions of personality*. London: Kegan Paul.
8. Geetha C., Subash C.S., (1998) How to Understand and Help Adolescents. A Friendlier Approach, Student publications; New Delhi.
9. Goleman D., (1998). *Emotional Intelligence: Why it can matter more than IQ*. Sage publications: New Delhi.
10. Guilford, J.P.(1977). *The Nature of Human Intelligence*. McGraw Hill, NY.
11. Harry Adler., *Boost Your Creative Intelligence*. Kogan Page India Pvt. Limited: New Delhi.
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14. Kapur, M, (1998). *Mental Health of Indian Children*, Sage Publications, New Delhi.
15. Mangal, S.K. (1981). *Psychological foundations of education*. Ludhiana: Parkash Bros.
16. Nirmala, J. (2012). *Psychology of Learning and Human Development*. Neel kamal publication Pvt Ltd, New Delhi.
17. Quazi Ferdoushi Islam (2012), *Educational Psychology*, New Delhi : Dorling Kindersley (India) Pvt. Ltd., Licenses of Pearson in South Asia - Core Paper II
18. Roberts T.B. (Ed) 1970). *Four Psychologies Applied to Education: Freudian, Behavioral, Humanistic, Transpersonal*, NY.
19. Sharma.R.A (1980), *Technology of Teaching*, International Publishing House, Meerut.

Edn 8: C&PS - PEDAGOGY OF SCHOOL SUBJECT I

8(i): Pedagogy of Tamil I – Part 1

தமிழ் கற்பிக்கும் முறைகள் I -பகுதி 1

Theory

Credits 4

அடிப்படைக் கோட்பாடுகள்

மொழியின் தோற்றத்தையும் செம்மொழியின் சிறப்புகளையும் அறிந்திருப்பர். அறிவியல் வளர்ச்சியின் தாக்கம் மொழியிலும் மாற்றத்தை ஏற்படுத்துவதால் அதற்கான கலைச்சொற்களை உருவாக்கும் திறனைப் பெறுவர். கலைச்சொற்கள் உருவாக்கத்திற்கு நூலகங்களின் பயன்களையும் தேவையையும் அறிந்திருப்பர். காலத்திற்கேற்ப தாய்மொழியை எவ்வாறு கற்பிக்க வேண்டும் என்பதையும் கற்பிக்கும் முறைகளையும் அறிந்திருப்பர். இக்கால இலக்கியங்களின் சிறப்புகளை அறிந்து கற்பிக்கும் திறனைப் பெற்றிருப்பர். தாய்மொழியைப் பிழையின்றி பேசுவதையும் அதன் நுணுக்கங்களையும் அறிந்திருப்பர். மொழியைப் பற்றி மொழியியலாளர்கள் கூறும் கருத்துகளையும் மொழி வளர்ச்சிக்கு ஒப்பிலக்கியத்தின் தேவையையும் அறிந்திருப்பர்.

நோக்கங்கள்

- மொழியின் அமைப்புகளையும் பண்புகளையும் அறியச் செய்தல்.
- செம்மொழித் தமிழின் தொன்மைகளை அறிந்து பெருமிதம் கொள்ளச் செய்தல்.
- நூலகத்தைப் பயன்படுத்தும் ஆர்வத்தைத் தூண்டுதல்.
- அறிவியல் தமிழின் அவசியத்தை உணர்த்துதல்.
- பல்வேறு கற்பிக்கும் முறைகளை அறியச் செய்தல்.
- இலக்கியத் திறனாய்வு குறித்த அடிப்படைச் செய்திகளை அறிய செய்தல்.
- இக்கால இலக்கியங்கள் குறித்து அறிந்து கொள்ளச் செய்தல்.
- மொழியியல் நோக்கில் தமிழ்மொழியின் அமைப்பினை உணர்த்துதல்.
- கற்பித்தல் -கற்றல் உத்திகளைப் பயன்படுத்தும் திறனை வளர்த்தல்.
- தொல்காப்பியம் குறிப்பிடும் ஆசிரியர் மாணக்கர் குணநலன்களை உணர்த்துதல்.

அலகு 1: தமிழ்மொழி வரலாறு

மொழியின் தோற்றம்- தமிழின் தொன்மை- உயர்தனிச் செம்மொழி-வரையறை, அறிஞர்களின் கூற்று, வளர்ச்சி, இன்றைய நிலை, காலம் தோறும் பண்பாட்டுச் சிறப்புகள்- தமிழில் சமூக, வட்டார வேறுபாடுகள்

அலகு 2: அறிவியல் தமிழ்

அறிவியல் தமிழின் தேவைகள்- அறிவியல் தமிழ் அமைப்பு - கலைச்சொல்லாக்கம்- கடன்வாங்கல்- வேறுபாடுகளை நீக்குதல்- மொழித்தூய்மையைக் கையாளுதல் -நிறைகள், குறைகள்

அலகு 3: கற்பித்தல் வளங்கள்

நூலகத்தின் நோக்கங்கள்- வகைகள்- பயன்கள்- அகன்ற படிப்பு, நிறைகள், குறைகள்- அகராதி, கலைக்களஞ்சியம், நிகண்டுகள், சொல்லடைவு, பொருளடைவு, நூலடைவு, இணையம்.

அலகு 4: கற்பிக்கும் முறைகள்

விரிவுரை- கலந்துரையாடல்- சொற்பொழிவு- கருத்தரங்கம்- குழுவிவாதம்- மாநாடுகள்- ஆய்வரங்கங்கள்

அலகு 5: இக்கால இலக்கியங்களின் அறிமுகம்

உரைநடை -நாவல்- சிறுகதை- புதிக்கவிதை- வரையறை, வகைகள், இலக்கிய பங்களிப்பு

மதிப்பீடு: வகுப்புத் தேர்வு, வாய்மொழித் தேர்வு, ஒப்படைப்புகள், வகுப்புக் கருத்தரங்கம், மாதிரிப் பாடம் எடுத்தல், வகுப்பில் மாணவர்கள் பங்கேற்பை மதிப்பிடல்.

செய்முறைப் பயிற்சிகள்

1. Practice minimum 3 Micro teaching skills and maintain the record.(Compulsory)
2. தமிழ் அறிஞர்களின் படத்தொகுப்புச் சேகரித்தல்
3. கலைச்சொற்களைச் சேகரித்தல்
4. ஏதாவது ஒரு பொருள் குறித்த நூலடைவு தயாரித்தல்
5. பிழை நீக்கல் பயிற்சி தயாரித்தல்

பார்வை நூல்கள்

1. அகத்தியலிங்கம்,ச. புஷ்பவல்லி,க. 1977. மொழியில் வாழ்வும் வரலாறும்.அனைத்திந்திய தமிழ் மொழியியற் கழகம்
2. இரத்தின சபாபதி, பி. செம்மொழிக் கல்வி, சாந்தா பப்ளிஷர்ஸ், சென்னை.
3. கணபதி,வி. (1989) நற்றமிழ் கற்பிக்கும் முறைகள், சாந்தா பப்ளிஷர்ஸ், சென்னை.
4. குழந்தைசாமி,வா.செ. 2001. அறிவியல் தமிழ். பாரதி பதிப்பகம், சென்னை.
5. கோகிலா தங்கசாமி (2000) குழந்தைமையக் கல்வியும் தமிழ் கற்பித்தலும், அனிச்சம் புளும்ஸ், காந்திகிராமம்.
6. கோவிந்தராசன், மு. (1990) நற்றமிழ் கற்பிக்கும் முறைகளும் நோக்கங்களும், சரஸ்வதி பதிப்பகம், சென்னை.
7. சக்திவேல்,ச.1988. தமிழ்மொழி வரலாறு, மணிவாசகர் பதிப்பகம்,சிதம்பரம்.
8. சந்திரசேகரன், சோ. 2006. ஒப்பியில் கல்வி- சில புதிய பரிமாணங்கள். குமரன் பதிப்பக இல்ல வெளியீடு, கொழும்பு.
9. செந்தூர் பாண்டியன், செ. (1983) திட்டமிட்டதைக் கற்றல் ஓர் அறிமுகம். மீனாட்சி பதிப்பகம், புதுக்கோட்டை.
10. சேகர், து. (2003) தமிழ் இலக்கணங்களில் கல்வியியல் சிந்தனைகள், சேமா பதிப்பகம்.
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12. துளசிதாசன், 2010. கனவு ஆசிரியர், பாரதி புத்தகாலயம், சென்னை
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8 (ii): Pedagogy of English I – Part 1**Theory****Credits 4****Essence of the course:**

School education and teacher-education share a symbiotic relationship. To have qualitative improvement in education, both teacher-education and school education need to mutually reinforce each other. NCF-2005 and the Right to Education Act, 2009 suggest a rethinking in the area of teacher-education as well. A need to review and redesign the B.Ed. Syllabus was felt as NCF-2005 expects the teacher to look at school education in a holistic manner. It advocates learner-centered learning rather than teacher-centered teaching. Teacher's attitude, aptitude and motivation play an important role because the teacher needs to engage with the learning process of the learner. Teacher as a facilitator helps learners to construct their knowledge. The teacher should be able to participate meaningfully to transact the syllabus and textbooks effectively along with teaching-learning materials. Therefore, the teacher should be well-versed not only with the subject content but also with the pedagogy of learning. Language is the medium for comprehending ideas, for reflection and thinking, as well as for expression and communication. This course is visualized as a range of language based activities, which will aid in strengthening the ability to 'read', 'think', 'discuss and communicate' as well as to 'write' in the language of instruction.

Objectives:**At the end of the course the student teachers will be able to**

- understand the aims & objectives of teaching English
- enable the student teachers to acquire knowledge of the sound systems of English and to familiarize them with the appropriate terminology to describe the sounds in English.
- acquire an understanding of the nature and structure of English language and components skills
- enable the student teachers to understand the connections of English speech and to acquire good pronunciation and fluency of speech.
- develop skills for effective teaching—micro teaching.
- understand the importance of Using-English in global context
- get familiarized with the various aspects of the B.Ed. programme with special reference to the nature of the language skills to be developed and evaluation
- familiarize student teachers with the text book contents related to high school and Higher Secondary classes.
- help student teachers acquire a working knowledge of the grammatical terminology and the grammatical system in English.
- acquaint with the planning of instruction.
- develop in the student teachers the ability to write in an appropriate manner for a particular purpose with a particular audience in mind.
- develop an insight into the symbiotic relationship between curriculum syllabus and textbooks
- Get familiarized with the IT sources / packages that are helpful in teaching English

CONTENT OUTLINE**Unit 1: Nature and Scope of English Language Teaching**

English for Global purpose- First Language- Second Language - Foreign Language. Utilitarian aim. Objectives of teaching English in India- Problems related to teaching and learning of English in schools-Remedial suggestions to overcome these difficulties.

Unit 2: Spoken English

The different speech organs and their role – the individual sounds – vowels and consonants – their place and manner of articulation – The concepts of the phoneme and allophone – phonetic transcription – stress – word stress and sentence stress – intonation in English – four basic patterns of intonations in English- Rhythm.

Unit 3: Lexis

Word formation – affixation – conversion – compounding – other minor devices – pattern of spelling – phrasal verbs and prepositional phrases- spelling rules.

Unit 4: Advanced Grammar: I

The noun phrase – MHQ (Modifier, Headword, Qualifier); the verb phrase; Adverbial. Tense forms – auxiliary verbs – The Sentence – Types of sentences – subordinate and co-ordinate clauses- Question forms.

Unit 5: Acquisition of teaching skills

Teaching Skills – meaning, analytical approach to understand teaching learning process in English language in terms of teaching skills – relevant teaching skills in teaching of English – micro teaching as a technique for acquiring teaching skills – integration of teaching skill – strategies – link practice

Mode of transaction:

Introductory lecture, Use of multimedia resources, Library resources, Accessing Online input on the topic, Language Lab, Observation of video clips, Print versions of texts focusing on communication, Dictionary and online referencing, Virtual learning, Usage of Language games, Power point presentation (PPP) for teaching a grammar topic, Micro-teaching through video lessons, Lesson Plan presentation, Mind mapping, Comparative & critical study on various methods and approaches of teaching prose poetry and grammar, Interactive Sessions, Comparative study of various forms of compositions, Demonstration, Small group discussions, Framing, evaluating and interpreting a question paper.

Practicum: Task and Assignment

1. Practice minimum 3 Micro teaching skills and maintain the record. (Compulsory)
2. Seminar on significance of English language in India
3. Project on formation of new words
4. Assignments on learning phrasal verbs
5. Planning of 10 vocabulary building exercises and techniques to teach the students in the classroom
6. Construction of New lexical items and structural items

Mode of assessment:

Analysis of Group discussion, Assessment of expressing ideas and thoughts through suitable examples, Monitoring performance of communicative tasks, Self-assessment and peer assessment, Evaluation based on documentation, Performance evaluation, Feedback

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8(iii): Pedagogy of Hindi I – Part 1

Theory

Credits 4

पृष्ठभूमि:

राष्ट्रीय पाठ्यचर्यासूचिका 2005 तथा शिक्षा का अधिकार एक्ट 2009 विद्यालयी शिक्षा तथा शिक्षण प्रशिक्षण के निकट संबंधों को ध्यान में रखते हुए शिक्षकों की भूमिका में एक बहुत बड़े परिवर्तन की माँग करती है। पाठ्यचर्या में अभी तक शिक्षकों को ही ज्ञान के स्रोत के रूप में केन्द्रीय स्थान मिलता रहा है, वह सीखने-सिखाने की समूची प्रक्रिया के संरक्षक और प्रबंधक के रूप में मुख्य भूमिका निभाने का काम करते आए हैं। पर 2005 की स्कूली पाठ्यचर्या उनसे माँग करती है कि वे सूचनाओं के वितरक और ज्ञान के स्रोत बन कर न रहें बल्कि विद्यार्थियों द्वारा ज्ञान हासिल करने की प्रक्रिया में स्वयं को सहायक मानें। इन सब परिवर्तनों को उनके व्यवहार का हिस्सा बनाने के लिए ज़रूरी है कि अध्यापक शिक्षा के पाठ्यक्रम में परिवर्तन आए। विद्यालयी शिक्षा व्यवस्था में परिवर्तन की पहल तभी संभव है जब इस व्यवस्था से जुड़े लोगों की सोच और दृष्टिकोण में परिवर्तन आए और शिक्षकों की भूमिका इस व्यवस्था में सबसे महत्वपूर्ण है। इस दृष्टि से भाषा-शिक्षण का पाठ्यक्रम और भी महत्वपूर्ण हो जाता है, क्योंकि भाषा पूरी शिक्षा की आधारशिला का काम करती है, जहाँ सिर्फ भाषा पढ़ना-सीखना नहीं बल्कि भाषा के द्वारा अन्य विषयों में भी निपुणता प्राप्त करने की बात आती है। इसके साथ ही भाषा से जुड़े नए बिन्दुआ. जैसे - बहुभाषिक कक्षा, समझ का माध्यम, शांति की शिक्षा में भाषा की भूमिका आदि की समझ शिक्षकों के लिए ज़रूरी है जो अध्यापक शिक्षा में व्यापक बदलाव की माँग करते हैं।

वर्तमान पाठ्यक्रम भाषा के नए सरोकारों और सीखने-सिखाने की नई दृष्टियों को ध्यान में रखकर तैयार किया गया है। आशा है कि शिक्षकों प्रशिक्षणार्थियों को इससे भाषा-शिक्षण की तैयारी में सहायता मिलेगी।

पाठ्यक्रम के विशेष उद्देश्य

- भाषा की अलग-अलग भूमिकाओं को जानना
- भाषा सीखने की सृजनात्मक प्रक्रिया को जानना
- भाषा के स्वरूप और व्यवस्था को समझना
- स्कूल की भाषा, बच्चों की भाषा और समझ के बीच के संबंध को जानना
- भाषा के संदर्भ में पढ़ने के अधिकार, शांति और पर्यावरण के प्रति सचेत होना
- भाषा सीखने के तरीके और प्रक्रिया को जानना और समझना
- पाठ्यचर्या, पाठ्यक्रम और पाठ्यपुस्तक का विश्लेषण कर कक्षा विशेष और बच्चों की समझ के अनुसार ढालना
- भाषा और साहित्य के संबंध को जानना
- हिंदी भाषा के विविध रूपों और अभिव्यक्तियों को जानना
- भावों और विचारों की स्वतंत्र अभिव्यक्ति करना
- भाषायी बारीकियों के प्रति संवेदनशील होना
- अनुवाद के महत्व और भूमिका को जानना
- विद्यार्थियों की सृजनात्मक क्षमता को पहचानना
- बच्चों के भाषायी विकास के प्रति समझ बनाना और उसे समुन्नत करने के लिए विद्यालय में तरह-तरह के मौके जुटाना
- भाषा के मूल्यांकन की प्रक्रिया को जानना
- साहित्यिक और गैर साहित्यिक मौलिक रचनाओं की समझ और सराहना
- भाषा सीखने-सिखाने के सृजनात्मक दृष्टिकोण को समझना

इकाई 1: भाषा की भूमिका

(बच्चा जब स्कूल आता है तो उसके पास भाषा का एक रूप मौजूद होता है। कक्षा में बच्चों की भाषा के इस रूप को सम्मान देने से उसका आत्मविश्वास बढ़ेगा, यह सीखने की बुनियाद है।)

1. समाज में भाषा - भाषा और लिंग; भाषा और सत्ता; भाषा और अस्मिता, भाषा और वर्ग
2. विद्यालय में भाषा - घर की भाषा और स्कूल की भाषा; समझ का माध्यम (बच्चे की भाषा); समूचे पाठ्यक्रम में भाषा; ज्ञान सृजन और भाषा; माध्यम भाषा; एक आलोचनात्मक दृष्टि; विषय वेफ रूप में भाषा और मामयम भाषा में अंतर; विविध भाषिक प्रयुक्तियाँ; बहुभाषिक कक्षा; शिक्षक-शिक्षार्थी संबंध के पहलू के रूप में भाषा
3. संविधान और शिक्षा समितियों के रिपोर्ट में भाषा-भाषाओं की स्थिति (धारा 343-351, 3501); कोठारी कमीशन (64 से 66); राष्ट्रीय शिक्षा नीति - 1986; पी.ओ.ए-1992, राष्ट्रीय पाठ्यचर्या - 2005 (भाषा अध्ययन)

इकाई 2: हिंदी भाषा की स्थिति और भूमिका

हिंदी भाषा की भूमिका: स्वतंत्रता से पहले और स्वतंत्रता के बाद हिंदी; हिंदी के विविध रूप; अंतर्राष्ट्रीय स्तर पर हिंदी; ज्ञान की भाषा के रूप में हिंदी; हिंदी पढ़ने-पढ़ाने की चुनौतिया।

इकाई 3: भाषा शिक्षण पर एक दृष्टि

(हिंदी में विज्ञान, गणित, समाज विज्ञान और कला सब कुछ है पर ये विषय स्वयं हिंदी या भाषा नहीं हैं।)

1. भाषा सीखने सिखाने की विभिन्न दृष्टि - भाषा अर्जन और अधिगम का दार्शनिक, सामाजिक और मनोवैज्ञानिक आधार, समग्र भाषा दृष्टि, रचनात्मक दृष्टि, भाषा सीखने-सीखाने की बहुभाषिक दृष्टि आदि (जॉनडुई, ब्रूनर, जे. प्याजे, एल. वायगात्स्की, चॉम्स्की आदि) भारतीय भाषा दृष्टि (पाणिनी, कामता प्रसाद गुरु, किशोरी दास वाजपेयी आदि)।
2. भाषा शिक्षण की प्रचलित विधियाँ/प्रणालियाँ और उनका विश्लेषण - व्याकरण अनुवाद प्रणाली; प्रत्यक्ष प्रणाली, ढाँचागत प्रणाली, प्राकृतिक प्रणाली, उद्देश्यपरक (अन्तर्विषयक/अन्तर्नुशासनात्मक) संप्रेषणात्मक प्रणाली आदि।

इकाई 4: भाषा का स्वरूप

(कोई व्याकरण भाषा की चाल को बदल नहीं सकता। भाषा लोक व्यवहार से परिचालित होती है।)

1. भाषायी व्यवहार के विविध पक्ष - नियमबद्ध व्यवस्था के रूप में भाषा; भाषायी परिवर्तनशीलता (उच्चारण के संदर्भ में); हिंदी की बोलियाँ! वाक् तथा लेखन।
2. भाषायी व्यवस्थाएँ - सार्वभौमिक व्याकरण की संकल्पना; अर्थ की प्रकृति तथा संरचना; वाक्य विज्ञान तथा अर्थ विज्ञान की मूलभूत संकल्पनाएँ; स्वनिम विज्ञान और रूप विज्ञान; (उपयुक्त उदाहरण देकर पढ़ाए जाएँ)

इकाई 5: भाषायी दक्षताएँ!

- **संदर्भ में भाषा** - संदर्भ में व्याकरण और संदर्भ में शब्द
- **भाषायी दक्षताएँ** - सुनना, बोलना, पढ़ना और लिखना
 - **सुनना और बोलना** - सुनने का कौशल, बोलने का लहजा- भाषाई विविधता और हिंदी पर इसका प्रभाव, पढ़ने-पढ़ाने पर इसका प्रभाव; सुनने और बोलने के कौशल विकास के स्रोत और सामग्री, रोलप्ले, कहानी सुनाना, परिस्थिति के अनुसार संवाद, भाषा लैब, मल्टीमीडिया तथा मौलिक सामग्री की सहायता से संप्रेषणात्मक वातावरण का निर्माण
 - **पढ़ना** - पढ़ने के कौशल; पढ़ने के कौशल विकास में समझ का महत्व, मौन और मुखर पठन, गहन-पठन, विस्तृत पठन, आलोचनात्मक पठन, पढ़ने के कौशल विकास में सृजनात्मक साहित्य (कहानी, कविता आदि) सहायक, थिसॉरस, शब्दकोश और इन्साइक्लोपीडिया का उपयोग/महत्व
 - **लिखना** - लिखने के चरण; लेखन-प्रक्रिया, सृजनात्मक लेखन, औपचारिक और अनौपचारिक लेखन (कहानी, कविता, संवाद, डायरी, पत्र, रिपोर्ट, समाचार आदि)

सिखाने का माध्यम

- व्याख्यान
- सामूहिक चर्चा

- निदर्शन एवं सामग्री विश्लेषण
- विचारगोष्ठी
- विभिन्न साहित्यकारा, लेखका. एवं कविया. के विषय म. चर्चाएँ
- पुस्तकालय संसाधना. का उपयोग
- भाषा प्रयोगशाला
- वीडियो क्लिप्स का प्रयोग
- दृश्य-श्रव्य पाठ. के माध्यम से सूक्ष्म शिक्षण
- व्याकरण प्रकरण. के शिक्षण हेतु पावर प्वाइंट प्रस्तुतीकरण
- पाठ योजना प्रस्तुतीकरण
- अर्न्तसक्रिय सत्र
- प्रश्न पत्र निर्माण, मूल्यांकन एवं विश्लेषण
- शब्दकोष तथा ऑन लाइन संदर्भ

प्रायोगिक कार्य

- Practice minimum 3 Micro teaching skills and maintain the record.(Compulsory)
- विश्वस्तर पर हिन्दी की उपयुक्तता एवं उपयोगिता पर विचारगोष्ठी
- मौखिक एवं लेखन अभिव्यक्ति गतिविधियाँ
- मुहावरे, लोकोक्तिया. का प्रयोग करते हुए कहानी, लेख आदि लिखवाना
- विषयवस्तु आधारित अभ्यास
- सूक्ष्म एवं व्यापक पाठ योजनाएं. बनाना
- पावर प्वाइंट प्रस्तुतीकरण
- दृश्य-श्रव्य सामग्री का निर्माण
- ब्लूप्रिंट, प्रश्न-पत्र, अंकयोजना तथा प्रश्नानुसार विश्लेषण
- विषय वस्तु परीक्षण तथा उपलब्धि परीक्षण की संरचना
- परीक्षण आंकड़ा. का प्रस्तुतीकरण
- पाठ से संबंधित प्रायोगिक कार्य

मूल्यांकन के माध्यम

- सामूहिक चर्चा का विश्लेषण
- स्व मूल्यांकन तथा निकट समूह मूल्यांकन
- उपलब्धि मूल्यांकन
- अभिलेखन एवं अभिव्यक्ति आधारित मूल्यांकन
- प्रत्यक्ष-अप्रत्यक्ष सूचना आधारित मूल्यांकन

संदर्भ- स्रोत

1. अनन्त चौधरी, नागरी लिपी और हिन्दी वर्तनी, बिहार हिन्दी ग्रन्थ अकादमी, पटना।
2. के० क्षत्रिया, मात्रभाषा शिक्षण, विनोद पुस्तक मंदिर, आगरा।
3. के० जी० रस्तोगी, भाषा सम्प्राप्ती मूल्यांकन, केन्द्रीय हिन्दी संस्थान, आगरा।
4. के० के० सुखिया, हिन्दी ध्वनियाँ और उनका शिक्षण, रामनारायण लाल, इलाहाबाद।
5. जयनारायण कौशिक, हिन्दी शिक्षण, हरियाणा साहित्य अकादमी, चण्डीगढ़।
6. जयनारायण कौशिक एवं विमला कौशिक, पाठ-योजना निर्देशिका हिन्दी शिक्षण, आर्य बुक डिपो, करोलबाग, नई दिल्ली।
7. जयनारायण कौशिक, शुद्ध हिन्दी लेखन, आर्य बुक डिपो, करोलबाग, नई दिल्ली।

8. निरंजन कुमार सिंह, माध्यमिक विद्यालयों में हिन्दी शिक्षण, राजस्थान ग्रंथ अकादमी, जयपुर।
9. भगवती प्रसाद शुक्ल, हिन्दी उच्चारण और वर्तनी, आर्य बुक डिपो, करोलबाग, नई दिल्ली।
10. भोलानाथ तिवारी, भाषा विज्ञान, किताब महल, इलाहाबाद।
11. भोलानाथ तिवारी तथा कैलाश भाटिया, हिन्दी शिक्षण, लिपी प्रकाशन, दिल्ली।
12. योगेन्द्रजीत, हिन्दी भाषा शिक्षण, विनोद पुस्तक मंदिर, आगरा।
13. रघुनाथ सफाया, हिन्दी शिक्षण, पंजाब किताब घर, जालंधर।
14. रमन बिहारी लाल, हिन्दी शिक्षण, रस्तोगी पब्लिकेशन, मेरठ।
15. रामशकल पांडेय, हिन्दी शिक्षण, विनोद पुस्तक मंदिर, आगरा।
16. लक्ष्मीनारायण शर्मा, भाषा की शिक्षण विधियाँ एवं पाठ-नियोजन, विनोद पुस्तक मंदिर, आगरा।
17. वैद्यनाथ प्रसाद वर्मा, बिहार हिन्दी ग्रन्थ अकादमी, पटना।
18. सीताराम चतुर्वेदी, भाषा की शिक्षा, हिन्दी साहित्य कुटीर, वाराणसी।
19. सावित्री सिंह, हिन्दी शिक्षण, लायल बुक डिपो, मेरठ।
20. शारदा भसीन, स्वनिम विज्ञान और हिन्दी की स्वनिम व्यवस्था, आर्य बुक डिपो, करोल बाग, नई दिल्ली।
- 21- हरिदेव बिहारी, व्यवहारिक हिन्दी व्याकरण, लोक भारतीय प्रकाशन, इलाहाबाद।

8(iv): Pedagogy of Malayalam I – Part 1**Theory****Credits 4****Essence of the course:**

Malayalam is the medium for comprehending ideas, for reflection and thinking, as well as for expression and communication. This course deals Evolution of Malayalam Language, Historical development of Malayalam Literature, Language skill, curriculum development in Malayalam, Discourses in Malayalam, Methods of teaching Malayalam, Theories of learning with special reference to Malayalam teaching, Evaluation of learning Malayalam. This course is visualized as a range of language based activities, which will aid in strengthening the ability to 'read', 'think', 'discuss and communicate' as well as to 'write' in the language of instruction.

Objectives:**At the end of the course the student teachers will be able to**

- enable the student teachers to acquire knowledge of the sound systems of Malayalam and to familiarize them with the appropriate terminology to describe the sounds in Malayalam.
- enable the student teachers to understand correct Malayalam usage and to acquire good pronunciation and fluency of speech.
- familiarize student teachers with the school syllabuses related to high school classes.
- help student teachers acquire a working knowledge of the grammatical terminology and the grammatical system in Malayalam.
- develop in the student teachers the ability to write in an appropriate manner for a particular purpose with a particular audience in mind.
- realize the significance of teaching Communicative Malayalam.
- develop their skill in curriculum transaction.
- develop a thorough understanding of the conceptual background of Malayalam.
- improve the understanding of the principles of curriculum construction and organization in Malayalam language.

CONTENT OUTLINE**Unit 1: Evolution of Malayalam Language**

Over the ages - Status of Malayalam language at different periods - Relationship between language and social development - Functions of language in the society - Influence of mother tongue in the formation of culture - Relevance of mother tongue in a democratic society - Mother tongue as a medium of instruction - Malayalam as an official language

Unit 2: Historical development of Malayalam Literature

Development of Malayalam literature - The influence of Tamil and neighboring languages on Malayalam - Influence of Sanskrit - Contributions of early poets - Contributions of Ezhuthachan - Earlier poets - Earlier prose writers - Development of champu - Development of the present day Malayalam Literature - Development of other forms of literature such as drama, short stories etc. - Development of Malayalam literature till date - Short description of the development of Malayalam Literature.

Unit 3: Language skill

Listening – Speaking – Reading – Writing - Importance of basic skills in language learning- strategies and activities appropriate for different levels-process learning.

Unit 4: curriculum development in Malayalam

Curriculum development-General principles-psychological, sociological, philosophical, needs and interests of learner, nature of subject matter and philosophy of nation - Different approaches to curriculum organization – Spiral, topical and concentric approach - New school Malayalam curriculum and its critical appraisal -- Micro teaching – definition and principles of micro teaching cycle – limitations. – Teaching Skills – meaning, analytical approach to understand teaching learning process in Malayalam in terms of teaching skills – relevant teaching skills in teaching of Malayalam- Core skills

Unit 5: Discourses in Malayalam

Importance of discourses in the daily life - Functions of seminars, symposiums, debates, discussions, speeches, brain storming, screen play, essays, memorandums, letter writing, notice, press notes, editorial, postures, advertisement, travelogue, biography, auto biography, description, dramatization etc. for effective communication.

Mode of Transaction:

Introductory lecture, Use of multimedia resources, Library resources, Dictionary and online referencing, Usage of Language games, Mind mapping, Demonstration, group discussions

Practicum: Task and Assignment

1. Practice minimum 3 Micro teaching skills and maintain the record.(Compulsory)
2. Prepare a short essay on inter relationship between language and social development. (group activity)
3. Open discussion on Mother tongue as a tool for transforming culture
4. Seminar (group) on Need of mother tongue as the medium of instruction
5. Seminar (group presentation)
6. Prepare short essay on 5 sub topics
7. Trace out the activities included in the Text book/Hand book for developing basic language skills among the learners
8. Find out the activities mentioned in the text book and hand book for developing the creativity among the learners.
9. Prepare essay on general principles of curriculum development.
10. Prepare an editorial for your class magazine
11. Prepare postures on any social issues
12. Write a screen play based on any one of the poems in the 8th or 9th std text book
13. Select a poem from any text book and present the same through simulation (group task)
14. Conduct a debate on the relevance of critical pedagogy in the context of the teaching-learning atmosphere prevailing in the schools in Kerala
15. Conduct a seminar on Chomsky's concept of language development.
16. Analyse and trace out the learning activities included in any one topic on the basis of prescribed curricular objectives (Group task)
17. Analyse any one text book and Trace out new vocabulary, phrases, idioms, proverbs, and grammar contents (group task)

18. Conducts a panel discussion on the relevance of grading system in the B.Ed programme.
19. Prepare a sample question paper considering all the elements of a scientific question paper (group task)

Mode of Assessment

Written test and Task and assignment

References:

1. A.R. Raja RajaVarma – Vrithamanjari, Kerala Panineeyam, Bhashabhushanam.
2. Damodaran Nair. P – Apasabdanighantu
3. Sankarakurup. G – SahithyaParichayam
4. Parameswaran Nair. P.K – Malayala Sahithya Charithram
5. Raghavan Payyanad – Folklore
6. Balasahithyam Thatwavum Charithravum – State Institute of Children Literature
7. Sahithya Charithram, Prasthanangaliloode – National Book Stall, Kottayam.
8. Allen,D& Ryan, K (1969). *Micro teaching*. London: Adison Wesley
9. Bindhu,C.M(2ndEd.)(2009). Mathrubhashabhodhanam: Pravanathakalum Reethikalum. Calicut: Scorpio
10. Bloom. B. S.(1956). *Taxonomy of Educational Objectives: cognitive domain*, New York: David Mckay Co.
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12. Chomsky, N (1975). *Reflections on Language*. New York: Randomouse.
13. Dale,(1961). *Audio visual methods in teaching*, New York: Holt Rinehart & Winston
14. Ebel,L.&Frisbie,A.(1991). *Essentials of educational measurement*. New York: McGraw Hill.
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16. Fosnot,C.(1996). *Constructivism: theory, perspectives and practice*. Newyork: Teachers College Press.
17. Gren,G.H.(1987). *Planning the lesson*. London: Logman
18. Gronlund,N.E(1970) *Stating Behavioural objectives for class room instruction*.London: MacMillan
19. Joyce, B & Weil, M (2003). *Models of Teaching*(5th Ed.) New Delhi.Prentice hall
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23. Lee,W.R(1972). *Language teaching games and contexts*. London: Oxford University press.
24. Mayer,R.E(2003). *Language and instruction*, Upper Saddle River. Pearson education
25. Nair, Chandrashekhara,C.K(2002) *Mathrubhasha Bhodhanam*. Trivandrum. Kerala bhasha institute.
26. NCERT(2005)National Cruiculum Framework. NewDelhi: NCERT
27. SCERT(2007),Kerala Curriculum Frame work. Trivandrum:SCERT
28. Passi, B. K(Ed)(1976). *Becoming better teacher: A micro teaching approach*. Ahmadabad
29. Pillai,P.E (1991) *Malayalabhashabhodhanam*. Kerala: chris printers kottayam.
30. Sivarajan, k & Sreemannuni, P. S. (2003) *Malayalabhashadhyapanam. Central cooperativestores, Calicut university*.
31. Variyar, Prabhakaran,K.M& A. Santha(1998). *Modern linguistics*, Trivandrum: keralabhasha institute.

8(v): Pedagogy of Telugu I – Part 1

Theory

Credits 4

Essence of the course:

Objectives:

CONTENT OUTLINE

Mode of Transaction

Practicum: Task and Assignment

Mode of Assessment

References:

Syllabus yet to be prepared for Pedagogy of Telugu I – Part 1.

8(vi): Pedagogy of French – Part 1**Credit: 4****Essence of the course:**

This course is to enable students to specialize in teaching French as a foreign language and to develop an understanding of the modern day teaching approaches to teach grammar, vocabulary and pronunciation. The course includes analysis of teaching content and text books.

Objectives:

At the end of the course, the student teacher will be able to:

- understand the basic theories of learning and communication
- understand different approaches of teaching FLE/FLES
- acquire knowledge of various techniques in teaching oral and written skills
- prepare unit plan and activity oriented Lesson plans
- apply the theoretical concepts in classroom teaching
- develop the positive attitude among the students
- stimulate curiosity and creativity

CONTENT OUTLINE**Unit 1: Theories of Learning**

Behaviourisme – Rationalisme – Constructivisme - Socio –cognitivism – Intéraction de tutelle de Bruner – Intelligences multiples de Gardner
(*Manuel de formation pratique : P.29-32,*)

Unit 2: Communication in teaching

Quatre théories importantes de la communication pour la didactique - Le non-verbal en classe de langue - Registre de langue – Enonciation – Actes de parole – Intéraction -Compétence de communication

(*Manuel de formation pratique : P. 49-52,52-56, 57-59, 60-61, 62-63, 64-66, 70-71*)

Teaching Skills – meaning, analytical approach to understand teaching learning process in French in terms of teaching skills – relevant teaching skills in teaching of French

Unit 3: Didactic strategies for oral skills

Compréhension orale: Différents types d'écoute – Supports de la compréhension orale - Démarche pédagogique de l'écoute en classe. – Production orale: Interagir – Simulation – Simulation Globale – Jeu de rôles

(*Manuel de formation pratique: P. 96-99, 104-107*)

Unit 4: Didactic strategies for written skills

Compréhension écrite: Types de texte – Processus de lecture – Types de lecture – Démarche pédagogique de la compréhension de l'écrit. – Production écrite: Ecrire pour communiquer – Ecriture créative

(*Manuel de formation pratique: P.119-120, 122-123, 128, 129-130,133-137, 138-141*)

Unit 5: Revision of teaching content (Grammar and Vocabulary) & Teaching of Grammar

Modes et temps – Pronoms – Prépositions - Adjectifs - Adverbes - Articles – Conjonctions de coordination et subordination

Prescribed book: Grammaire Française, Jacqueline Ollivier

Définition de « grammaire » - types de grammaire - grammaire implicite/ explicite – inductive/déductive – Notions: activité, exercice, tâche

(Manuel de formation pratique: P. 183 -195)

Mode of Transaction

Lecturing on theoretical concepts, Project method, Tasks and Assignments.

Practicum: Task and assignment

1. Practice minimum 3 Micro teaching skills and maintain the record.(Compulsory)
2. Seminar on foundation and significance of French language teaching
3. Oral Communication tasks
4. Language Lab activities
5. Preparation of micro lesson plan
6. Preparation of micro lesson plan using computer assisted instruction
7. Sessions in small or medium groups
8. Language games on grammatical structure
9. Dramatization and miming.
10. Project on formation of new words
11. Planning of 10 vocabulary building exercises and techniques to teach the students in the classroom.
12. Assignments & Library work
13. Preparation of audio visual aids(PPT, Charts, Models)
14. Listening to radio news and responding to questions.

Mode of Assessment

Paper-pencil tests, Performance tests, Formal and Informal Testing

References:

1. ABRY D., VELDEMAN-ABRY J. *La phonétique : audition, prononciation, correction*, CLE, 2007, 1CD
2. BERTOCCHINI P., COSTANZO E., *Manuel de formation pratique pour le professeur de FLE*, Paris, CLE International, 2008.
3. CHARLIAC, Lucile et MOTRON, Anne-Claire. *Phonétique progressive du français*. CLE International, 1999.
4. CUQ J.-P., GRUCA I., *Cours de didactique du français langue étrangère et seconde*, Grenoble, PUG, 2002.
5. MOIRAND S., *Enseigner à communiquer en langue étrangère*, Paris, Hachette, coll. F, 1982.
6. OLLIVIER JACQUELINE et BEAUDOIN MARTIN, *Grammaire française*, 5e édition, Montréal, Groupe Modulo,
7. POISSON-QUINTON, Sylvie et MIMRAN, Reine. *Vocabulaire expliqué du français*. Niveau intermédiaire. CLE International, 2004
8. TAGLIANTE., CHRISTINE., *La classe de langue*, coll, Techniques de classe, CLE international, 2006

8(vii): Pedagogy of Mathematics I – Part 1**Theory****Credits 4****Essence of the course:**

This course is to enable student teachers to specialize in mathematics teaching to develop an understanding of the curriculum and linking school knowledge with community life. The course includes reconstruction of mathematical knowledge through appropriate pedagogic processes and to communicate meaningfully with students.

Objectives:**At the end of the course, the student teacher will be able to**

- appreciate the nature, structure, scope of Mathematics and its relation with other disciplines.
- acquire knowledge of the nature and development of Mathematics
- understand the aims and objectives of teaching Mathematics
- prepare unit plan and activities oriented Lesson plans for effective classroom communications.
- prepare the prospective Mathematics teachers as facilitators for effective teaching and learning of Mathematics.
- apply different methods and techniques of teaching of Mathematics and to employ them proficiently in the classroom
- develop the positive attitude among the student in teaching Mathematics
- appreciate the role of Mathematics in day-to-day life
- stimulate curiosity, creativity and inventiveness in Mathematics

COURSE CONTENT**Unit 1: Nature and Significance of Mathematics**

Meaning and Characteristics of Mathematics – Nature of Mathematics: Precision, Logical Structure, Abstractness, Symbolism– Need and Significance of Learning Mathematics. Scope of Mathematics- Mathematics in day today activities in our life, various fields, disciplines and subjects.

Unit 2: Great mathematicians and contributions

History of Mathematics –Vedic Mathematics- Contribution of eminent mathematicians for the development of Mathematics –Aryabhata, Brahmagupta, Baskara, Ramanujam, Euler, Euclid, Pythagoras, Rene Descartes, Gauss.

Unit 3: Aims, Goals and Objectives of Learning Mathematics

Aims: Practical, Disciplinary, Cultural, Vocational, Social and Aesthetic - Taxonomy of Educational of objectives: cognitive, affective and psychomotor domains for teaching Mathematics - Revised Bloom's Taxonomy of Educational of objectives with specifications - General Instructional objectives: Knowledge, Understanding, Application, Skill, Interests, Attitude, Appreciation and Personality traits - Writing General Instructional objectives, specific learning outcomes and teaching points of various content areas in Mathematics.

Unit 4: Teaching skills

Teaching Skills – meaning, analytical approach to understand teaching learning process in mathematics in terms of teaching skills – relevant teaching skill in teaching of mathematics –

core teaching skills, meaning, components, observation procedure, writing lesson plan, for the following core teaching skills – Writing instructional objectives – Introducing a lesson, Fluency in Questioning , Probing Questioning, Explaining, Illustrating with Examples, Stimulus Variation, Reinforcement, Using Blackboard and Closure – micro teaching as a technique for acquiring teaching skills - Integration of Teaching Skills – Meaning, Need and Strategies – Vicarious integration and summation.

Unit5: Methods and Techniques of Teaching for Facilitating Learning Mathematics

Methods of Teaching: Inductive, Deductive, Analytic, Synthetic, Lecture-cum-Demonstration, Heuristic, Laboratory, Problem solving, Project. Techniques: Oral work, Drill, Review and Assignment.

Modes of Transactions:

Lecturing on Theoretical Concepts, Logical Reasoning of Mathematical problems, Analytic and Synthetic Methods of Teaching, Project Method, Tasks and Assignments, seminars.

Practicum: Task and Assignment

1. Practice minimum 3 Micro teaching skills and maintain the record.(Compulsory)
2. Study any one of eminent mathematician and his contribution to development of Mathematics– submit report
3. Writing specific objectives and teaching point of content areas in Mathematics of Algebra.
4. Prepare a year plan for any standard at the Secondary level.

Learning Activities:

Learning the Content and practicing them appropriately, Oral work, drill, Review and Practising Pedagogical Aspects for different areas of School Curriculum.

Mode of Assessment:

Paper-Pencil Tests, Performance tests, Formal and Informal Testing and Continuous Comprehensive Evaluation.

References:

1. Aggarwal, J. C. (2008). Teaching of Mathematics. UP: Vikas Publishing House Pvt Ltd.
2. Anice and Jeyanthi Alwan (2011). Skills and Strategies of Teaching Mathematics. Hyderabad: Neelkamal Publications Pvt. Ltd.
3. Anita J. Harrow (1977). A Taxonomy of the Psychomotor Domain. New York: David Mckay Company, Inc.
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14. Krathwohl. David R. Ed (1984). Taxonomy of Educational Objective. Handbook – II: Affective Domain New York: David McKay.
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18. Marlow Ediger and Digumarti Bhaskara Rao (2011). Essays on Teaching Mathematics. New Delhi: Discovery Publishing House Pvt. Ltd. Meerut: loyal book depot.
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27. Sidhu, K. S. (2006). The teaching of Mathematics. New Delhi: Sterling Publishers private ltd.
28. Singh M.P (2007). Teacher's Handbook of Mathematics. New Delhi: Anmol Publications
29. Singh, L.C. and Sharma R.D. (1987) Micro-teaching and Practice. Agra: National Psychological Corporation.
30. Singh, M. (2006). Modern teaching of Mathematics. New Delhi: Anmol Publications Pvt.Ltd.
31. Sudhir Kumar and Ratnalikar (2012). Teaching of Mathematics. New Delhi: Anmol Publications Pvt.Ltd.
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WEB Resources

1. www.infodev.org
2. <http://enhancinged.wgbh.org/research/eeeeee.html>
3. www.infodev.org
4. <http://enhancinged.wgbh.org/research/eeeeee.html>
5. www.classle.net
6. www.famous-mathematicians.org
7. www.thesecondprinciple.com
8. www.arvindguptatoys.com
9. www.ricum.edu.rs
10. www.ndlrn.edu.au
11. www.bbc.co.uk/learning/subjects/math.shtml
12. www.primaryresources.co.uk/math/math.shtm
13. www.mathtutordvd.com

8(viii): Pedagogy of Physical Science I – Part 1

Theory

Credits 4

Essence of the course:

Physical Science is a general science, after having learning this Course, student teachers understand the epistemological and pedagogical bases of physical science subject. They Pedagogy is integration of knowledge about *the learner, the subject* and *the societal context*. This course comprises of - the nature of the physical science subject, the aims and pedagogical approaches for the teaching of physical science at different stages of school; and deeper theoretical understanding of children in diverse social contexts.

The student-teachers will revisit basic concepts of physics and chemistry which was given in upper primary and secondary school books. The student-teachers will work with such theoretical studies as well as on the field with school children from different backgrounds, They will capable to critically examine teaching learning processes that incorporate enquiry, discovery, conceptual development, activity based learning, etc. within the classroom.

Objectives:**At the end of the course, the student teacher will be able to**

- acquire knowledge of nature, values and modern approaches in physical science teaching.
- understand learning objectives and curriculum approaches in physical science teaching.
- apply acquired knowledge of various methods and technique in teaching physical science.
- develop skill in adopting various approaches of learning in physical science teaching.
- develop interest in participating the practice teaching.
- develop desirable positive attitude towards contribution of eminent scientist for development of physics and chemistry.
- acquire hands-on experience in designing and developing suitable learning aids for classroom instruction.

COURSE CONTENT**Unit 1: Nature of physical science**

Meaning, scope – nature of physical science: Science as a dynamic and expanding body of knowledge – Science as a process of enquiry and a process of constructing knowledge –science as interdisciplinary area of learning – values in teaching physical science: individual, social.

Unit 2: Aims of learning physical science

Aims of Learning Science – Knowledge and understanding through science – Nurturing process skills of science – basic and integrated science process skills and their fostering – Development of scientific attitude and scientific temper – Nurturing the natural curiosity, creativity and aesthetic sense. Contribution of eminent scientists: Albert Einstein, Isaac Newton, Neils Bohr, C. V. Raman, J.C. Bose, Marie Curie.

Unit 3: Learning objectives of physical science:

Meaning of learning objectives – Revision of Bloom's taxonomy by Anderson and Krathwohl –learning objectives for upper primary, secondary and higher secondary stages – Learning objectives in the constructivist perspective.

Unit 4: Teaching skills

Teaching Skills – meaning, analytical approach to understand teaching learning process in physical science in terms of teaching skills – relevant teaching skills in teaching of physical science – core teaching skills, meaning, components, observation procedure, writing lesson plan, for the following core teaching skills – set induction, skill of explaining, skill of black board writing, skill of stimulus variation, skill of reinforcement, skill of probing questioning and skill of demonstration. – Micro teaching as a technique for acquiring teaching skills

Link practice – needs and importance.

Unit 5: Teaching resources

Science Textbook: characteristics and evaluation of a good science textbook – use of text book.

Machine operated aids: epidiascope, filmstrip-cum-slide projector, Over Head projector, digital projector, inter-active white board.

Non– Machine operated aids:

Graphical aids: flash cards, charts, flip chart, graphs, pictures, poster, and cut-outs.

Display Board: chalkboard, bulletin, flannel, magnetic, peg board and effective uses.

3D aids: objects, specimens, models.

Mode of transaction:

Lecture-demonstration method, Project method, Problem-solving method, CAI, Observation method (field visit/exhibition/internship), Seminar/ discussion

Practicum: Task and Assignment

1. Practice minimum 3 Micro teaching skills and maintain the record.(Compulsory)
2. “Science as a dynamic and expanding body of knowledge” prove this statement with any one of the concept in physical science from school science books.(discussion)
3. Study the scientific attitude among the school teacher in your internship programme (survey).
4. Collect information from the internet about any 2 great scientist’s contributions to society (present it in slideshow form).
5. Compare the leaning objective of physical science subject for upper primary, secondary with respect to other country through internet (Data collection).

Mode of Assessment:

Written test, Task and assignment, Laboratory work

References:

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4. Vanaja, M. (2006), *Methods of teaching physical science*. Hyderabad: Neelkamal publication pvt. Ltd., ISBN 81-8316-018-0
5. Panneerselvam, A and Rajendiran, E,K. (2009), *Teaching of Physical Science*. Chennai: Shantha publishers; ISBN 978-81-86689-53-0

6. NCERT. (2006), *Elementary level syllabus vol-I*. New Delhi. ISBN 81-7450-593-8
7. Mangal, S, K. and Uma Mangal. (2009), *Essentials of Educational Technology*. New Delhi: PHI Learning Pvt. Ltd., ISBN-978-81-203-3723-7
8. Monika davar. (2012), *Teaching of science*, New Delhi: PHI Learning Pvt. Ltd., ISBN 978-81-203-4624-6 and 81-203-4624-6.
9. Central Board of Secondary Education. (2010), *Manual for Teachers on School Based Assessment Classes VI to VIII*. Delhi.
10. Jonathan Anderson. (2010), *ICT Transforming Education- A Regional Guide*. UNESCO Bangkok. ISBN 978-92-9223-325-9 ISBN 978-92-9223-326-6.
11. Pathak R P. (2012), *Teaching skills*. Pearson Education India. ISBN:8131776336, 9788131776339

Web Resources:

1. <http://famousphysicists.org/>
2. <http://famouschemists.org/>
3. www.ncert.nic.in/departments/nie/desm/publication/.../phy_sci_partI.pdf
4. www.ncert.nic.in/departments/nie/desm/publication/.../phy_sci_PartII.pdf
5. <http://www.physicsclassroom.com/>
6. <http://www.chem4kids.com/>
7. <http://www.physics.org/explore.asp>
8. <http://www.ducksters.com/science/chemistry/>
9. <http://learningscience.org/physci.htm>
10. <http://www.sciencekids.co.nz/gamesactivities.html>
11. <http://www.learnerstv.com/Free-Physics-video-lecture-courses.htm>
12. <http://www.sheppardsoftware.com/science.htm>
13. <http://interactivesites.weebly.com/temperature.html>
14. <http://interactivesites.weebly.com/science.html>

8(ix): Pedagogy of Biological Science I – Part 1

Theory

Credits 4

Essence of the course:

This course is intending to enhance the ability and skill of the student teacher in understanding the importance of science and its relevance to the existence of life in this earth and to teach the same with different Techniques and approaches to the students of science learner. The student teacher will be acquainted with such steps involved in planning the science teaching and implementing the different methods and techniques in teaching of the same and further direct himself to do research. Further it helps him to develop desirable positive attitude towards science teaching and its development.

Objectives:**At the end of the course, the student teacher will be able to**

- Understand the nature of science and aims and objectives of teaching Biological Science.
- understand the microteaching skills
- Acquiring skills related in planning the lessons and presenting them effectively.
- Develop a theoretical and practical understanding of the various methods and techniques of teaching Biological Science.
- Understand the criteria in selecting a good textbook and to evaluate Science textbook.
- Understand the techniques of evaluating Science teaching and to construct an achievement test to assess the learning outcomes of pupils.
- Estimate the facilities required for the organization and maintenance of Science laboratory.
- Understand the special qualities of a Science teacher and to acquire those qualities.
- Understand the basic concepts in science for science teaching.
- Acquire a favourable scientific temper towards science teaching and values.
- Develops favourable positive attitude towards research on science teaching.

CONTENT OUTLINE**Unit 1: Nature of Science**

Historical background of science – origin its Meaning, Scope, Nature -Science as a dynamic and expanding body of Knowledge-Science as an interdisciplinary approach-correlation of science subjects – Science as a process of enquiry and a process of constructing knowledge – Science to the Society-Value development- Intellectual, Utilitarian, aesthetic, disciplinary, training in scientific attitude, vocational.

Unit 2: Aims and objectives of teaching Biological Science

Aims of learning Biological Science Objectives of teaching at Secondary School Level- Difference between Instructional Objectives and Learning Objectives – Learning Objectives- General Objectives-Specific objectives based on Bloom's taxonomy – Mastering on Collaborative vs Constructivist Perspectives in planning the lesson plan

Unit 3: Curriculum in Biological Science

Meaning –Curriculum Framework – Curriculum and Syllabus – Principles of curriculum construction – Approaches to curriculum – Development. – Recommendations of National curriculum frame work on science curriculum-Analysis of Biological science syllabi and textbooks of NCERT.

Unit 4: Teaching skills

Teaching Skills – meaning, analytical approach to understand teaching learning process in biological science in terms of teaching skills – relevant teaching skills in teaching of biological science – core teaching skills, meaning, components, observation procedure, writing lesson plan, for the following core teaching skills – Skill of Introduction – Skill of Explaining – Skill of probing questioning – Skill of demonstration - Skill of reinforcement -Skill of Stimulus Variation. Skill of black board – micro teaching as a technique for acquiring teaching skills – Link lesson practice

Unit 5: Learning resources

Science Textbook: Characteristics and evaluation of a good science textbook – use of text book

Science library: values, book selection and organizing library work in science.

Science museum: importance, essential and desirable item - preparation of museum materials, organization and management.

Modes of transaction:

Lecture method, Assignment Method, Report writing, Field visit & Preparation of Field report, Laboratory Method, Presentation by students, Demonstration of scientific experiments.

Practicum: Task and Assignment

1. Practice minimum 3 Micro teaching skills and maintain the record.(Compulsory)
2. Critically compare Biological science syllabi of NCERT and State board at upper primary and secondary stage through respective website.
3. Analysis of a Science text book report preparation.
4. Museum collection (preserved plants and animals)
5. Collection of rare specimens(ie. seeds,insects, algae, shells and feathers)

Mode of Assessment:

Observation, Report preparation & Records, Assignment submissions, Seminar presentation, Development of Psychological test.

References:

1. Aggarwal .D.D. (2008), Modern Method of Teaching Biology, Karanpaper backs, NewDelhi.
2. Amin, J.A. (2011), Training science teachers through activities; towards constructivism. USA: Lap-lambert publishing house.
3. Anderson, R. D. (1992). Issues of curriculum reform in science, mathematics and higher order thinking across the disciplines: The curriculum reform project. U.S.A: University of Colorado.
4. Bloom, Benjamin, S., Ed. (1958): Taxonomy of Educational Objectives, Handbook I- Cognitive Domain, Harcourt Brace & WorldInc., New York.
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8. Hassard J. (2000): Science as Inquiry. Good Year Books. New Jersey
9. Heiss, Obourn. & Hoffman. (1985) Modern science in secondary schools. New Delhi: Sterling Publication (Pvt.) Limited.
10. Jenkins, E. W. (1997). Innovations in science and technology education. (Vol.VI), Paris: UNESCO.]
11. Ramakrishna A (2012): Methodology of Teaching Life Sciences. Pearson. Delhi.

12. Sharma, R.C. & Shukla C. S. (2002): Modern Science Teaching, Dhanpat Rai, Publishing Company, NewDelhi.
13. Sharma. R.C (2010): Modern Science teaching. Dhanpat Rai Publishing Company. NewDelhi.
14. Pandey, (2003). Major issues in science teaching. New Delhi: Sumit Publications.
15. Sharma, P.C. (2006). Modern science teaching. New Delhi: DhanpatRai Publications.
16. Siddifit, S. (1985). Teaching of science today and tomorrow. New Delhi: Doba's House.
17. Sonika Rajan. (2012), Methodology of Teaching Science. New Delhi: Pearson Education.
18. Monika davar. (2012), Teaching of science, New Delhi: PHI Learning Pvt. Ltd.,
19. Nayak, (2003). Teaching of physics. New Delhi: APH Publications.
20. NCERT. (2006), Elementary level syllabus vol-I. New Delhi. ISBN 81-7450-593-8
21. Yadav, M. S. (2003). Teaching of science. New Delhi: Anmol Publications.
22. UNESCO: Mordern Trends in Teaching Biological Sciences Vols III.

Web resources:

1. <http://www.edutopia.org/blog/websites-for-science-teachers-eric-brunsell>
2. <http://naturalsciences.sdsu.edu/links.html>
3. <https://conbio.org/professional-development/education-programs>
4. <http://www.explorebiology.com/teachers/>

8(x): Pedagogy of Social Science I – Part 1**Theory****Credits 4****Essence of the course:**

This course sensitizes the learners the relevance of social science in the current context. It makes them familiar about the techniques and approaches of teaching social science. This course acquaints the preparation and administration of learning resources in the meaningful way. It develops the competency in making use of appropriate assessment system to apprise the learning outcomes. It also sensitizes the learners about the various social issues and mould them to face the same in a plausible way.

Objectives**At the end of the course, the student teacher will be able to**

- acquire basic knowledge and skills to analyze and transact the Social Science curriculum effectively following wide-ranging teaching
- acquire a conceptual understanding on the process of teaching and learning Social Science
- sensitize and equip student teachers to handle social issues and concerns in a responsible manner.
- Develop ability for critical and logical thinking and apply the acquired knowledge and skills in unfamiliar situations
- Acquaint with different methods, approaches and techniques of teaching social science
- Develop ability to design different evaluation tools
- Develop practical skills for analyzing socio-economic, political and physical phenomena

CONTENT OUTLINE**Unit 1: Nature and Scope of Social Science**

Meaning, Scope, Content and Concept of Social Science – Features of Social Science – Classification of Social Science - Difference between Social Science and Social Studies – Social Science relationship between History, Geography, Civics and Economics – Need and importance of Social Science in Modern age.

Unit 2: Aims and Objectives of Teaching Social Science

General and Specific aim of Teaching Social Science at secondary level – Relationship between the objectives of teaching Social Science with special reference to the objectives of Secondary education commission - anticipated outcomes of the Teaching of Social Science – The values inherent in Social Science: aesthetic, moral, utilitarian, intellectual and vocational – Values of National Integration and International Understanding.

Unit 3: Teaching skills

Teaching Skills – meaning, analytical approach to understand teaching learning process in social science in terms of teaching skills – relevant teaching skills in teaching of social science – core teaching skills, meaning, components, observation procedure, writing lesson plan, for the following core teaching skills – skills of explaining, questioning, stimulus variation, using black board, and closure– micro teaching as a technique for acquiring teaching skills – integration of teaching skill – strategies – link practice

Unit 4: Design of Lesson Plan

Need and importance of lesson plan – steps in lesson plan – Stating of instructional objectives- offering appropriate learning experiences to achieve the formulated objectives, – different models/approaches for writing lesson plan – preparation of unit plan

Unit 5: Methods and approaches for Teaching Social Science

Approaches: learner centered approach and activity centered approach, group learning, and problem solving – Methods: observation method, project method, field trip, dramatization, discussion, assignment, lecture method, and Team teaching.

Mode of Transaction

Lecture cum discussion, Dramatization, Field visit, Debate, Panel Discussion.

Practicum: Task and Assignment

1. Practice minimum 3 Micro teaching skills and maintain the record. (Compulsory)
2. Preparation of a practical records on the basis of the observation of school practice undergone during the first week of internship
3. A detailed report may be prepared after visiting the various institutions which are practicing innovative approach in transaction modalities

Mode of Assessment

Unit test, Project, Preparation of assignments, Preparation Teaching aids, Seminar Presentation.

References:

1. Aggarwal J.C., Teaching of Social Studies, Vikas Publishing House, New Delhi, Third Edition:1999,
2. Bank James A (1977) Teaching Strategies for the Social Studies: Enquiry, Valuing and Decision Making, Addition –Wesley Publishing Co., Reading, Massachusetts.
3. Binning and Binning (1952) Teaching of Social Studies in Secondary Schools, Mc Graw Hills, New York
4. Dhamija Neelam (1993) Multimedia Approaches in Teaching Social Studies, Harmen Publishing House, New Delhi
5. Kochar S K (1970) Fundamentals of Teaching Social Studies, Mahendra Capital Publishers
6. Mangal S K & Uma Mangal (2014 rp) Teaching of Social Science, PHI Learning private Ltd, New Delhi.
7. Sharma R. A., Teaching of Social Science, Surya Publishing House, Meerut, First Edion:2004.
8. Sharma.R.K., Teaching of Social Studies, International Publication House, Meerut, 2004
9. UNESCO: New Source Book for Teaching of Geography, UNESCO
10. Yagnik K S (1966) The Teaching of Social Studies in India, Bombay, Orient Longman Ltd.

8(xi): Pedagogy of Computer Science I – Part 1**Credit: 4****Essence of the course:**

This course is to enable students to specialize in Computer science and to develop an understanding of the curriculum, linking school knowledge with community life. The course includes reconstruction of Computer Knowledge through appropriate pedagogic processes and to communicate meaningfully with children

Objectives:

At the end of the course, the student teacher will be able to

- enable the student teachers acquire knowledge on Fundamentals of Computer.
- acquaint the student teachers with the aim of teaching computer science at various levels.
- help the students teachers in acquiring skills relating to planning lessons and presenting them effectively.
- familiarise the student teachers with the various methods of Teaching Computer Science.
- understand the Computer Science curriculum and various approaches.
- make the student teachers aware of the use of various instructional materials and aids in Teaching of Computer Science.
- enable the student teachers acquire knowledge on Computer Evaluation.

CONTENT OUTLINE**Unit 1: Introduction to Computers**

Hardware components of a micro computer – Input and Output devices – types of computers – Software - History of Computes - Network Communication – Computer viruses – Protective measures – Software: definition – System software – Application Software – High level and Programming languages – use of computers in schools.

Unit 2: Aims of Teaching Computer Science

Introduction – Aim and Objectives of Teaching Computer Science – based on Bloom's Taxonomy of Educational objectives – Computer Science Teaching at different levels: Primary, Secondary and Higher Secondary levels.

Unit 3: Teaching skills

Teaching Skills – meaning, analytical approach to understand teaching learning process in computer science in terms of teaching skills – relevant teaching skills in teaching of computer science – core teaching skills, meaning, components, observation procedure, writing lesson plan, for the following core teaching skills – Set induction - Skill of explaining, stimulus variation, reinforcement, Questioning, Blackboard writing, Skill of Demonstration - Skill of Closure – micro teaching as a technique for acquiring teaching skills – integration of teaching skill – strategies – link practice

Unit 4: Lesson, Unit and Year Planning

Lesson Planning: Importance of lesson plans, writing instructional objectives and planning for specific behavioral changes. – Different models/approaches for writing lesson plan – Unit Planning: Preparation and use of unit plan, Year planning

Unit 5: Methods of Teaching in Computer Science

Lecture- Lecture – cum – demonstration - Demonstration – Problem Solving – Project Method – Scientific Method – Analytic and Synthetic Methods, Inductive-deductive approaches of teaching computer science; Individualized instruction-Concept - Self learning - programmed learning - computer- assisted learning (CAI) - Computer Managed Learning

Mode of Transaction

Lecturing on Theoretical Concepts, use of computers in lab, Analytic and Synthetic Methods of Teaching, Project Method, Tasks and Assignments

Practicum: task and assignment

1. Practice minimum 3 Micro teaching skills and maintain the record.(Compulsory)
2. Prepare digital lesson plan
3. Conduct Online Quizzes or E- Quizzes
4. Prepare E-Content (any two topics)
5. Develop a CAI Package (Using Visual Basic Programming)
6. Prepare any two E-assignments
7. Prepare Program Learning Material

Mode of Assessment

Written tests, task and assignments.

References:

1. Aggarwal J.C (2006). Essential of educational technology: innovation in Teaching-Learning. New Delhi: Vikas Publishing House.
2. Aruna .A (2014). Micro-Teaching. Chennai: UMi Media Integrators.
3. Carl Hamachar, Zvonko Vranesic and Safwa Zaky (2002). Computer Organization. New York: McGraw Hill Higher Education.
4. Chauhan, S.S (1985). Innovations in Teaching Learning Process. New Delhi: Vikas Publishing House.
5. Deivam M (2014). Teaching of Computer Science. Madurai: Jayalakshimi Publication.
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7. Murthy et.al (1999). Fundamental of Information Technology. Mumbai: Himalaya Publishing House.
8. Mangal S.K. Mangal Uma. (2012). Essential of educational technology. New Delhi: PHI publication.
9. Mohanty Jagannath (2010). Educational Technology, New Delhi: Deep & Deep publication.
10. Neil A. Sheldon (2001). Fundamental of Computing. London: Hutchinson & Co (publisher)
11. Patrick Hall (1989). Introduction to PC Computing. England: Sigma press.
12. Passi B.K (1976). Becoming a Better Teaching and Microteaching Approaches. Ahamadabad: Sahitya Mudranalaya.
13. Packiam.S.,(1986), Curriculum Innovations and Educational Technology, Delhi: Doaba House.
14. Rajasekar S (2010). Methodology of Teaching Computer Science. Hyderabad: Neelkal Publication.
15. Shelly, Cashman, Vermaat (2002). Discovering computers. USA: Thomson Course Technology.

Edn 9: C&PS - PEDAGOGY OF SCHOOL SUBJECT II

9(i): Pedagogy of Tamil II – Part 1

தமிழ் கற்பிக்கும் முறைகள் II - பகுதி 1

Theory

Credits 4

அடிப்படைக் கோட்பாடு:

தாய்மொழிக் கல்வியின் தேவையை உணர்ந்து அதைப் பயன்படுத்தும் திறனைப் பெற்றிருப்பர். தாய்மொழிக் கல்வியில் கலைத்திட்டம் உருவாகும் திறனைப் பெற்றிருப்பர். முற்காலம் முதல் இக்காலம் வரையிலும் தாய்மொழி எவ்வாறு கற்பிக்கப்படுகிறது என்னும் அறிவைப் பெற்றிருப்பர். வகுப்புக் கற்பித்தலுக்கு நுண்ணிலைக் கற்பித்தலின் தேவையை அறிந்திருப்பர். மொழிப்பாடத்தில் செய்யுள், உரைநடை, இலக்கணம், கட்டுரை, துணைப்பாடம், முதலானப் பாடங்களுக்குப் பாடத்திட்டம் எழுதும் திறனையும் கற்பிக்கும் திறனையும் பெற்றிருப்பர். மொழியின் அடிப்படைத் திறன்களையும் உயர்நிலைத் திறன்களையும் பெற்றிருப்பர்.

நோக்கங்கள்:

- தாய்மொழியின் இயல்புகளை அறியச் செய்தல்.
- கலைத்திட்டத்தில் தாய்மொழியின் பங்கினை உணர்த்துதல்.
- உடலியல், உளவியல் அடிப்படையில் மொழிக் கற்றல் கூறுகளை அறியச் செய்தல்.
- அடிப்படைத் திறன்களை வளர்க்கும் திறன் பெறச் செய்தல்.
- கலைத்திட்டம், பாடத்திட்டம் தயாரித்துப் பயன்படுத்தும் அறிவினை ஊட்டுதல்.
- பலவகையான கற்பித்தல் முறைகளை அறியச் செய்தல்.
- கற்பித்தல் துணைக்கருவிகள் பயன்படுத்தும் அறிவினை வளர்த்தல்.
- நுண்ணிலை கற்பித்தல் வழி பயிற்றும் திறன் வளர்த்தல்.
- மொழி ஆசிரியரின் தொழில் திறனை மேம்படுத்துதல்.
- கற்பித்தல் தொழில்நுட்பக் கருவிகள் பயன்படுத்த பயிற்றுவித்தல்.

அலகு 1: மொழியின் இயல்புகள்

மொழிப்பாடத்தின் நோக்கங்கள் - தாய்மொழிக் கல்வியின் முக்கியத்துவம் - எண்ணத்தை வெளியிடுங் கருவி - சிந்தனை ஆற்றலை வளர்க்கும் முறை - சமூகப் பண்பாட்டு மரபினை அறியும் கருவி - சூழ்நிலையைப் புரிந்துகொள்ளும் ஆற்றல் - வாழ்க்கை நுகர்வுகளை எடுத்தாளுதல்

அலகு 2: கலைத்திட்டமும் தமிழும்

தேசியக் கல்விக் கொள்கையின் குறிக்கோள்கள், பரிந்துரைகள் - கலைத்திட்டத்தில் தாய்மொழியின் பங்கு - தமிழ் கற்பித்தலின் குறிக்கோள்கள், நோக்கங்கள்- தொடக்க, இடைநிலை, மேல்நிலைப் பள்ளிகளில் பயிற்றுமொழியாகத் தமிழ் - பிற பாடங்களைக் கற்பிக்கும் ஊடகம் - இரண்டாவது மொழியாகத் தாய்மொழியைக் கற்பித்தல்

அலகு 3: நுண்ணிலை கற்பித்தல்

நுண்ணிலை கற்பித்தல் - வரையறை - திறன்கள் - முக்கியத்துவம் - சுழற்சி அமைப்பு- திறன்பயிற்சிகள் - இணைப்புப் பயிற்சிகள், நிறை, குறைகள்.

அலகு 4: பாடத்திட்டம் தயாரித்தல்

பாடத்திட்டம் தயாரித்தலின் தேவை - முக்கியத்துவம் - புள்ளியின் கற்பித்தல் கோட்பாடுகள்- பாடத்திட்டத்தின் படிநிலைகள் - அணுகுமுறைகள்- அலகுத்திட்டம் - பாடத்திட்டத்திற்கும் பாடக்குறிப்பிற்கும் உள்ள வேறுபாடுகள்.

அலகு 5: பாடங்களைக் கற்பித்தல் நோக்கங்களும் முறைகளும்

செய்யுள் - உரைநடை - இலக்கணம் - துணைப்பாடம் கற்பித்தல் - பொது நோக்கங்கள் - சிறப்பு நோக்கங்கள் - முறைகள் - வேறுபாடுகள் (ஆறாம் வகுப்பு முதல் ஒன்பதாம் வகுப்பு வரையில் உள்ள தமிழ்ப் பாடங்களைப் பாடத்திட்டத்தின் அடிப்படையில் கற்பித்தல் பயிற்சிகள்)

கற்பிக்கும் முறைகள்

விரிவுரை, கலந்துரையாடல், மாணவர் கருத்தரங்கம், ஒப்பார்குழு விவாதம், குழுக் கற்பித்தல், செய்துகாட்டல், பதாகை வழிக் கற்பித்தல், செய்து கற்றல், ஆய்வரங்கம், பணிமனை, செயல்திட்டக் கற்பித்தல், விதிவருமுறை, விதிவிளக்குமுறை, விளையாட்டுமுறை, கணினி வழிக் கற்பித்தல், இணையம் வழிக் கற்பித்தல், பாடல் மூலம், நாடகம் மூலம் கற்பித்தல், சொற்பொழிவு, சிறப்புச் சொற்பொழிவு, காட்சிக் கேள்விக் கருவிகள் மூலம் கற்பித்தல், மொழிப்பயிற்றாய்வுக் கூடம் வழிக் கற்பித்தல்.

மதிப்பீடு

வகுப்புத் தேர்வு, வாய்மொழித் தேர்வு, ஒப்படைப்புகள், வகுப்புக் கருத்தரங்கம், மாதிரிப் பாடம் எடுத்தல் - வகுப்பில் மாணவர்கள் பங்கேற்பை மதிப்பிடல்.

செய்முறை பயிற்சிகள்

1. Practice minimum 3 Micro teaching skills and maintain the record.(Compulsory)
2. சொல்விளையாட்டுத் தயாரித்தல்.
3. குறிப்பிட்டத் தலைப்பில் உரை தயாரித்தல்.
4. தனித் தமிழ்நடையில் பேசுதல்.
5. உங்களுக்குக் கற்பித்த மொழியாசிரியர்களுள் சிறந்தவர் எனக் கருதும் ஒருவரைப் பற்றிக் காரணங்களுடன் விவரித்தல்.

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9(ii): Pedagogy of English II – Part 1**Theory****Credits 4****Essence of the course:**

Equipping the student with English knowledge for communication and Literature for appreciation. Developing the skill of communication in order to help children at various school levels towards effective communication. The course focuses on developing the ability of the future teachers to transact language in inclusive classroom.

Objectives:**At the end of the course, the student teacher will be able to**

- develop English Language teaching competency.
- understand and appreciate the importance of English.
- have a critical study of learning English as a second language in the multilingual Indian Society.
- understand the role of English in India and to improve English Language attainment.
- produce the different methods, techniques and strategies of ELT.
- Prepare and use appropriate teaching aids to make teaching more effective.
- develop the various micro skills to teach English language.
- acquire the skill of preparing lesson plans to teach English.

CONTENT OUTLINE**Unit 1: Foundation and importance of English language teaching**

Meaning, Nature of English Language-English as a First Language; English as a Second Language (ESL); English as a Foreign Language (EFL)-English in Post-colonial times- History and Position of Languages in India; Kothari Commission (1964-66); NPE-1986 National Curriculum Framework-2005(language education)-Principles of English Language Teaching.

Unit 2: Aims and objectives of teaching English as a second language

Aims of teaching English at the primary, Secondary and higher secondary level. English as a Link Language – Functions of language, Linguistic Principles of English Language Teaching; a Library Language, Window on the west, English as an asset language- Objectives of teaching English as a second language – a) skill based (LSRW); b) ICT Language- Difference between learning a mother tongue and a foreign language.

Unit 3: Teaching skills

Teaching Skills – meaning, analytical approach to understand teaching learning process in English in terms of teaching skills – relevant teaching skills in teaching of English as second language – core teaching skills, meaning, components, observation procedure, writing lesson plan, for the following core teaching skills – skill of stimulus variation, probing questions, using black board, reinforcement and explaining – using micro teaching as a technique for acquiring teaching skills – integration of teaching skill – strategies – link practice

Unit 4: Methods of teaching English

Direct method, Bilingual method, Dr. West method, Audio-video method – CAI (Computer assisted Instruction), CALT (Computer assisted language teaching), CLT (Communicative language teaching)- Play-way method.

Unit 5: Acquisition of language elements

Parts of speech, Tense forms, sentence – classification; types of sentences – simple, compound and complex; pattern of sentences, forms of sentences: active and passive and question tags.

Mode of Transaction:

Use of multimedia resources, Library resources, Accessing Online input on the topic, Print versions of texts focusing on communication, Usage of ICT, Introductory lecture, Micro-teaching through video lessons, Lesson Plan preparation, Demonstration, Mind mapping, Small group discussions, Dictionary and Online referencing, Language Lab activities

Practicum: Task and assignment

1. Practice minimum 3 Micro teaching skills and maintain the record.(Compulsory)
2. Seminar on foundation and significance of English language teaching
3. Oral Communication tasks
4. Language Lab activities
5. Preparation of micro lesson plan using computer assisted instruction
6. Sessions in small or medium groups
7. Language games on grammatical structure

Mode of Assessment:

Evaluation based on documentation (written) – Address the level of pupil involvement in Group Discussion – Performance evaluation (seminar, project and assignment) – Monitor the ability to distinguish between similar concepts – Use of Checklist to monitor, rate performance in each skill – Monitoring performance of communicative tasks

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9(iii): Pedagogy of Hindi II – Part 1

Theory

Credits 4

पृष्ठभूमि:

राष्ट्रीय पाठ्यचर्यारूपरेखा 2005 तथा शिक्षा का अधिकार एक्ट 2009 विद्यालयी शिक्षा तथा शिक्षण प्रशिक्षण के निकट संबंधों को ध्यान में रखते हुए शिक्षक की भूमिका में एक बहुत बड़े परिवर्तन की माँग करती है। पाठ्यचर्या में अभी तक शिक्षक को ही ज्ञान के स्रोत के रूप में केन्द्रीय स्थान मिलता रहा है, वह सीखने-सिखाने की समुची प्रक्रिया के संरक्षक और प्रबंधक के रूप में मुख्य भूमिका निभाने का काम करते आए हैं। पर 2005 की स्कूली पाठ्यचर्या उनसे माँग करती है कि वे सूचनाओं के वितरक और ज्ञान के स्रोत बन कर न रहें बल्कि विद्यार्थियों द्वारा ज्ञान हासिल करने की प्रक्रिया में स्वयं को सहायक मानें। इन सब परिवर्तनों को उनके व्यवहार का हिस्सा बनाने के लिए ज़रूरी है कि अध्यापक शिक्षा के पाठ्यक्रम में परिवर्तन आए। विद्यालयी शिक्षा व्यवस्था में परिवर्तन की पहल तभी संभव है जब इस व्यवस्था से जुड़े लोगों की सोच और दृष्टिकोण में परिवर्तन आए और शिक्षक की भूमिका इस व्यवस्था में सबसे महत्वपूर्ण है। इस दृष्टि से भाषा-शिक्षण का पाठ्यक्रम और भी महत्वपूर्ण हो जाता है, क्योंकि भाषा पूरी शिक्षा की आधारशिला का काम करती है, जहाँ सिर्फ भाषा पढ़ना-सीखना नहीं बल्कि भाषा के द्वारा अन्य विषयों में भी निपुणता प्राप्त करने की बात आती है। इसके साथ ही भाषा से जुड़े नए बिन्दुआ. जैसे - बहुभाषिक कक्षा, समझ का माध्यम, शांति की शिक्षा में भाषा की भूमिका आदि की समझ शिक्षक के लिए ज़रूरी है जो अध्यापक शिक्षा में व्यापक बदलाव की माँग करते हैं।

वर्तमान पाठ्यक्रम भाषा के नए सरोकारों और सीखने-सिखाने की नई दृष्टियों को ध्यान में रखकर तैयार किया गया है। आशा है कि शिक्षक प्रशिक्षणार्थियों को इससे भाषा-शिक्षण की तैयारी में सहायता मिलेगी।

पाठ्यक्रम के विशेष उद्देश्य

- भाषा के अलग-अलग भूमिकाओं को जानना
- भाषा सीखने की सृजनात्मक प्रक्रिया को जानना
- भाषा के स्वरूप और व्यवस्था को समझना
- स्कूल की भाषा, बच्चों की भाषा और समझ के बीच के संबंध को जानना
- भाषा के संदर्भ में पढ़ने के अधिकार, शांति और पर्यावरण के प्रति सचेत होना
- भाषा सीखने के तरीके और प्रक्रिया को जानना और समझना
- पाठ्यचर्या, पाठ्यक्रम और पाठ्यपुस्तक का विश्लेषण कर कक्षा विशेष और बच्चों की समझ के अनुसार ढालना
- भाषा और साहित्य के संबंध को जानना
- हिंदी भाषा के विविध रूपों और अभिव्यक्तियों को जानना
- भावों और विचारों की स्वतंत्र अभिव्यक्ति करना
- भाषायी बारीकियों के प्रति संवेदनशील होना
- अनुवाद के महत्व और भूमिका को जानना
- विद्यार्थियों की सृजनात्मक क्षमता को पहचानना
- बच्चों के भाषायी विकास के प्रति समझ बनाना और उसे समुन्नत करने के लिए विद्यालय में तरह-तरह के मौके जुटाना
- भाषा के मूल्यांकन की प्रक्रिया को जानना
- साहित्यिक और गैर साहित्यिक मौलिक रचनाओं की समझ और सराहना
- भाषा सीखने-सिखाने के सृजनात्मक दृष्टिकोण को समझना

इकाई 1: लिपि एवं भाषा

देवनागिरी लिपि की वैज्ञानिकता एवं अन्य भारतीय लिपियों से निकटता – भाषा-विकास में लिपि का महत्व – हिन्दी भाषा का पाठ्यक्रम में स्थान

इकाई 2: नवीनतम शिक्षण पद्धतियां एवं भाषा शिक्षण

किण्डन गार्टन - उद्देश्य, गुण-दोष एवं उपयोगिता - प्रयोजना विधि - दर्शन एवं उपादेयता - डाल्टन पद्धति की उपादेयता - खेल पद्धति की बालकेन्द्रित शिक्षा प्रणाली से निकटता - हिन्दी शिक्षण विधियों में कम्प्यूटर का समावेश

इकाई 3: जनसंचार माध्यम एवं हिन्दी का विकास

समाचार पत्र-पत्रिकाएं एवं शोध-पत्र - इलेक्ट्रॉनिक जनसंचार एवं हिन्दी का विकास - चलचित्र, नाटक एवं कथा श्रृंखलाएँ - हिन्दी भाषा के हिन्दुस्तानी स्वरूप में जनसंचार माध्यमों की भूमिका - हिन्दी भाषा का सामासिक स्वरूप

इकाई 4: भाषा प्रयोगशाला-भाषा शिक्षण का अभिन्न अंग

भाषा प्रयोगशाला की आवश्यकता एवं वर्तमान स्थिति - भाषायी कौशल वृद्धि एवं भाषा प्रयोगशाला का अभिन्नता - भाषा-प्रयोगशाला की सीमाएं - भाषा-प्रयोगशाला में प्रयुक्त किये जाने वाले आवश्यक उपकरण - भाषा-प्रयोगशाला में कम्प्यूटर का महत्व

इकाई 5: निदानात्मक एवं उपचारात्मक शिक्षण

निदानात्मक शिक्षण का अर्थ एवं आधुनिक स्वरूप - निदानात्मक शिक्षण की प्रमुख विधियां - उपचारात्मक शिक्षण की आवश्यकता एवं महत्व - हिन्दी भाषा ज्ञान में पिछड़े छात्रों के लिए उपचारात्मक शिक्षण - हिन्दी भाषा ज्ञान में पाये जाने वाले पिछड़ेपन के कारण एवं निदान

(इकाई-10 में सम्मिलित इकाइयों के माध्यम से छात्राध्यापक/ छात्राध्यापिका से अपेक्षा की जाती है कि वह हिन्दी साहित्यकारों का आधारभूत ज्ञान अवश्य रखें)

Practicum: Task and Assignment

1. Practice minimum 3 Micro teaching skills and maintain the record.(Compulsory)
2. Other practicum activities relevant to the syllabus.

संदर्भ-ग्रंथ

- | | | |
|--|---|---|
| 1. डॉ. विजयराघव रेड्डी | - | हिन्दी शिक्षण अन्य भाषा के संदर्भ में |
| 2. कामता प्रसाद गुरु | - | हिन्दी व्याकरण |
| 3. डॉ. रामचन्द्र वर्मा | - | अच्छी हिन्दी |
| 4. डॉ. नामवर सिंह | - | आधुनिक साहित्य की प्रवृत्तियां |
| 5. डॉ.रामसजन पाण्डेय | - | विविध साहित्यिक वाद |
| 6. डॉ.लक्ष्मीनारायण शर्मा | - | देवनागरी लिपि और वर्तनी |
| 7. डॉ.रघुनाथ सफाया | - | हिन्दी शिक्षण |
| 8. डॉ.रामदेव पी. कथूरिया | - | सूक्ष्म शिक्षण |
| 9. केन्द्रीय हिन्दी संस्थान के प्रकाशन | - | 1. हिन्दी का वैज्ञानिक व्याकरण 2. देवनागरी लेखन तथा हिन्दी वर्तनी व्यवस्था 3. हिन्दी शिक्षण विविध आयाम 4. हिन्दी शिक्षण अन्तर्राष्ट्रीय परिपेक्ष्य 5. द्वितीय भाषा शिक्षण में अभिक्रानित अधिगम की तैक्नालॉजी 6. भाषा शिक्षण तथा भाषा विज्ञान |

9(iv): Pedagogy of Malayalam II – Part 1**Theory****Credits 4****Essence of the course:**

This course equipping the student teacher with Malayalam knowledge for communication and its values for appreciation. It helps to prepare and use the various teaching aids in learning of Malayalam. It also develops the skill of communication in order to help children at various school levels towards effective communication. The course focuses on developing the ability of the future teachers to transact language in inclusive classroom.

Objectives:**At the end of the course, the student teacher will be able to**

- develop positive attitude towards mother tongue (Malayalam), the rich and vivid culture of Kerala, Arts of Kerala and Folklore etc.
- develop the five basic skills such as reception, expression, creative ability, aesthetic sense and productivity.
- develop linguistic abilities – vocabulary sentence pattern, proverbs, idioms, grammatical structure etc.
- develop an insight into the historical and contemporary relationship with other Dravidian languages, Indo-Aryan languages.
- acquaint the trainee with advanced development in the theory relating to the teaching of mother tongue.
- acquaint the trainee with some of modern methods, techniques, procedures in teaching mother tongue.
- help the student to improve his professional competency and consciousness as a language teacher.
- acquaint the trainee with the use of different teaching aids, materials and media used in language teaching.
- develop computer skill in curriculum transaction.

Unit 1: Values of Teaching Malayalam

Disciplinary and cultural values: Mother tongue as medium and experiences – Means of developing imagination, aesthetic taste and creative talents - Mother tongue as the key to social and cultural heritage. To inculcate social, moral and spiritual values – perception, expression, appreciation and culture.

Unit 2: Values of Teaching Malayalam – Application consideration

Application consideration: The correlation of the study of Malayalam with other languages. How far the knowledge in the mother tongue can be utilized in the study of other languages Sanskrit, English, Hindi and Tamil - Helps the covering of a major area of human experiences - Gives the essential basis for the study of all other languages and subjects in curriculum.

Unit 3: Instructional Objectives

Concept of objective based instruction – Relationship among the objectives – learning experience and evaluation - Instructional objectives and specification of Malayalam with

special reference to Bloom's Taxonomy - The aims and objectives of teaching mother-tongue at the school level.

Unit 4: Techniques and Strategies of Teaching Malayalam

Mother-tongue as medium of thoughts and communication of ideas, emotions and experiences – means of developing imagination, aesthetics taste, creative talents – key to social and cultural heritage – inculcate social, moral and spiritual values – reception, expression, creative ability, aesthetic sense and productivity – importance of language in life – especially mother tongue – education – culture, thinking special life technology and democracy.

Unit 5: Methods of teaching Malayalam

Old methods – indigenous oral method. Methods – merits and demerits – new trends in the methods of teaching – direct method – play – way – Dalton plan – dramatization – creative activity – inductive, deductive, assignment modern innovation on education – systems approach – programmed instruction, interaction analysis,

Mode of Transaction

Dialogue, seminars, discussions, and group-work

Practicum: Task and Assignment

1. Practice minimum 3 Micro teaching skills and maintain the record.(Compulsory)
2. Five relations of other language
3. Prepare a note on Malayalam curriculum in High School
4. Write an essay on approaches of Malayalam language in primary classes
5. Critically analyse the objective of teaching mother tongue.
6. Prepare a teaching manual on the basis of Bloom's taxonomy.
7. Critically analyse five different methods & approaches in Malayalam language study.

Mode of assessment:

Written test and Task and assignment

References:

1. A.R. Raja Raja Varma – Vrithamanjari, Kerala Panineeyam, Bhashabhushanam.
2. Damodaran Nair. P – Apasabda Nighantu
3. Sankarakurup. G – Sahithya Parichayam
4. Parameswaran Nair. P.K – Malayala Sahithya Charithram
5. Raghavan Payyanad – Folklore
6. Balasahithyam Thatwavum Charithravum – State Institute of Children Literature
7. Sahithya Charithram, Prasthanangaliloode – National Book Stall, Kottayam.
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9. Bindhu,C.M(2nd Ed.)(2009). Mathrubhashabhodhanam: Pravanathakalum Reethikalum. Calicut: Scorpio
10. Bloom.B.S.(1956). *Taxonomy of Educational Objectives: cognitive domain*, New York: David Mckay Co.
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16. Fosnot,C.(1996).*Constructivism: theory,perspectives and practice*. Newyork:Teachers College Press.
17. Gren,G.H.(1987).*Planning the lesson*.London: Logman
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21. Kumar,S.P.K & Bindhu C.M.(2002) *Instructional Learning Strategies and Cognitive Entry Behaviour-An Experimental Analysis*. Kanishka Publishers: NewDelhi.
22. Lado,R (1979). *Language teaching- a scientific approach*.New York: McGraw Hill INC
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24. Mayer,R.E(2003). *Language and instruction*, Upper Saddle River. Pearson education
25. Nair, Chandrashekharan,C.K(2002) *Mathrubhasha Bhodhanam*. Trivandrum. Kerala bhasha institute.
26. NCERT(2005)National Cruuiculum Framework.New Delhi:NCERT
27. SCERT(2007),Kerala Curriculum Frame work.Trivandrum:SCERT
28. Passi,B.K(Ed)(1976). *Becoming better teacher: A micro teaching approach*. Ahmadabad
29. Pillai,P.E(1991) *Malayala bhasha bhodanam*.Kerala:chris printers kottayam.
30. Sivarajan,k & Sreemannuni,P.S.(2003) *Malayalabhashadhyapanam*.Central cooperative stores,Calicut university.
31. Variyar, Prabhakaran,K.M & A. Santha(1998). *Modern linguistics*, Trivandrum: kerala bhasha institute.

9(v): Pedagogy of Telugu II – Part 1

Theory

Credits 4

Essence of the course:

Objectives:

CONTENT OUTLINE

Mode of Transaction

Practicum: Task and Assignment

Mode of Assessment

References:

Syllabus yet to be prepared for Pedagogy of Telugu II – Part 1

9(vi): Pedagogy of Mathematics II – Part 1

The same syllabus as given in course – 8(vii)

9(vii): Pedagogy of Physical Science II – Part 1

The same syllabus as given in course – 8(viii)

9(viii): Pedagogy of Biological Science II – Part 1

The same syllabus as given in course –8(ix)

Edn: Int 1 - SCHOOL INTERNSHIP**Practicum****Credits 4****School Internship (4 Weeks)**

During internship in the **third year**, student teacher shall spend 4 weeks, spread over several days throughout the **5th or 6th Semester**. This will include one week of school engagement and three weeks of other engagements as explained in the syllabus.

This will include one week of school engagement by the student teacher making observation in the school and 3 weeks for visit to innovative centers of pedagogy and learning, educational resource centres and community resources. Within the institution, the observation will focus on understanding the institution in totality, with reference to features such as its philosophy and aims, organization, teachers' role, student needs with respect to their development, curriculum, its transaction and assessment. This period can also be spent for working on projects and tasks based on the course papers in school or out of the school. The observation record and/or project report of the student teacher should be the base for awarding CCE marks by the faculty.

Edn: Int 2 - COMMUNITY LIVING CAMP**Practicum****Credits 2**

Each college of education shall organize a camp of a minimum of 5 days and provide training on community life, First-aid/ Scouts & Guides /Social service / health and hygiene/etc. the camp may preferably be held outside the college in a rural setting.

The 5 days programme should include the participation of student teachers in community life, awareness creation on clean India, Environment, disaster management and other topics of social and current interest, tree plantation, cultural programme and other activities in the village along with local people.

A self-study report regarding the camp from planning stage to camp evaluation stage along with necessary photograph should be submitted for continuous and comprehensive evaluation

Edn: EPC 5: SOFT SKILL**Practicum****Credits 2****Objectives**

- To develop communication competence in prospective teachers.
- To enable them to convey thoughts and ideas with clarity and focus.
- To develop report writing skills.
- To equip them to face interview & Group Discussion.
- To inculcate critical thinking process.
- To prepare them on problem solving skills.
- To provide symbolic, verbal, and graphical interpretations of statements in a problem description.
- To understand team dynamics & effectiveness.
- To learn leadership qualities and practice them.

Unit 1: Problem Solving skill and Decision Making Skill

Problem Solving: Identifies and states the problem - Views problems as a stepping stone to success - Finds ways to solve different kinds of conflicts

Decision Making: Decisive and convincing - able to analyse the alternatives critically - Takes decisions logically - Shows readiness to face challenges

Unit 2: Critical Thinking & Creative Thinking

Critical Thinking: Assesses the statements and arguments - Examines the problems closely - Listens carefully and gives feedback - Tries to find out alternatives and solutions - Questions relevantly

Creative Thinking: Ability to find creative and constructive solutions to problems and issues - independent in thinking - fluency in expression - rich imagination and is able to think out of the box.

Unit 3: Interpersonal Relationships

able to interact effectively with peers and teachers - cheerful and friendly - Exhibits fine etiquettes and other social skills - share and discuss the feelings with others - Responsive to others' interests and concerns - Teambuilding, respecting and sharing responsibility, Group Discussion, Presentation Skills, Technology-based Communication.

Unit 4: Effective Communication Skill

the difference between assertive, aggressive and submissive manners of communication - able to make use of speech, action and expression while communicating - Listening Skills: Exhibits good listening skills - Non-verbal Communication and Body Language, uses gestures, facial expressions and voice intonation to emphasize points - Clarity and Concision

Writing Skills, Technical Writing, Letter Writing, Job Application, Report Writing, Interview Skills,

Unit 5: Self-Awareness and Empathy

Self-Awareness: aware of physical/social and emotional self - Self-respecting - Aware of strengths and weaknesses - Adopts optimistic approach - the confidence to face challenges

Empathy: Demonstrates ability to respect others - Managing Emotions - express feelings in a healthy manner - Remains cool and calm under adverse conditions - Dealing with Stress

REFERENCE:

- Barun K. Mitra; (2011), “Personality Development & Soft Skills”, First Edition; Oxford Publishers.
- Kalyana; (2015) “Soft Skill for Managers”; First Edition; Wiley Publishing Ltd.
- Larry James (2016); “The First Book of Life Skills”; First Edition; Embassy Books.
- Shalini Verma (2014); “Development of Life Skills and Professional Practice”; First Edition; Sultan Chand (G/L) & Company
- John C. Maxwell (2014); “The 5 Levels of Leadership”, Centre Street, A division of Hachette Book Group Inc.
- CBSC-i, Secondary Curriculum, “CLASSES IX-X”. NewDelhi.
- CBSC(2010), “Manual for Teachers on School Based Assessment Classes VI to VIII”, New Delhi

THIRD YEAR - SEMESTER VI**Edn 10: PE - LEARNING AND TEACHING – II****Theory****Credits 4****Essence of the course:**

Modern world is marching towards technology and scientific innovations. Keeping these changes in mind, this course tries to enable the student teachers to be aware of learning and teaching deeply. This also intends to develop a positive attitude towards the process of teaching and learning which would help the trainees to adopt various strategies of learning and teaching with reference to various levels of learning. It also enables the trainees to adopt various modern tools and techniques for facilitating learning and teaching.

Objectives:**At the end of the course, the student teacher will be able to**

- Understand the concept of learning and its importance for human excellence
- Apply the learning theories in their teaching
- Understand the processes that facilitate construction of knowledge
- Create facilitative learning environments in schools
- Understand the concept and different levels of teaching
- Adopt different teaching strategies
- Understand the models of teaching
- Adopt ICT tools for facilitating teaching and learning
- Adopt innovative practices of teaching and learning
- Understand teaching as a profession.

CONTENT OUTLINE**Unit 1: Innovative practices in learning**

Techniques for higher learning-conference, seminar, symposium, workshop and panel discussion, field trips, social camps, educational tours, ICTs and changing venues of teaching and learning, strategies for active learning, multicultural understanding in teaching and learning, learning with new technologies, online tools of learning, pedagogy of online learning and virtual learning.

Unit 2: Concept of Teaching

Meaning, definitions, criteria for teaching – teaching an art or a science? – relationship between teaching and learning – analysis of the concept of teaching - teaching as a deliberately planned process: analysis in terms of teaching skills – general model of instruction – Pre-active, Interactive and Post active phases and teachers role in them.

Unit 3: Approaches to Teaching

Various Approaches to Teaching, such as, Behaviourist, Cognitivist, Constructivist, Connectionist, Participatory, Cooperative, Personalized, Wholistic

Unit 4: Models of Teaching

Models of Teaching-Meaning and elements and families of models of teaching-Information processing models(Concept Attainment and Advance organizer models), Social interaction

models(Jurisprudential model) – Personal development model(Non-directive teaching) – Behavior modification model(Contingency Management)

Unit 5: Teaching as a profession and values of teachers

Profession – meaning, characteristics – professional ethics and values - code of ethics – critical analysis of teaching as profession, job and occupation, profession and professionalism, Skills and competencies required for a teacher, Teacher as a purveyor and facilitator of knowledge and Essential qualities of a teacher.

Mode of transaction: Lecture, discussion, Project work, field trip, assignment, seminar, workshop

Practicum: Task and Assignment

1. Writing criticism on any one of the innovative practices in learning (Symposium, Seminar, Workshop or Panel Discussion)
2. Analyze and record the suitability of different tools of ICT for learning.
3. Teacher trainee participation in observation and reporting of the learning aspects of marginalised students in school learning.

Mode of Assessment:

Written test and Task and assignment

References:

1. Anastasi, Anne (1989) *Psychology Testing*, Macmillan Publishing Company.NY.
2. Ausubel David, P and Floyd, G. Robinson (1985). *Educational Psychology*, Holt Rinehart and WinstonInc.
3. Chauhan S.S., (1988). *Advanced Educational Psychology*, Vikas Publishing House Pvt Ltd.Clifford.
4. Dunlop, F. (1971). *The Education of Feeling and Emotions*, London: George Allen and Unwin.
5. Erik Erikson, (1968). *Childhood and Society*, W.W. Norton &Co.NY.
6. Elizabeth B. (1977) *Developmental Psychology*, Tata McGraw Hill Publishing Company, New Delhi.
7. Eysenck, H.J. (1997). *Dimensions of personality*. London: Kegan Paul.
8. Geetha C., Subash C.S., (1998) How to Understand and Help Adolescents. A Friendlier Approach, Student publications; New Delhi.
9. Goleman D., (1998). *Emotional Intelligence: Why it can matter more than IQ*. Sage publications: New Delhi.
10. Guilford, J.P. (1977). *The Nature of Human Intelligence*. McGraw Hill, NY.
11. Harry Adler., *Boost Your Creative Intelligence*. Kogan Page India Pvt. Limited: New Delhi.
12. Hurlock, Elizabeth B. (1973) *Adolescent Development*, McGraw Hill Book Company, NY. Hurlock,
13. Jerisld, A.T., (1954) *The Psychology of Adolescence*, Macmillan Co., Kakar, S, (1995) *The IndianPsyche*, Oxford University press.
14. Kapur, M, (1998). *Mental Health of Indian Children*, Sage Publications, New Delhi.
15. Mangal, S.K. (1981). *Psychological foundations of education*. Ludhiana: Parkash Bros.

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17. Quazi Ferdoushi Islam (2012), *Educational Psychology*, New Delhi: Dorling Kindersley (India) Pvt. Ltd., Licenses of Pearson in South Asia - Core Paper II
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19. Sharma.R. A (1980), *Technology of Teaching*, International Publishing House, Meerut.

Edn 11: PE - CONTEMPORARY INDIA AND EDUCATION -II**Theory****Credits 4****Essence of the course:**

This course provides deep and penetrating analysis of socio-economic concerns in contemporary India and the role of education in suitably meeting the challenges. All the emerging concerns are discussed in their sociological, philosophical, values, cultural, economical, constitutional, and global perspectives.

The knowledge on education, philosophy of education; educational thinkers and their contributions in education, National integration and socialization, international understanding, Indian constitution, the education policies, inclusive education and the role of education in secularism, socialism, democracy etc. will enable the student teachers to emerge as a successful teacher.

It can prove as an effective course to student teachers to understand the challenges of education in the contemporary Indian society and it will surely show the students, the right path in the field of teaching.

Objectives:**At the end of the course the student teachers will be able to**

- acquire knowledge of terms and concepts used in Indian society, communities and groups with focus on government policy frame work socialisation and sociological aims of Education
- understand Inequality and the importance of equality, stratification, causes of diversity, marginalised society
- apply the constitutional values related to Education and social diversity
- develop the skills to respect collective living, resolution of tension peacefully and justly
- develop interest on language policies, multilingual education to understand contemporary India and education
- develop the attitude towards plebianisation, liberalisation, privatisation and stratification in Education from global point of view.

CONTENT OUTLINE**Unit 1: Education for Marginalised**

Marginalized population (economically, socially, culturally) – reservation policies – education and social equalisation – social process, social interactions and social movements – education for diversities – schools under different management – public school a broad perspective – education as public property – education for global equality.

Unit 2: Language policies in education.

Language policies – during post-independence period – three language formula – mother tongue as medium of instruction – English versus regional language as medium of instruction.

Unit 3: Issues in education

Equalization of Educational Opportunities – SC/ ST, OBC, Women, Handicapped and religious minorities – Universalization of education with respect to access, enrollment, retention and achievement – Ensuring right to education – under employment, unemployment and non-employability – digital divide – Privatization in Education – commercialization – Child labor and ensuring child rights – Malnutrition – Value Education – Environmental education.

Unit 4: Programmes and policies

Centrally sponsored Schemes and Programme: Operation Black board scheme – Mid day meals – DPEP – SSA – RMSA – Mahila Samakya; Significant recommendations of commission and committees – National policy on education 1986, 1992. RTE Act 2009.

Unit 5: Initiatives for educational development in India

Publication of dispatches– implementation of policies – education in five year plans– role of education in community mobilisation– integration of school and community work– role and responsibilities of teacher – Education policy under debates over time – problems in implementation, financial allocation, field condition and pressure groups – comparison of issues between pre and post-independence period.

Mode of transaction of the course:

Lecture method, Peer group, Discussion method, Team teaching, Debates, Brain storming, Workshop, Seminar, Project work, elearning (edmoda.com)

Practicum activities: Task and Assignment

1. Study the impact of Right to Education Act on schools
2. Critical Analysis of Different Committees and Commissions on Education
3. Study of Educational Process in Private Schools
4. Planning and Implementation of Activities (any one)
 - a. Eco-Club,
 - b. instructional material to inculcate values,
 - c. creating awareness among SC/ST students about various schemes and scholarships available to them,
 - d. survey of schools to see the implementation of various incentives of government to equalize educational opportunities

Mode of Assessment

Written test and Task and assignment

References:

1. Bhatia, K. & Bhatia, B. (1983). The philosophical and Sociological foundation of Education. New Delhi: Doaba House.
2. Bhattacharya, S. (2006). Sociological Foundation of Education: Atlantic Publishers. New Delhi
3. Dhankar, N. (2010). Education in Emerging Indian Society. New Delhi: APH Publishing Corporation.
4. Dhiman, O. P. (1973). Principles and Techniques of Education. Ludhiana: Sharda Brothers.
5. Fagerling, I., and Saha, L. J.O. (1989). Education and National Development (2nd Ed.). England: Pergamon Press.
6. Kakkar, S. B. (1995). Changing Perspectives in Education. New Delhi: Vikas Publishing House Pvt. Ltd.
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Edn 12: PE - SCHOOL MANAGEMENT – I**Theory****Credits 4****Essence of the course:**

The focus of the course is on the essentials of school management and the challenges therein. This course is designed to throw light on the concepts of management related to School. The purpose is to foster proper understanding of these essential concepts and to create necessary managerial skills and capabilities among student teachers so as to enable them efficiently manage schools.

Objectives:

At the end of the course, the student teacher will be able to

- Understand the basic concepts of school management.
- Understand different components of school management
- Realize the multifaceted role of teacher/head teacher.
- Sensitize the student teachers about the concept of child rights in the process of School Management.
- Explain the factors contributing to the success of supervision and to acquaint with the modern trends in Supervision and Inspection.
- Discuss the present examination system and suggest some innovations.

CONTENT OUTLINE**Unit 1: Introduction to School Management**

Meaning, Definitions, Aims and Scope of School Management - Objectives, Principles and Types of Educational Management, Theories of management relevant to School - Administrative Structure of Education in India - Vision and Mission of Educational Institutions: Primary, Secondary, and Higher Secondary

Unit 2: School as an Organisation

Concept and Objectives of School - Importance and Components of School Plant - Physical, Human and Financial Resources for Elementary School, Secondary School and Higher Secondary School - School under different managements - Recommendation of various Commissions on School Plant - Infrastructural facilities for an ideal Secondary School

Unit 3: Teacher and School Management

Concept of Effective Teaching - Code of Conduct: Professional ethics - Qualification of effective teacher - Evaluation of Effectiveness - Professional Growth – Significance of (INSET: In-service Education for Teacher) - Status of the Teacher - Accountability of Teacher - Recommendations of various commissions.

Unit 4: Head Teacher as School Manager

Importance and Roles- Academic Aspects: Inspection & Supervision, Guidance, Maintenance of Standards, Institutional Evaluation, Time-table, Subject Clubs, Co-curricular activities - Administrative Aspects: Institutional Planning, Budgeting, Mobilization of Resource, Supervision, Staff Meetings, Registers & Records, DISE (District Information for School Education), School Discipline

Unit 5: Management of Resources in School

Issues related to management of Physical Resources of a School, Human Resource Management –concept of Human Relations in a School, Group Dynamics, Motivating People,

Communication, Management of Teaching-Learning Process, Essentials of Classroom Management, Financial Management, and Budgeting, Office Management

Mode of Transaction:

Lecture, Discussion, Project work, Field visits, Assignment, Seminar, Workshop, etc

Practicum: Task and Assignment

1. Critical analysis of recommendations of various committees and commissions on School Plant/ School-Community relationship
2. Case study of best practices in School management
3. Comparison of school management practices among Govt, Aided and unaided schools
4. Search in the internet and report the problems faced by the teachers and head of the school in the school management.

Mode of Assessment:

Written test, task and assignment.

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Edn 13: C&PS - PEDAGOGY OF SCHOOL SUBJECT I

13(i): Pedagogy of Tamil I – Part 2

தமிழ் கற்பிக்கும் முறைகள் I -பகுதி 2

Theory

Credits 4

அடிப்படைக் கோட்பாடுகள்

மொழியின் தோற்றத்தையும் செம்மொழியின் சிறப்புகளையும் அறிந்திருப்பர். அறிவியல் வளர்ச்சியின் தாக்கம் மொழியிலும் மாற்றத்தை ஏற்படுத்துவதால் அதற்கான கலைச்சொற்களை உருவாக்கும் திறனைப் பெறுவர். கலைச்சொற்கள் உருவாக்கத்திற்கு நூலகங்களின் பயன்களையும் தேவையையும் அறிந்திருப்பர். காலத்திற்கேற்ப தாய்மொழியை எவ்வாறு கற்பிக்க வேண்டும் என்பதையும் கற்பிக்கும் முறைகளையும் அறிந்திருப்பர். இக்கால இலக்கியங்களின் சிறப்புகளை அறிந்து கற்பிக்கும் திறனைப் பெற்றிருப்பர். தாய்மொழியைப் பிழையின்றி பேசுவதையும் அதன் நுணுக்கங்களையும் அறிந்திருப்பர். மொழியைப் பற்றி மொழியியலாளர்கள் கூறும் கருத்துகளையும் மொழி வளர்ச்சிக்கு ஒப்பிலக்கியத்தின் தேவையையும் அறிந்திருப்பர்.

நோக்கங்கள்

- மொழியின் அமைப்புகளையும் பண்புகளையும் அறியச் செய்தல்.
- செம்மொழித் தமிழின் தொன்மைகளை அறிந்து பெருமிதம் கொள்ளச் செய்தல்.
- நூலகத்தைப் பயன்படுத்தும் ஆர்வத்தைத் தூண்டுதல்.
- அறிவியல் தமிழின் அவசியத்தை உணர்த்துதல்.
- பல்வேறு கற்பிக்கும் முறைகளை அறியச் செய்தல்.
- இலக்கியத் திறனாய்வு குறித்த அடிப்படைச் செய்திகளை அறிய செய்தல்.
- இக்கால இலக்கியங்கள் குறித்து அறிந்து கொள்ளச் செய்தல்.
- மொழியியல் நோக்கில் தமிழ்மொழியின் அமைப்பினை உணர்த்துதல்.
- கற்பித்தல் -கற்றல் உத்திகளைப் பயன்படுத்தும் திறனை வளர்த்தல்.
- தொல்காப்பியம் குறிப்பிடும் ஆசிரியர் மாணக்கர் குணநலன்களை உணர்த்துதல்.

அலகு 1: மொழி கற்பித்தலில் பிழைகள்

தவறும் பிழையும் வரையறை- பிழைக்கான காரணங்கள்- பிழை வகைகள்- பிழைநீக்கல் பயிற்சி- பிழை தவிர்த்தல்

அலகு 2: மொழி அமைப்பு

ஒலியன் வரையறை- கொள்கைகள்- விதிகள்- மாற்றொலிகள்- உருபன்- மாற்றுருபு- உருபன் வகைகள்- தொடரியல் குறித்த செய்திகள்.

அலகு 3: ஒப்பிலக்கிய அறிமுகம்

ஒப்பியல் வரையறை- தமிழில் ஒப்பிலக்கியச் சிந்தனைகள்- பிறமொழிகளோடு கொண்டுள்ள தொடர்பு- பண்புகள்- பயன்கள்.

அலகு 4: கற்பித்தல் உத்திகள்

பிளாண்டரின் வகுப்பறைச் சூழல் பகுத்தறிமுறை- திட்டமிட்டுத் தானே கற்றல்

அலகு 5: இலக்கியங்கள் காட்டும் கல்வியியல் சிந்தனைகள்

தொல்காப்பியர் குறிப்பிடும் முப்பத்திரண்டு உத்திகள்- ஆசிரியரின் அருங்குணங்கள்- ஆசிரியராகார் இயல்புகள்- நல்லமாணாக்கரது இலக்கணம்- மாணாக்கர் வகை- மாணாக்கராகார்- நன்னூல் கூறும் செய்திகள்.

கற்பிக்கும் முறைகள்

விரிவுரை, கலந்துரையாடல், மாணவர் கருத்தரங்கம், ஒப்பார்குழு விவாதம், குழுக் கற்பித்தல், செய்துகாட்டல், பதாகை வழிக் கற்பித்தல், செய்து கற்றல், ஆய்வரங்கம், பணிமனை, செயல்திட்டக் கற்பித்தல், விதிவருமுறை, விதிவிளக்கமுறை, விளையாட்டுமுறை, கணினி வழிக் கற்பித்தல், இணைய வழிக் கற்பித்தல், பாடல் மூலம், நாடகம் மூலம் கற்பித்தல், சொற்பொழிவு, சிறப்புச் சொற்பொழிவு, காட்சிக் கேள்விக் கருவிகள் மூலம் கற்பித்தல், மொழிப்பயிற்றாய்வுக் கூடம் வழிக் கற்பித்தல், புத்த வாசிப்பு முகாம் நடத்துதல்.

மதிப்பீடு

வகுப்புத் தேர்வு, வாய்மொழித் தேர்வு, ஒப்படைப்புகள், வகுப்புக் கருத்தரங்கம், மாதிரிப் பாடம் எடுத்தல், வகுப்பில் மாணவர்கள் பங்கேற்பை மதிப்பிடல்.

செய்முறைப் பயிற்சிகள்

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4. குறிப்பிட்டத் தலைப்பில் உரையாடலை ஒருங்கிணைத்தல்
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6. ஒரு சிறு பத்தியில் உள்ள சொற்களைப் பிரித்து உருபன்களைக் கண்டறிதல்.

பார்வை நூல்கள்

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13(ii): Pedagogy of English I – Part 2**Theory****Credits 4****Essence of the course:**

School education and teacher-education share a symbiotic relationship. To have qualitative improvement in education, both teacher-education and school education need to mutually reinforce each other. NCF-2005 and the Right to Education Act, 2009 suggest a rethinking in the area of teacher-education as well. A need to review and redesign the B.Ed. Syllabus was felt as NCF-2005 expects the teacher to look at school education in a holistic manner. It advocates learner-centered learning rather than teacher-centered teaching. Teacher's attitude, aptitude and motivation play an important role because the teacher needs to engage with the learning process of the learner. Teacher as a facilitator helps learners to construct their knowledge. The teacher should be able to participate meaningfully to transact the syllabus and textbooks effectively along with teaching– learning materials. Therefore, the teacher should be well-versed not only with the subject content but also with the pedagogy of learning. Language is the medium for comprehending ideas, for reflection and thinking, as well as for expression and communication. This course is visualized as a range of language based activities, which will aid in strengthening the ability to 'read', 'think', 'discuss and communicate' as well as to 'write' in the language of instruction.

Objectives:**At the end of the course the student teachers will be able to**

- understand the aims & objectives of teaching English
- enable the student teachers to acquire knowledge of the sound systems of English and to familiarize them with the appropriate terminology to describe the sounds in English.
- acquire an understanding of the nature and structure of English language and components skills
- enable the student teachers to understand the connections of English speech and to acquire good pronunciation and fluency of speech.
- develop skills for effective teaching—micro teaching.
- understand the importance of using-English in global context
- get familiarized with the various aspects of the B.Ed programme with special reference to the nature of the language skills to be developed and evaluation
- familiarize student teachers with the text book contents related to high school and Higher Secondary classes.
- help student teachers acquire a working knowledge of the grammatical terminology and the grammatical system in English.
- acquaint with the planning of instruction.
- develop in the student teachers the ability to write in an appropriate manner for a particular purpose with a particular audience in mind.
- develop an insight into the symbiotic relationship between curriculum syllabus and textbooks
- Get familiarized with the IT sources / packages that are helpful in teaching English

CONTENT OUTLINE**Unit 1: Lesson Planning**

Bloom's Taxonomy of Educational Objectives – General and Specific Instructional Objectives
Lesson planning Characteristics, Need and advantages, Lesson Plan format – Teaching Prose

– Poetry -Teaching of different language form Prose, Poetry- Aims, Objectives, and Steps of teaching prose, poetry and supplementary reading– different model/approaches in writing lesson plans.

Unit 2: Compositions

Aims and objectives of teaching composition – oral and written composition – controlled and guided composition – free composition – correcting composition exercises – developing creative competency – developing strategic competency. Letters – formal, informal, semi – formal and informal – reports – situational composition – précis writing.

Unit 3: Teaching Learning materials (TLM)

Language games – Language lab -Newspaper for teaching English -Blackboard Sketches-Use of TV, E-tool: Computers and Internet for teaching English - Use of information communication technology (ICT) for teaching English- use of www, E-learning, Teleconferencing.

Unit 4: Pedagogic Analysis

Pedagogic analysis - concept overview- importance and component -Content analysis understanding relation between curriculum, syllabus and textbook.

Unit 5: Evaluation and interpretation of data

Need for assessment -Type of tests – oral, written, objective, subjective – diagnostic, achievement tests- Formative, summative evaluation- Construction and administration of achievement test- Analysis and interpretation of test data.

Mode of transaction:

Introductory lecture, Use of multimedia resources, Library resources, Accessing Online input on the topic, Language Lab, Observation of video clips, Print versions of texts focusing on communication, Dictionary and online referencing, Virtual learning, Usage of Language games, Power point presentation (PPP) for teaching a grammar topic, Micro-teaching through video lessons, Lesson Plan presentation, Mind mapping, Comparative & critical study on various methods and approaches of teaching prose poetry and grammar, Interactive Sessions, Comparative study of various forms of compositions, Demonstration, Small group discussions, Framing, evaluating and interpreting a question paper.

Practicum: Task and Assignment

1. Textual exercises
2. Dramatization and miming.
3. Activities & competitions for Creative writing.
4. Practicing Formal and Informal Letter
5. Preparation of blue prints, question papers, marking scheme and question wise analysis.
6. Construction of test items for diagnosis and achievement test and Interpretation of test data.

Mode of assessment:

Analysis of Group discussion, Assessment of expressing ideas and thoughts through suitable examples, Monitoring performance of communicative tasks, Self-assessment and peer assessment, Evaluation based on documentation, Performance evaluation, Feedback

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13(iii): Pedagogy of Hindi I – Part 2

Theory

Credits 4

पृष्ठभूमि:

राष्ट्रीय पाठ्यचर्यारूपरेखा 2005 तथा शिक्षा का अधिकार एक्ट 2009 विद्यालयी शिक्षा तथा शिक्षण प्रशिक्षण के निकट संबंधा. को ध्यान म. रखते हुए शिक्षका. की भूमिका में एक बहुत बड़े परिवर्तन की माँग करती है। पाठ्यचर्या में अभी तक शिक्षका. को ही ज्ञान के स्रोत के रूप में केन्द्रीय स्थान मिलता रहा है, वह सीखने-सिखाने की समूची प्रक्रिया के संरक्षक और प्रबंधक के रूप में मुख्य भूमिका निभाने का काम करते आए हैं। पर 2005 की स्कूली पाठ्यचर्या उनसे माँग करती है कि वे सूचनाओं के वितरक और ज्ञान के स्रोत बन कर न रहें बल्कि विद्यार्थियों द्वारा ज्ञान हासिल करने की प्रक्रिया में स्वयं को सहायक मानें। इन सब परिवर्तनों को उनके व्यवहार का हिस्सा बनाने के लिए ज़रूरी है कि अध्यापक शिक्षा के पाठ्यक्रम में परिवर्तन आए। विद्यालयी शिक्षा व्यवस्था में परिवर्तन की पहल तभी संभव है जब इस व्यवस्था से जुड़े लोगों की सोच और दृष्टिकोण में परिवर्तन आए और शिक्षक की भूमिका इस व्यवस्था में सबसे महत्वपूर्ण है। इस दृष्टि से भाषा-शिक्षण का पाठ्यक्रम और भी महत्वपूर्ण हो जाता है, क्योंकि भाषा पूरी शिक्षा की आधारशिला का काम करती है, जहाँ सिर्फ भाषा पढ़ना-सीखना नहीं बल्कि भाषा के द्वारा अन्य विषयों में भी निपुणता प्राप्त करने की बात आती है। इसके साथ ही भाषा से जुड़े नए बिन्दुआ. जैसे - बहुभाषिक कक्षा, समझ का माध्यम, शांति की शिक्षा में भाषा की भूमिका आदि की समझ शिक्षका. के लिए ज़रूरी है जो अध्यापक शिक्षा में व्यापक बदलाव की माँग करते हैं।

वर्तमान पाठ्यक्रम भाषा के नए सरोकारों और सीखने-सिखाने की नई दृष्टियों को ध्यान में रखकर तैयार किया गया है। आशा है कि शिक्षक प्रशिक्षणार्थियों को इससे भाषा-शिक्षण की तैयारी में सहायता मिलेगी।

पाठ्यक्रम के विशेष उद्देश्य

- भाषा की अलग-अलग भूमिकाओं को जानना
- भाषा सीखने की सृजनात्मक प्रक्रिया को जानना
- भाषा के स्वरूप और व्यवस्था को समझना
- स्कूल की भाषा, बच्चों की भाषा और समझ के बीच के संबंध को जानना
- भाषा के संदर्भ में पढ़ने के अधिकार, शांति और पर्यावरण के प्रति सचेत होना
- भाषा सीखने के तरीके और प्रक्रिया को जानना और समझना
- पाठ्यचर्या, पाठ्यक्रम और पाठ्यपुस्तक का विश्लेषण कर कक्षा विशेष और बच्चों की समझ के अनुसार ढालना
- भाषा और साहित्य के संबंध को जानना
- हिंदी भाषा के विविध रूपों और अभिव्यक्तियों को जानना
- भावों और विचारों की स्वतंत्र अभिव्यक्ति करना
- भाषायी बारीकियों के प्रति संवेदनशील होना
- अनुवाद के महत्व और भूमिका को जानना
- विद्यार्थियों की सृजनात्मक क्षमता को पहचानना
- बच्चों के भाषायी विकास के प्रति समझ बनाना और उसे समुन्नत करने के लिए विद्यालय में तरह-तरह के मौके जुटाना
- भाषा के मूल्यांकन की प्रक्रिया को जानना
- साहित्यिक और गैर साहित्यिक मौलिक रचनाओं की समझ और सराहना
- भाषा सीखने-सिखाने के सृजनात्मक दृष्टिकोण को समझना

इकाई 1: भाषा शिक्षण द्वारा अपेक्षित योग्यताआ. का विकास

उच्चारण, वर्तनी, श्रवण वाचन, पठन लेखन, चिन्तन एवं अभिव्यक्ति की योग्यताआ. का विवरण । अपेक्षित विकास हेतु विधियाँ

इकाई 2: ध्वनि

हिन्दी की ध्वनियाँ, मुख विवर म. उनका स्थान तथा प्रयत्न के आधार पर उनका वर्गीकरण, हिन्दी भाषा म. उच्चारण की समस्याएँ, अशुद्ध उच्चारण के कारणों की पहचान तथा निदानात्मक शिक्षण, कक्षा शिक्षण म. उच्चारण ठीक कराने के प्रयत्न तथा अन्य भाषिक क्रियाएँ

इकाई 3: भाषायी दक्षता

परम्परागत सूत्रों का प्रयोग - अभिवादन, क्षमायाचना, निमन्त्रण, अस्वीकारोक्ति, स्वीकृति, धन्यवाद ज्ञापन, उच्च स्वर म. गद्यांशों एवं कविताओं का वाचन, सारणी, रेखाचित्र, मानचित्र आदि का वर्णन एवं विश्लेषण, कहानी सुनाना तथा घटनाओं का वर्णन

इकाई 4: भाषा का जनसंचार परिप्रेक्ष्य

मुद्रित जनसंचार - समाचार पत्र भाषा, रेडियो एवं दूरदर्शन भाषा, प्रचार-प्रसार भाषा, सोशल नेटवर्किंग भाषा, सोशल नेटवर्किंग साइट्स का शैक्षिक विस्तार (फेसबुक, ट्वीटर, यू ट्यूब, व्हाट्स ऐप) ब्लॉगिंग एवं ई-अधिगम

इकाई 5: पाठ योजना और उसकी उपयोगिता

कविता, कहानी, निबंध, नाटक आदि विधाओं का शिक्षण एवं उनकी पाठ योजना

सिखाने का माध्यम

- व्याख्यान
- सामूहिक चर्चा
- निदर्शन एवं सामग्री विश्लेषण
- विचारगोष्ठी
- विभिन्न साहित्यकारों, लेखकों एवं कवियों के विषय म. चर्चाएँ
- पुस्तकालय संसाधनों का उपयोग
- भाषा प्रयोगशाला
- वीडियो क्लिप्स का प्रयोग
- दृश्य-श्रव्य पाठों के माध्यम से सूक्ष्म शिक्षण
- व्याकरण प्रकरणों के शिक्षण हेतु पावर प्वाइंट प्रस्तुतीकरण
- पाठ योजना प्रस्तुतीकरण
- अन्तर्सक्रिय सत्र
- प्रश्न पत्र निर्माण, मूल्यांकन एवं विश्लेषण
- शब्दकोष तथा ऑन लाइन संदर्भ

प्रायोगिक कार्य

- विश्वस्तर पर हिन्दी की उपयुक्तता एवं उपयोगिता पर विचारगोष्ठी
- मौखिक एवं लेखन अभिव्यक्ति गतिविधियाँ
- मुहावरों, लोकोक्तियों का प्रयोग करते हुए कहानी, लेख आदि लिखवाना
- विषयवस्तु आधारित अभ्यास
- सूक्ष्म एवं व्यापक पाठ योजनाएँ बनाना

- पावर प्वाइंट प्रस्तुतीकरण
- दृश्य-श्रव्य सामग्री का निर्माण
- ब्लूप्रिंट, प्रश्न-पत्र, अंकयोजना तथा प्रश्नानुसार विश्लेषण
- विषय वस्तु परीक्षण तथा उपलब्धि परीक्षण की संरचना
- परीक्षण आंकड़ा. का प्रस्तुतीकरण
- पाठ से संबंधित प्रायोगिक कार्य

मूल्यांकन के माध्यम

- सामूहिक चर्चा का विश्लेषण
- स्व मूल्यांकन तथा निकट समूह मूल्यांकन
- उपलब्धि मूल्यांकन
- अभिलेखन एवं अभिव्यक्ति आधारित मूल्यांकन
- प्रत्यक्ष-अप्रत्यक्ष सूचना आधारित मूल्यांकन

संदर्भ- स्रोत

1. अनन्त चौधरी, नागरी लिपी और हिन्दी वर्तनी, बिहार हिन्दी ग्रन्थ अकादमी, पटना।
2. के० क्षत्रिया, मात्रभाषा शिक्षण, विनोद पुस्तक मंदिर, आगरा।
3. के० जी० रस्तोगी, भाषा सम्प्राप्ति मूल्यांकन, केन्द्रीय हिन्दी संस्थान, आगरा।
4. के० के० सुखिया, हिन्दी ध्वनियाँ और उनका शिक्षण, रामनारायण लाल, इलाहाबाद।
5. जयनारायण कौशिक, हिन्दी शिक्षण, हरियाणा साहित्य अकादमी, चण्डीगढ़।
6. जयनारायण कौशिक एवं विमला कौशिक, पाठ-योजना निर्देशिका हिन्दी शिक्षण, आर्य बुक डिपो, करोलबाग, नई दिल्ली।
7. जयनारायण कौशिक, शुद्ध हिन्दी लेखन, आर्य बुक डिपो, करोलबाग, नई दिल्ली।
8. निरंजन कुमार सिंह, माध्यमिक विद्यालयों में हिन्दी शिक्षण, राजस्थान ग्रंथ अकादमी, जयपुर।
9. भगवती प्रसाद शुक्ल, हिन्दी उच्चारण और वर्तनी, आर्य बुक डिपो, करोलबाग, नई दिल्ली।
10. भोलानाथ तिवारी, भाषा विज्ञान, किताब महल, इलाहाबाद।
11. भोलानाथ तिवारी तथा कैलाश भाटिया, हिन्दी शिक्षण, लिपी प्रकाशन, दिल्ली।
12. योगेन्द्रजीत, हिन्दी भाषा शिक्षण, विनोद पुस्तक मंदिर, आगरा।
13. रघुनाथ सफाया, हिन्दी शिक्षण, पंजाब किताब घर, जालंधर।
14. रमन बिहारी लाल, हिन्दी शिक्षण, रस्तोगी पब्लिकेशन, मेरठ।
15. रामशकल पांडेय, हिन्दी शिक्षण, विनोद पुस्तक मंदिर, आगरा।
16. लक्ष्मीनारायण शर्मा, भाषा की शिक्षण विधियाँ एवं पाठ-नियोजन, विनोद पुस्तक मंदिर, आगरा।
17. वैद्यनाथ प्रसाद वर्मा, बिहार हिन्दी ग्रन्थ अकादमी, पटना।
18. सीताराम चतुर्वेदी, भाषा की शिक्षा, हिन्दी साहित्य कुटीर, वाराणसी।
19. सावित्री सिंह, हिन्दी शिक्षण, लायल बुक डिपो, मेरठ।
20. शारदा भसीन, स्वनिम विज्ञान और हिन्दी की स्वनिम व्यवस्था, आर्य बुक डिपो, करोल बाग, नई दिल्ली।
21. हरिदेव बिहारी, व्यवहारिक हिन्दी व्याकरण, लोक भारतीय प्रकाशन, इलाहाबाद।

13(iv): Pedagogy of Malayalam I – Part 2**Theory****Credits 4****Essence of the course:**

Malayalam is the medium for comprehending ideas, for reflection and thinking, as well as for expression and communication. This course deals Evolution of Malayalam Language, Historical development of Malayalam Literature, Language skill, curriculum development in Malayalam, Discourses in Malayalam, Methods of teaching Malayalam, Theories of learning with special reference to Malayalam teaching, Evaluation of learning Malayalam. This course is visualized as a range of language based activities, which will aid in strengthening the ability to 'read', 'think', 'discuss and communicate' as well as to 'write' in the language of instruction.

Objectives:**At the end of the course the student teachers will be able to**

- enable the student teachers to acquire knowledge of the sound systems of Malayalam and to familiarize them with the appropriate terminology to describe the sounds in Malayalam.
- enable the student teachers to understand correct Malayalam usage and to acquire good pronunciation and fluency of speech.
- familiarize student teachers with the school syllabuses related to high school classes.
- help student teachers acquire a working knowledge of the grammatical terminology and the grammatical system in Malayalam.
- develop in the student teachers the ability to write in an appropriate manner for a particular purpose with a particular audience in mind.
- realize the significance of teaching Communicative Malayalam.
- develop their skill in curriculum transaction.
- develop a thorough understanding of the conceptual background of Malayalam.
- improve the understanding of the principles of curriculum construction and organization in Malayalam language.

CONTENT OUTLINE**Unit 1: Methods of teaching Malayalam**

Lecture cum Demonstration method -Inductive and Deductive method - Dalton Plan - Project method - Play way method - Role play and simulation - Co-operative and collaborative strategies -Problem solving method.

Unit 2: Theories of learning with special reference to Malayalam teaching

Theory and practice of: Cognitive constructivism (Piaget and Bruner) and Social constructivism -Chomsky's concept of language development - Multiple intelligence - Critical Pedagogy - Recent changes practiced in the state schools

Unit 3: Content Analysis

Pedagogic Analysis - Meaning and steps of analysis - Pedagogic analysis of the lessons in the text book of 8th, 9th & 10th standards.

Unit 4: Evaluation of learning Malayalam

Importance of evaluation - Different types of evaluation – merits and limitations - Continuous and comprehensive evaluation – Area of CCE - Evaluation criterion for different learning activities - Construction and administration of achievement tests -Evaluation of mental processes - Relevance and administration of grading system.

Unit 5: Models of Teaching

Meaningful verbal learning model – Gagne’s hierarchical model – Information processing model – Concept attainment model – New trends and approaches in language learning – Behaviourism, structuralism, cognitive interactionist approach, constructivism, multiple intelligence theory

Mode of Transaction:

Introductory lecture, Use of multimedia resources, Library resources, Dictionary and online referencing, Usage of Language games, Mind mapping, Demonstration, group discussions

Practicum: Task and Assignment

1. Prepare a short essay on inter relationship between language and social development. (group activity)
2. Open discussion on Mother tongue as a tool for transforming culture
3. Seminar (group) on Need of mother tongue as the medium of instruction
4. Seminar (group presentation)
5. Prepare short essay on 5 sub topics
6. Trace out the activities included in the Text book/Hand book for developing basic language skills among the learners
7. Find out the activities mentioned in the text book and hand book for developing the creativity among the learners.
8. Prepare essay on general principles of curriculum development.
9. Prepare an editorial for your class magazine
10. Prepare postures on any social issues
11. Write a screen play based on any one of the poems in the 8th or 9th std text book
12. Select a poem from any text book and present the same through simulation (group task)
13. Conduct a debate on the relevance of critical pedagogy in the context of the teaching-learning atmosphere prevailing in the schools in Kerala
14. Conduct a seminar on Chomsky’s concept of language development.
15. Analyse and trace out the learning activities included in any one topic on the basis of prescribed curricular objectives (Group task)
16. Analyse any one text book and Trace out new vocabulary, phrases, idioms, proverbs, and grammar contents (group task)
17. Conducts a panel discussion on the relevance of grading system in the B.Ed programme.
18. Prepare a sample question paper considering all the elements of a scientific question paper (group task)

Mode of Assessment

Written test and Task and assignment

References:

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3. Sankarakurup. G – SahithyaParichayam
4. Parameswaran Nair. P.K – Malayala Sahithya Charithram
5. Raghavan Payyanad – Folklore
6. Balasahithyam Thatwavum Charithravum – State Institute of Children Literature
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25. Nair, Chandrashekharan,C.K(2002) *Mathrubhasha Bhodhanam*. Trivandrum. Kerala bhasha institute.
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30. Sivarajan, k & Sreemannuni, P. S. (2003) *Malayalabhashadhyapanam*. Central cooperativestores, Calicut university.
31. Variyar, Prabhakaran,K.M& A. Santha(1998). *Modern linguistics*, Trivandrum: keralabhasha institute.

13(v): Pedagogy of Telugu I – Part 2

Theory

Credits 4

Essence of the course:

Objectives:

CONTENT OUTLINE

Mode of Transaction

Practicum: Task and Assignment

Mode of Assessment

References:

Syllabus yet to be prepared for Pedagogy of Telugu I – Part 2.

13(vi): Pedagogy of French I – Part 2**Theory****Credits 4****Essence of the course:**

This course is to enable students to specialize in teaching French as a foreign language and to develop an understanding of the modern day teaching approaches to teach grammar, vocabulary and pronunciation. The course includes analysis of teaching content and text books.

Objectives:**At the end of the course, the student teacher will be able to:**

- understand the basic theories of learning and communication
- understand different approaches of teaching FLE/FLES
- acquire knowledge of various techniques in teaching oral and written skills
- prepare unit plan and activity oriented Lesson plans
- apply the theoretical concepts in classroom teaching
- develop the positive attitude among the students
- stimulate curiosity and creativity

CONTENT OUTLINE**Unit 1: Revision of Teaching content (Pronunciation) & Teaching of Pronunciation***Revision of teaching content :*

Voyelles et consonnes – Division des syllabes - Liaisons et enchainements

*Prescribed book: Phonétique progressive du français – Niveau débutant et intermédiaire**Teaching of pronunciation*

Différence entre phonétique et phonologie – Méthodes de correction phonétique - Transcription phonétique

*Prescribed book: La phonétique audition, prononciation, correction***Unit 2: Lesson plan preparation**

Définition et rôle du plan de cours – Conseils méthodologiques pour préparer les leçons

Unit 3: Detailed analysis of following text books

Mauger bleu / C'est génial / Echo / Saison

Unit 4: Creation of teaching aids

Images de Manuel – Images sur internet – tableaux muraux – diagrammes – cartes de mémoire – dessins – schémas préparés sur papier – maquettes – objets réels

Unit 5: Methodology of class observation

Méthodologie de l'observation de classe – Elaborer une fiche d'observation - Critères d'observation – Grille d'observation

Mode of Transaction

Lecturing on theoretical concepts, Project method, Tasks and Assignments.

Practicum: Task and assignment

1. Practice minimum 3 Micro teaching skills and maintain the record.(Compulsory)
2. Seminar on foundation and significance of French language teaching
3. Oral Communication tasks
4. Language Lab activities
5. Preparation of micro lesson plan
6. Preparation of micro lesson plan using computer assisted instruction
7. Sessions in small or medium groups
8. Language games on grammatical structure
9. Dramatization and miming.
10. Project on formation of new words
11. Planning of 10 vocabulary building exercises and techniques to teach the students in the classroom.
12. Assignments & Library work
13. Preparation of audio visual aids(PPT, Charts, Models)
14. Listening to radio news and responding to questions.

Mode of Assessment

Paper-pencil tests, Performance tests, Formal and Informal Testing

References:

1. ABRY D., VELDEMAN-ABRY J. *La phonétique : audition, prononciation, correction*, CLE, 2007, 1CD
2. BEROCCHINI P., COSTANZO E., *Manuel de formation pratique pour le professeur de FLE*, Paris, CLE International, 2008.
3. CHARLIAC, Lucile et MOTRON, Anne-Claire. *Phonétique progressive du français*. CLE International, 1999.
4. CUQ J.-P., GRUCA I., *Cours de didactique du français langue étrangère et seconde*, Grenoble, PUG, 2002.
5. MOIRAND S., *Enseigner à communiquer en langue étrangère*, Paris, Hachette, coll. F, 1982.
6. OLLIVIER JACQUELINE et BEAUDOIN MARTIN, *Grammaire française*, 5e édition, Montréal, Groupe Modulo,
7. POISSON-QUINTON, Sylvie et MIMRAN, Reine. *Vocabulaire expliqué du français*. Niveau intermédiaire. CLE International, 2004
8. TAGLIANTE., CHRISTINE., *La classe de langue*, coll, Techniques de classe, CLE international, 2006

13(vii): Pedagogy of Mathematics I – Part 2**Theory****Credits 4****Essence of the course:**

This course is to enable student teachers to specialize in mathematics teaching to develop an understanding of the curriculum and linking school knowledge with community life. The course includes reconstruction of mathematical knowledge through appropriate pedagogic processes and to communicate meaningfully with students.

Objectives:**At the end of the course, the student teacher will be able to**

- appreciate the nature, structure, scope of Mathematics and its relation with other disciplines.
- acquire knowledge of the nature and development of Mathematics
- understand the aims and objectives of teaching Mathematics
- prepare unit plan and activities oriented Lesson plans for effective classroom communications.
- prepare the prospective Mathematics teachers as facilitators for effective teaching and learning of Mathematics.
- apply different methods and techniques of teaching of Mathematics and to employ them proficiently in the classroom
- develop the positive attitude among the student in teaching Mathematics
- appreciate the role of Mathematics in day-to-day life
- stimulate curiosity, creativity and inventiveness in Mathematics

COURSE CONTENT**Unit 1: Lesson plan preparation**

Lesson planning – Meaning, Purpose, Components and Characteristics - types - needs -aspects of a good lesson plan –different models/approaches for writing lesson plan – Unit Plan, Year Plan.

Unit 2: Models of Teaching Mathematics

Five E-Model- Engage, Explore, Enforce, Expand and Evaluate. – Suchman’s Enquiry Model and Bruner’s Concept Attainment Model – Individualized Instruction – Programmed Instruction – Meaning and concept – Types – Linear, Branching, Mathematics.

Unit 3: Learning Resources and diverse classroom

Mathematics textbook – workbook – Mathematics library – Mathematics laboratory – Mathematics club– Mathematics exhibition and fair – using community resources for Mathematics learning – pooling of learning resource in school complex / block / district level.

Unit 4: Professional development of Mathematics teacher

Pre-requisite qualifications – professional training: selective academic training, in-service training, professional activities, school activities, mathematical organization – administrative duties – community activities–qualities of Mathematics teacher–ethics of teacher – social and environmental responsibilities of the Mathematics teacher – problems faced by the Mathematics teachers.-Appropriate use of ICT for Teacher Professional Development (TPD) – Linkage – contribution to corporate life and to society, Journals and other resource materials

in Mathematics Education – Participation in conferences/Seminars/Workshops -Qualities of a Mathematics Teacher.

Unit 5: Research in Mathematics teaching

Research in the field of mathematics and mathematics teaching – status of achievement in mathematics at elementary and secondary schools – areas of difficulties – phobia for and attitude toward mathematics learning – factors related to mathematics learning – Action research –implication of research findings

Modes of Transactions:

Lecturing on Theoretical Concepts, Logical Reasoning of Mathematical problems, Analytic and Synthetic Methods of Teaching, Project Method, Tasks and Assignments, seminars.

Practicum: Task and Assignment

1. Collection of articles relevant to recent developments in Mathematics.
2. Prepare a lesson plan for any topic in Mathematics based on Inquiry Training Model or Concept Attainment Model.
3. Preparation of ten frames of Linear or Branching Programmes on any topic in Mathematics.

Learning Activities:

Learning the Content and practicing them appropriately, Oral work, drill, Review and Practising Pedagogical Aspects for different areas of School Curriculum.

Mode of Assessment:

Paper-Pencil Tests, Performance tests, Formal and Informal Testing and Continuous Comprehensive Evaluation.

References:

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2. Anice and JeyanthiAlwan (2011). Skills and Strategies of Teaching Mathematics. Hyderabad: Neelkamal Publications Pvt. Ltd.
3. Anita J. Harrow (1977). A Taxonomy of the Psychomotor Domain. New York: David Mckay Company, Inc.
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29. Singh, L.C. and Sharma R.D. (1987) Micro-teaching and Practice. Agra: National Psychological Corporation.
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31. Sudhir Kumar and Ratnalikar (2012). Teaching of Mathematics. New Delhi: Anmol Publications Pvt.Ltd.
32. Wadhwa, S. (2008). Modern methods of teaching Mathematics. New Delhi: Karan Papers Backs.
33. Zubair P.P (2013). Teaching of Mathematics. New Delhi: APH Publishing Corporation.

13(viii): Pedagogy of Physical Science I – Part 2

Theory

Credits 4

Essence of the course:

The student-teachers will revisit basic concepts of physics and chemistry which was given in upper primary and secondary school books. The student-teachers will work with such theoretical studies as well as on the field with school children from different backgrounds, they will be capable to critically examine teaching learning processes that incorporate enquiry, discovery, conceptual development, activity based learning, etc. within the classroom.

Objectives:

At the end of the course, the student teacher will be able to

- acquire knowledge of nature, values and modern approaches in physical science teaching.
- understand learning objectives and curriculum approaches in physical science teaching.
- apply acquired knowledge of various methods and technique in teaching physical science.
- develop skill in adopting various approaches of learning in physical science teaching.
- develop interest in participating the practice teaching.
- develop desirable positive attitude towards contribution of eminent scientist for development of physics and chemistry.
- acquire hands-on experience in designing and developing suitable learning aids for classroom instruction.

COURSE CONTENT**Unit 1: Lesson planning**

Lesson planning – meaning, need – Factors that need to be considered for organisation of concepts – Elements of a physical science lesson – different models/approaches for writing lesson plan – aspects of a good lesson plan – Unit planning – salient features

Unit 2: Methods and techniques of teaching physical science

Lecture-cum-Demonstration method – Heuristic approach – Historical and Biographical approaches – Scientific method, Inductive and Deductive methods – Project method – laboratory method – Team-teaching – Supervised study – Role play – Play way – Programmed instruction, Linear and branching programme – Computer assisted instruction.

Unit 3: Approaches in learning physical science

5E learning model – Collaborative learning approach – Problem solving approach – Concept mapping – Experiential learning – Cognitive conflict – Inquiry approach – Analogy strategy

Unit 4: Basic physics

Matter and Measurement: Measurement, Measuring Instruments

Forces and Movement: Motion, Force and Pressure, Motion and liquids, Laws of Motion and Gravitation

Exploring Energy: Types of Energy, Electricity, Heat, Work, and Power.

Exploring Phenomena: Magnetism, Light, Sound, Magnetic Effect of Electric Current.

Unit 5: Basics Chemistry

Matter: Separation of Substances, Matter in our Surroundings, Elements, Compounds

Exploring Chemical Changes and Formulation: Changes around us, Matter and Its Nature, Chemical equation, Chemical Reactions

Exploring Chemical Families: Periodic Classification of Elements

Exploring the World: Chemistry in Everyday Life, Combustion and Flame, Coal and Petroleum, Chemical Bonds, Carbon and its Compounds.

Mode of transaction:

Lecture-demonstration method, Project method, Problem-solving method, CAI, Observation method (field visit/exhibition/internship), Seminar/ discussion

Practicum: Task and Assignment

1. Critically analyze different branches of physics and chemistry are available in the school book from class 6 to 10th (Assignment).
2. Study the gender gap in learning science (scholastic record).
3. Observe classroom teaching methods and techniques used by the school teacher (Report).
4. Prepare 2 concept maps physics and chemistry each from the content.(concept map)
5. Prepare liner or branching frames for a single concept from physical science.(PI)

Mode of Assessment:

Written test, Task and assignment, Laboratory work

References:

1. National Council of Educational Research and Training (2013), *Pedagogy of Physical Science I & II*, New Delhi. ISBN 978-93-5007-224-0(Part I) ISBN 978-93-5007-225-7 (Part II)
2. Radha Mohan. (2013), *Teaching of Physical Science*. Hyderabad: Neelkamal publication pvt. Ltd., ISBN 978-81-8316-204-3
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4. Vanaja, M. (2006), *Methods of teaching physical science*. Hyderabad: Neelkamal publication pvt. Ltd., ISBN 81-8316-018-0
5. Panneerselvam, A and Rajendiran, E,K. (2009), *Teaching of Physical Science*. Chennai: Shantha publishers; ISBN 978-81-86689-53-0
6. NCERT. (2006), *Elementary level syllabus vol-I*. New Delhi. ISBN 81-7450-593-8
7. Mangal, S, K. and Uma Mangal. (2009), *Essentials of Educational Technology*. New Delhi: PHI Learning Pvt. Ltd., ISBN-978-81-203-3723-7
8. Monika davar. (2012), *Teaching of science*, New Delhi: PHI Learning Pvt. Ltd., ISBN 978-81-203-4624-6 and 81-203-4624-6.
9. Central Board of Secondary Education. (2010), *Manual for Teachers on School Based Assessment Classes VI to VIII*. Delhi.
10. Jonathan Anderson. (2010), *ICT Transforming Education- A Regional Guide*. UNESCO Bangkok. ISBN 978-92-9223-325-9 ISBN 978-92-9223-326-6.
11. Pathak R P. (2012), *Teaching skills*. Pearson Education India. ISBN:8131776336, 9788131776339

13(ix): Pedagogy of Biological Science I – Part 2**Theory****Credits 4****Essence of the course:**

This course is intending to enhance the ability and skill of the student teacher in understanding the importance of science and its relevance to the existence of life in this earth and to teach the same with different Techniques and approaches to the students of science learner. The student teacher will be acquainted with such steps involved in planning the science teaching and implementing the different methods and techniques in teaching of the same and further direct himself to do research. Further it helps him to develop desirable positive attitude towards science teaching and its development.

Objectives:**At the end of the course, the student teacher will be able to**

- Understand the nature of science and aims and objectives of teaching Biological Science.
- understand the microteaching skills
- Acquiring skills related in planning the lessons and presenting them effectively.
- Develop a theoretical and practical understanding of the various methods and techniques of teaching Biological Science.
- Understand the criteria in selecting a good textbook and to evaluate Science textbook.
- Understand the techniques of evaluating Science teaching and to construct an achievement test to assess the learning outcomes of pupils.
- Estimate the facilities required for the organization and maintenance of Science laboratory.
- Understand the special qualities of a Science teacher and to acquire those qualities.
- Understand the basic concepts in science for science teaching.
- Acquire a favourable scientific temper towards science teaching and values.
- Develops favourable positive attitude towards research on science teaching.

CONTENT OUTLINE**Unit 1: Organizing science related activities**

Science club – Field trips/Excursions – Science Fairs/Exhibitions – Science hobbies – educational values

Unit 2: Methods of teaching biological science

Lecture method, Lecture-cum-Demonstration method.- laboratory method, - Project method, Heuristic approach, – Historical and Biographical approaches-Scientific method-Team-teaching. – Remedial teaching.

Unit 3: Facilitating Individual learning strategies

Individualization of instruction – Programmed Instruction-linear and branching type-Computer Assisted Instruction. – Role of Multimedia in teaching biological science.

Unit 4: Lesson plan

Lesson Planning – Essential features of Lesson Planning – Steps in Lesson Planning –Preparing Lesson Plan –different models/approaches for writing lesson plan - Unit Plan - Steps in Unit Planning

Unit 5: Content and pedagogical analysis

Analyze the content in science books for standard VI to IX from lesson plan point of view and Concretization of concepts – pedagogical analysis of selected concepts for learning.

Modes of transaction:

Lecture method, Assignment Method, Report writing, Field visit & Preparation of Field report, Laboratory Method, Presentation by students, Demonstration of scientific experiments.

Practicum: Task and Assignment

1. Preparation of three lesson plans on any topic of Biological Science included in the Science text book of secondary / Hr. secondary school science subject.
2. Preparation of blue print for construction of achievement test.
3. Preparation of unit test for a unit in Biology.
4. During your internship programme, observe the normal class and report that Methods and techniques of teaching Biological I science used by the school teacher.
5. Select one or two topic from upper primary or secondary biology syllabus – identify the learning difficulties – suggest suitable remedial measures.

Mode of Assessment:

Observation, Report preparation & Records, Assignment submissions, Seminar presentation, Development of Psychological test.

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20. NCERT. (2006), Elementary level syllabus vol-I. New Delhi. ISBN 81-7450-593-8
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Web resources:

1. <http://www.edutopia.org/blog/websites-for-science-teachers-eric-brunsell>
2. <http://naturalsciences.sdsu.edu/links.html>
3. <https://conbio.org/professional-development/education-programs>
4. <http://www.explorebiology.com/teachers/>

13(x): Pedagogy of Social Science I – Part 2**Theory****Credits 4****Essence of the course:**

This course sensitizes the learners the relevance of social science in the current context. It makes them familiar about the techniques and approaches of teaching social science. This course acquaints the preparation and administration of learning resources in the meaningful way. It develops the competency in making use of appropriate assessment system to apprise the learning outcomes. It also sensitizes the learners about the various social issues and mould them to face the same in a plausible way.

Objectives**At the end of the course, the student teacher will be able to**

- acquire basic knowledge and skills to analyze and transact the Social Science curriculum effectively following wide-ranging teaching
- acquire a conceptual understanding on the process of teaching and learning Social Science
- sensitize and equip student teachers to handle social issues and concerns in a responsible manner.
- Develop ability for critical and logical thinking and apply the acquired knowledge and skills in unfamiliar situations
- Acquaint with different methods, approaches and techniques of teaching social science
- Develop ability to design different evaluation tools
- Develop practical skills for analyzing socio-economic, political and physical phenomena

CONTENT OUTLINE**Unit 1: Self-Instructional Modules in Social Science Teaching**

Programmed learning –Linear and Branching programme – Computer Assisted Instruction – Group Directed Instructional Modules.

Unit 2: Technological Media in Social Science Teaching

Hardware and Software approach - Multimedia in social science teaching.

Unit 3: Evaluation of Teaching and Learning in Social Science

Importance of evaluation – tools and techniques of evaluation in social science – characteristics and criteria for the preparation of different objective test items, short answer and essay questions in Social Science - Preparation of an achievement test , Preparation of blue print, Diagnostic test and remedial teaching.

Unit 4: Supporting Devices of Social Science Teaching

Educational Excursion, Field Trips – Social Science laboratory – Social Science Class room – Museum – Social Science Library – utilization of community resources- Bringing community to the school-taking school to the community, Teaching of current affairs and social issues.

Unit 5: Pedagogical analysis of content in Social Science at Secondary level

Stage – I - 6th to 8th Standard Social science text book. Stage – II - 9th and 10th Standard Social science text book.

Mode of Transaction

Lecture cum discussion, Dramatization, Field visit, Debate, Panel Discussion.

Practicum: Task and Assignment

1. A detailed report may be prepared after visiting the various institutions which are practicing innovative approach in transaction modalities
2. Organizing field trip to any one of the place of historical importance.
3. Newspaper analysis.

Mode of Assessment

Unit test, Project, Preparation of assignments, Preparation Teaching aids, Seminar Presentation.

References:

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8. Sharma.R.K., Teaching of Social Studies, International Publication House, Meerut, 2004
9. UNESCO: New Source Book for Teaching of Geography, UNESCO
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13(xi): Pedagogy of Computer Science I – Part 2**Credit: 4****Essence of the course:**

This course is to enable students to specialize in Computer science and to develop an understanding of the curriculum, linking school knowledge with community life. The course includes reconstruction of Computer Knowledge through appropriate pedagogic processes and to communicate meaningfully with children

Objectives:

At the end of the course, the student teacher will be able to

- enable the student teachers acquire knowledge on Fundamentals of Computer.
- acquaint the student teachers with the aim of teaching computer science at various levels.
- help the students teachers in acquiring skills relating to planning lessons and presenting them effectively.
- familiarise the student teachers with the various methods of Teaching Computer Science.
- understand the Computer Science curriculum and various approaches.
- make the student teachers aware of the use of various instructional materials and aids in Teaching of Computer Science.
- enable the student teachers acquire knowledge on Computer Evaluation.

CONTENT OUTLINE**Unit 1: Instructional Aids**

Meaning of the term instructional aids - use and importance of instructional aid in computer science – Guiding principles for the effective use of audio visual aids – classification of audio visual aids: The first approach, The second approach, the technological approach, The Edgar Dale Cone classification approach – Instructional material or teaching aids: Epidiascope – Overhead Projector – Black board – Visual Media – Charts- Maps –Graphs – Diagrams – Interactive Whiteboard – PowerPoint Presentation (Multimedia Presentation- preparation and use of the instructional media)

Unit 2: Curriculum in Computer Science

Introduction – Meaning – Definition – Principles of Curriculum development, Selection of content and organization of subject matter - Approaches to the organization of computer science curriculum: correlated approach, Integrated approach, Topical approach, Concentric or spiral approach, Chronological and sequential approach - Present status of Computer Science in Secondary and Senior secondary education

Unit 3: Computer Organization

Introduction – Components of Digital Computer – Functional units of Computer System – Memory Unit: Read Only Memory (ROM), Random Access Memory (ROM), PROM, EPROM and EEPROM – Central Processing Unit (CPU) – Arithmetic Logic Unit (ALU) – Input and Output devices – Storage devices: Hard disk, Magnetic Tape, Floppy disk, Optical disk – Software: Software Classification, Operating System: Introduction, Basic functions of OS, Classification of OS.

Unit 4: Text Books, Assignment and Review

Computer Science Textbook: Meaning – Qualities of good computer science text book – value of the computer science library. Assignment- types –need-characteristics of good assignment – correction – review – characteristics of a good review – need and importance of reviewing lesson.

Unit 5: Evaluation in Teaching of Computer Science

Introduction - Meaning – Definition – objective based evaluation – tools and techniques in evaluation – evaluation for achievement, diagnosis, prediction and remedial measures – Criterion and Norm referenced tests- Construction of different types of test: Principles of test construction and administration of an achievement test- Blue print – Characteristics of a good test – Item analysis – Continuous and comprehensive evaluation – Formative and summative assessment – Grading pattern – Computer Aided Evaluation – Online Examination.

Mode of Transaction

Lecturing on Theoretical Concepts, use of computers in lab, Analytic and Synthetic Methods of Teaching, Project Method, Tasks and Assignments

Practicum: task and assignment

1. Practice minimum 3 Micro teaching skills and maintain the record.(Compulsory)
2. Prepare digital lesson plan
3. Conduct Online Quizzes or E- Quizzes
4. Prepare E-Content (any two topics)
5. Develop a CAI Package (Using Visual Basic Programming)
6. Prepare any two E-assignments
7. Prepare Program Learning Material

Mode of Assessment

Written tests, task and assignments.

References:

1. Aggarwal J.C (2006). Essential of educational technology: innovation in Teaching-Learning. New Delhi: Vikas Publishing House.
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Edn 14: C&PS - PEDAGOGY OF SCHOOL SUBJECT II

14(i): Pedagogy of Tamil II – Part 2

தமிழ் கற்பிக்கும் முறைகள் II - பகுதி 2

Theory

Credits 4

அடிப்படைக் கோட்பாடு:

தாய்மொழிக் கல்வியின் தேவையை உணர்ந்து அதைப் பயன்படுத்தும் திறனைப் பெற்றிருப்பர். தாய்மொழிக் கல்வியில் கலைத்திட்டம் உருவாகும் திறனைப் பெற்றிருப்பர். முற்காலம் முதல் இக்காலம் வரையிலும் தாய்மொழி எவ்வாறு கற்பிக்கப்படுகிறது என்னும் அறிவைப் பெற்றிருப்பர். வகுப்புக் கற்பித்தலுக்கு நுண்ணிலைக் கற்பித்தலின் தேவையை அறிந்திருப்பர். மொழிப்பாடத்தில் செய்யுள், உரைநடை, இலக்கணம், கட்டுரை, துணைப்பாடம், முதலானப் பாடங்களுக்குப் பாடத்திட்டம் எழுதும் திறனையும் கற்பிக்கும் திறனையும் பெற்றிருப்பர். மொழியின் அடிப்படைத் திறன்களையும் உயர்நிலைத் திறன்களையும் பெற்றிருப்பர்.

நோக்கங்கள்:

- தாய்மொழியின் இயல்புகளை அறியச் செய்தல்.
- கலைத்திட்டத்தில் தாய்மொழியின் பங்கினை உணர்த்துதல்.
- உடலியல், உளவியல் அடிப்படையில் மொழிக் கற்றல் கூறுகளை அறியச் செய்தல்.
- அடிப்படைத் திறன்களை வளர்க்கும் திறன் பெறச் செய்தல்.
- கலைத்திட்டம், பாடத்திட்டம் தயாரித்துப் பயன்படுத்தும் அறிவினை ஊட்டுதல்.
- பலவகையான கற்பித்தல் முறைகளை அறியச் செய்தல்.
- கற்பித்தல் துணைக்கருவிகள் பயன்படுத்தும் அறிவினை வளர்த்தல். நுண்ணிலை கற்பித்தல் வழி பயிற்றும் திறன் வளர்த்தல்.
- மொழி ஆசிரியரின் தொழில் திறனை மேம்படுத்துதல்.
- கற்பித்தல் தொழில்நுட்பக் கருவிகள் பயன்படுத்த பயிற்றுவித்தல்.

அலகு 1: தாய்மொழி பயிற்றுமுறைகள்

பண்டையகால, இக்கால கற்பித்தல் முறை - விளையாட்டுமுறை - நடிப்புமுறை - செயல்திட்டமுறை - தனிப்பயிற்சிமுறை - மேற்பார்வைமுறை - பள்ளியில் தமிழ் பயிற்றுவிக்கப் பாடத்திட்டம் தயாரிப்பதன் அவசியம் - ஆறாம் வகுப்பு முதல் ஒன்பதாம் வகுப்பிற்கான தமிழ்ப் பாடக்கருத்துகளை அறிதல்.

அலகு 2: தமிழ் கற்பித்தலில் தொழில் நுட்பக் கருவிகள்

தேவைகள் - முக்கியத்துவம் - திரையில் அமையும் கருவிகள், திரையில் அமையாக்கருவிகள் - வானொலி - தொலைக்காட்சி - ஒலிப்பதிவு நாடாக்கருவி - படச்சுருள் - ஒலி, ஒளி குறிப்புகள் - திட்டதிரவ வீழ்த்தி - தலைமேல் பட வீழ்த்தி- வரைபடம், மாதிரிகள், அட்டைகள், இணையம்.

அலகு 3: கேட்டல், பேசுதல் திறன்கள்

கேட்டல் திறன் - முக்கியத்துவம் - கேட்டலின் வழிக் கற்றல் - கேட்டல் திறனை வளர்க்கும் வழிகள் - நன்மைகள் - பேசுதல் திறன் - வாய்மொழி பயிற்சி அளிக்கும் முறைகள் -

நோக்கங்கள்- திருந்திய பேச்சின் நல்லியல்புகள் - திருந்தாப் பேச்சின் குறைகள் - களையும் வழிமுறைகள் - நா நெகிழ் பயிற்சி - நா பிறழ் பயிற்சி

அலகு 4: படித்தல் , எழுதல் திறன்கள்

படித்தல் திறன் - முக்கியத்துவம் - படிக்கக் கற்பித்தலின் நோக்கங்கள் - எழுத்துக் கூட்டுதல், வாய்விட்டுப் படித்தல், வாய்க்குள் படித்தல், நிறை, குறைகள் - எழுத்துமுறை படிப்பு - சொல்முறை படிப்பு - ஆழ்ந்த படிப்பு - அகன்ற படிப்பு - எழுதுதல் திறன் - எழுதுவதற்கான தொடக்க நிலை - எழுதுவதற்குமுன் பயிற்சி - நல்ல கையெழுத்தின் இயல்புகள் - எழுதுதலின் வகைகள்

அலகு 5: மொழி ஆசிரியர்

மொழி ஆசிரியரின் இயல்புகள் - கல்வித் தகுதிகள் - தொழில் திறனை மேம்படுத்துதல் - பணியிடைப் பயிற்சி - வகுப்பு மேலாண்மை - மன எழுச்சிசார் தழுவல்கள் - தலைமைப் பண்பு - சிறப்புகள் -சமுதாயப் பங்களிப்பு.

கற்பிக்கும் முறைகள்

விரிவுரை, கலந்துரையாடல், மாணவர் கருத்தரங்கம், ஒப்பார்குழு விவாதம், குழுக் கற்பித்தல், செய்துகாட்டல், பதாகை வழிக் கற்பித்தல், செய்து கற்றல், ஆய்வரங்கம், பணிமனை, செயல்திட்டக் கற்பித்தல், விதிவருமுறை, விதிவிளக்குமுறை, விளையாட்டுமுறை, கணினி வழிக் கற்பித்தல், இணையம் வழிக் கற்பித்தல், பாடல் மூலம், நாடகம் மூலம் கற்பித்தல், சொற்பொழிவு, சிறப்புச் சொற்பொழிவு, காட்சிக் கேள்விக் கருவிகள் மூலம் கற்பித்தல், மொழிப்பயிற்றாய்வுக் கூடம் வழிக் கற்பித்தல்.

மதிப்பீடு

வகுப்புத் தேர்வு, வாய்மொழித் தேர்வு, ஒப்படைப்புகள், வகுப்புக் கருத்தரங்கம், மாதிரிப் பாடம் எடுத்தல் - வகுப்பில் மாணவர்கள் பங்கேற்பை மதிப்பிடல்.

செய்முறை பயிற்சிகள்

1. ஒலி உச்சரிப்புப் பயிற்சி.
2. ஏதாவது ஒரு பாடத்திற்குப் பாடக் குறிப்பு எழுதுதல்.
3. ஏதாவது ஒரு பாடம் கற்பிக்க தொழிற்றுட்பத்தை எவ்வாறு பயன்படுத்துதல் எனத் திட்டம் தயாரித்தல்.
4. விருது பெற்ற தமிழறிஞர்கள் பட்டியல் தயாரித்தல்
5. வானொலி, தொலைக்காட்சி நிகழ்ச்சிகள் தயாரித்தல்

பார்வை நூல்கள்

1. இரத்தின சபாபதி, பி. செம்மொழிக் கல்வி, சாந்தா பப்ளிஷர்ஸ், சென்னை.
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12(ii): Pedagogy of English II – Part 2**Theory****Credits 4****Essence of the course:**

Equipping the student with English knowledge for communication and Literature for appreciation. Developing the skill of communication in order to help children at various school levels towards effective communication. The course focuses on developing the ability of the future teachers to transact language in inclusive classroom.

Objectives:**At the end of the course, the student teacher will be able to**

- develop English Language teaching competency.
- understand and appreciate the importance of English.
- have a critical study of learning English as a second language in the multilingual Indian Society.
- understand the role of English in India and to improve English Language attainment.
- produce the different methods, techniques and strategies of ELT.
- Prepare and use appropriate teaching aids to make teaching more effective.
- develop the various micro skills to teach English language.
- acquire the skill of preparing lesson plans to teach English.

CONTENT OUTLINE**Unit 1: Lesson Plan format- Prose**

Planning of the lesson –Need, Features and Advantages of lesson plan – different models/approaches for writing lesson plan – Planning a Prose Lesson (Herbartian steps) - aims and objectives of teaching Prose-Identifying and listing language material to be taught (New lexical items and structures).

Unit 2: Lesson plan format-Poem

Concept, aims and objectives of teaching poetry in second language – Poetic devices- Difference between prose and poetry teaching- Steps of preparing a lesson plan on poetry.

Unit 3: Technology resources for English language teaching

Concept and use of A.V. aids in the teaching of English: Black board and white board, flannel board, bulletin board, flash cards, posters and flip charts, video clips, pictures, photos, puppets, postcards and advertisements, newspapers, brochures, Realia. Over Head Projector (OHP), Radio, T.V., role of computers, Power point presentation, Language laboratory and language games.

Unit 4: Skill of listening

Concept of listening in second language-Listening skills and their sub-skills -Techniques of teaching listening - Role of teaching aids in teaching listening skills - Difference between hearing and listening.

Unit 5: Teaching of receptive skills - skill of reading

Concept of reading in second language-Mechanics of reading (Eye span, pause, Fixations, Regression and speed) Types of reading: Skimming, Scanning, Browsing, SQ3R, Silent reading, reading aloud, Intensive reading and Extensive reading.

Mode of Transaction:

Use of multimedia resources, Library resources, Accessing Online input on the topic, Print versions of texts focusing on communication, Usage of ICT, Introductory lecture, Micro-teaching through video lessons, Lesson Plan preparation, Demonstration, Mind mapping, Small group discussions, Dictionary and Online referencing, Language Lab activities

Practicum: Task and assignment

1. Project on formation of new words
2. Planning of 10 vocabulary building exercises and techniques to teach the students in the classroom.
3. Assignments & Library work
4. Preparation of audio visual aids(PPT, Charts, Models)
5. Listening to radio news and responding to questions.

Mode of Assessment:

Evaluation based on documentation (written) – Address the level of pupil involvement in Group Discussion – Performance evaluation (seminar, project and assignment) – Monitor the ability to distinguish between similar concepts – Use of Checklist to monitor, rate performance in each skill – Monitoring performance of communicative tasks

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14(iii): Pedagogy of Hindi II – Part 2

Theory

Credits 4

पृष्ठभूमि:

राष्ट्रीय पाठ्यचर्यारूपरेखा 2005 तथा शिक्षा का अधिकार एक्ट 2009 विद्यालयी शिक्षा तथा शिक्षण प्रशिक्षण के निकट संबंधों को ध्यान में रखते हुए शिक्षकों की भूमिका में एक बहुत बड़े परिवर्तन की माँग करती है। पाठ्यचर्या में अभी तक शिक्षकों को ही ज्ञान के स्रोत के रूप में केन्द्रीय स्थान मिलता रहा है, वह सीखने-सिखाने की समूची प्रक्रिया के संरक्षक और प्रबंधक के रूप में मुख्य भूमिका निभाने का काम करते आए हैं। पर 2005 की स्कूली पाठ्यचर्या उनसे माँग करती है कि वे सूचनाओं के वितरक और ज्ञान के स्रोत बन कर न रहें बल्कि विद्यार्थियों द्वारा ज्ञान हासिल करने की प्रक्रिया में स्वयं को सहायक मानें। इन सब परिवर्तनों को उनके व्यवहार का हिस्सा बनाने के लिए ज़रूरी है कि अध्यापक शिक्षा के पाठ्यक्रम में परिवर्तन आए। विद्यालयी शिक्षा व्यवस्था में परिवर्तन की पहल तभी संभव है जब इस व्यवस्था से जुड़े लोगों की सोच और दृष्टिकोण में परिवर्तन आए और शिक्षकों की भूमिका इस व्यवस्था में सबसे महत्वपूर्ण है। इस दृष्टि से भाषा-शिक्षण का पाठ्यक्रम और भी महत्वपूर्ण हो जाता है, क्योंकि भाषा पूरी शिक्षा की आधारशिला का काम करती है, जहाँ सिर्फ भाषा पढ़ना-सीखना नहीं बल्कि भाषा के द्वारा अन्य विषयों में भी निपुणता प्राप्त करने की बात आती है। इसके साथ ही भाषा से जुड़े नए बिन्दु आते हैं - बहुभाषिक कक्षा, समझ का माध्यम, शांति की शिक्षा में भाषा की भूमिका आदि की समझ शिक्षकों के लिए ज़रूरी है जो अध्यापक शिक्षा में व्यापक बदलाव की माँग करते हैं।

वर्तमान पाठ्यक्रम भाषा के नए सरोकारों और सीखने-सिखाने की नई दृष्टियों को ध्यान में रखकर तैयार किया गया है। आशा है कि शिक्षक प्रशिक्षणार्थियों को इससे भाषा-शिक्षण की तैयारी में सहायता मिलेगी।

पाठ्यक्रम के विशेष उद्देश्य

- भाषा के अलग-अलग भूमिकाओं को जानना
- भाषा सीखने की सृजनात्मक प्रक्रिया को जानना
- भाषा के स्वरूप और व्यवस्था को समझना
- स्कूल की भाषा, बच्चों की भाषा और समझ के बीच के संबंध को जानना
- भाषा के संदर्भ में पढ़ने के अधिकार, शांति और पर्यावरण के प्रति सचेत होना
- भाषा सीखने के तरीके और प्रक्रिया को जानना और समझना
- पाठ्यचर्या, पाठ्यक्रम और पाठ्यपुस्तक का विश्लेषण कर कक्षा विशेष और बच्चों की समझ के अनुसार ढालना
- भाषा और साहित्य के संबंध को जानना
- हिंदी भाषा के विविध रूपों और अभिव्यक्तियों को जानना
- भावों और विचारों की स्वतंत्र अभिव्यक्ति करना
- भाषायी बारीकियों के प्रति संवेदनशील होना
- अनुवाद के महत्व और भूमिका को जानना
- विद्यार्थियों की सृजनात्मक क्षमता को पहचानना
- बच्चों के भाषायी विकास के प्रति समझ बनाना और उसे समुन्नत करने के लिए विद्यालय में तरह-तरह के मौके जुटाना
- भाषा के मूल्यांकन की प्रक्रिया को जानना
- साहित्यिक और गैर साहित्यिक मौलिक रचनाओं की समझ और सराहना
- भाषा सीखने-सिखाने के सृजनात्मक दृष्टिकोण को समझना

इकाई 1: भाषा-समृद्धि के व्याकरणिक अवयवों का शिक्षण

हिन्दी भाषा में रस, छन्द, अलंकार का महत्व – हिन्दी भाषा में सन्धि,समास तथा व्याकरणिक चिन्हों की महत्ता – विभिन्न व्याकरणिक अवयवों के शिक्षण में अपनायी जाने वाली सावधानियाँ – हिन्दी साहित्य की विभिन्न विधाओं की संक्षिप्त झलक – हिन्दी शिक्षण में मुहावरे और लोकोक्तियों की उपादेयता

इकाई 2: हिन्दी साहित्य में भावाभिव्यक्ति के विभिन्न माध्यम

सम्पादकीय एवं सम्पादक के नाम पत्र – प्रहसन, नाटक, नुक्कड़ नाटक, कवि गोष्ठी एवं साहित्यिक गोष्ठी – रिपोतार्ज एवं कार्टून – अन्त्याक्षरी, वाद-विवाद एवं संवाद, नृत्य – कहानी, लघुनाटिका एवं एकल अभिनय

इकाई 3: समालोचना एवं उसकी शिक्षा

समालोचना का महत्व एवं स्वरूप – भारतीय समालोचना शासन का विकास – समालोचन- एक कौशल के रूप में – वर्तमान हिन्दी साहित्य के समालोचक – समालोचक के अपेक्षित गुण- रीति एवं शैली के संदर्भ में

इकाई 4:

अहिन्दी भाषी क्षेत्रों में अध्ययनरत विद्यार्थियों के लिए सफल हिन्दी शिक्षण की चुनौतियाँ – संक्षिप्त झलक. – हिन्दी – एक राष्ट्रभाषा. – हिन्दी – एक राजभाषा – राजभाषा की दृष्टि से भारत के विभिन्न प्रान्तों का सूचीकरण – संक्षिप्त ज्ञांकी – हिन्दी की संवैधानिक स्थिति और राष्ट्रभाषा के रूप में विकसित होने में आने वाली चुनौतियाँ

इकाई 5: हिन्दी साहित्यकारों का संक्षिप्त विवरण

मुगलकालीन भारत में हिन्दी साहित्यकार – ब्रिटिशकालीन भारत में हिन्दी साहित्यकार – आधुनिक भारत में हिन्दी साहित्यकार – कुछ उभरते हिन्दी साहित्यकार – साहित्यकारों के सम्मुख उभरती सामाजिक चुनौतियाँ (इकाई-10 में सम्मिलित इकाइयों के माध्यम से छात्राध्यापक/ छात्राध्यापिका से अपेक्षा की जाती है कि वह हिन्दी साहित्यकारों का आधारभूत ज्ञान अवश्य रखें)

Practicum: Task and Assignment

practicum activities relevant to the syllabus.

संदर्भ-ग्रंथ

- | | | |
|--|---|---|
| 1. डॉ. विजयराघव रेड्डी | - | हिन्दी शिक्षण अन्य भाषा के संदर्भ में |
| 2. कामता प्रसाद गुरू | - | हिन्दी व्याकरण |
| 3. डॉ. रामचन्द्र वर्मा | - | अच्छी हिन्दी |
| 4. डॉ. नामवर सिंह | - | आधुनिक साहित्य की प्रवृत्तियाँ |
| 5. डॉ. रामसजन पाण्डेय | - | विविध साहित्यिक वाद |
| 6. डॉ. लक्ष्मीनारायण शर्मा | - | देवनागरी लिपि और वर्तनी |
| 7. डॉ. रघुनाथ सफाया | - | हिन्दी शिक्षण |
| 8. डॉ. रामदेव पी. कथूरिया | - | सूक्ष्म शिक्षण |
| 9. केन्द्रीय हिन्दी संस्थान के प्रकाशन | - | 1. हिन्दी का वैज्ञानिक व्याकरण 2. देवनागरी लेखन तथा हिन्दी वर्तनी व्यवस्था 3. हिन्दी शिक्षण विविध आयाम 4. हिन्दी शिक्षण अन्तर्राष्ट्रीय परिपेक्ष्य 5. द्वितीय भाषा शिक्षण में अभिक्रानित अधिगम की तैक्नालॉजी 6. भाषा शिक्षण तथा भाषा विज्ञान |

14(iv): Pedagogy of Malayalam II – Part 2**Theory****Credits 4****Essence of the course:**

This course equipping the student teacher with Malayalam knowledge for communication and its values for appreciation. It helps to prepare and use the various teaching aids in learning of Malayalam. It also develops the skill of communication in order to help children at various school levels towards effective communication. The course focuses on developing the ability of the future teachers to transact language in inclusive classroom.

Objectives:**At the end of the course, the student teacher will be able to**

- develop positive attitude towards mother tongue (Malayalam), the rich and vivid culture of Kerala, Arts of Kerala and Folklore etc.
- develop the five basic skills such as reception, expression, creative ability, aesthetic sense and productivity.
- develop linguistic abilities – vocabulary sentence pattern, proverbs, idioms, grammatical structure etc.
- develop an insight into the historical and contemporary relationship with other Dravidian languages, Indo-Aryan languages.
- acquaint the trainee with advanced development in the theory relating to the teaching of mother tongue.
- acquaint the trainee with some of modern methods, techniques, procedures in teaching mother tongue.
- help the student to improve his professional competency and consciousness as a language teacher.
- acquaint the trainee with the use of different teaching aids, materials and media used in language teaching.
- develop computer skill in curriculum transaction.

Unit 1: Educational technology used for learning Malayalam

Computerized instruction, stimulation in teaching, micro teaching - Listening – various listening activities – hearing – visual impressions – radio, speech, film, television, pictures, charts etc. How to prepare children for listening – importance of listening – basis of language learning - Oral work – importance of oral work as basis of language learning – social and cultural importance – the value of subconscious comprehension before speech.

Unit 2: preparation and use of various learning aids in Malayalam

Use of Audio-visual aids – Radio, TV, OHP, Video, Language Lab, Internet, CD, Clippings, Pictures, Charts, Models etc. - Newspaper language – Style – Structure of News-Heading – Credit line (By line) – Place line – Intro (lead) – Body – Nature of news - Radio language - Advertisement language - New generation medias and its language – History of social networks – Educational possibilities of social media – Youtube – Twitter – WhatsApp Messengers – Blog

Unit 3: Organizing and maintaining library, language lab and other resources in Malayalam

Importance of library in language learning - Types of library - Organisation of classroom library and school library - Techniques of library utilization in language learning - Relevance of language lab.

Unit 4: appreciating poems, short stories and other forms of literature

Importance of reciting poems in chorus in the language classroom - Importance of analyzing symbols, images, rhetoric, tunes etc. used in poems - Importance of analyzing symbols, images, rhetoric, etc. used in stories for the appreciation.

Unit 5: Grammar, Poetic metre and Figures of speech

Parts of speech – Tense – Gender – Number – Case - Sentence structures - Language poetic composition (10) - Use of various poetries (10)

Mode of Transaction

Dialogue, seminars, discussions, and group-work

Practicum: Task and Assignment

1. Prepares a collage on any relevant subject.
2. Prepare two journal articles reviews from popular journals of Malayalam.
3. Prepare a list of 10 books with all bibliographic details.
4. Collects folksongs with similar tunes of poems in the text book and recite in groups
5. Analyse the language, images, rhetoric and symbols used in any short story/Poem.
6. Prepare a note on teacher directs grammar & prosody.

Mode of assessment:

Written test and Task and assignment

References:

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3. Sankarakurup. G – Sahithya Parichayam
4. Parameswaran Nair. P.K – Malayala Sahithya Charithram
5. Raghavan Payyanad – Folklore
6. Balasahithyam Thatwavum Charithravum – State Institute of Children Literature
7. Sahithya Charithram, Prasthanangaliloode – National Book Stall, Kottayam.
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24. Mayer,R.E(2003). *Language and instruction*, Upper Saddle River. Pearson education
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27. SCERT(2007),Kerala Curriculum Frame work.Trivandrum:SCERT
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29. Pillai,P.E(1991) *Malayala bhasha bhodanam*.Kerala:chris printers kottayam.
30. Sivarajan,k & Sreemannuni,P.S.(2003) *Malayalabhashadhyapanam*.*Central cooperative stores*,Calicut university.
31. Variyar, Prabhakaran,K.M & A. Santha(1998). *Modern linguistics*, Trivandrum: kerala bhasha institute.

14(v): Pedagogy of Telugu II – Part 2

Theory

Credits 4

Essence of the course:

Objectives:

CONTENT OUTLINE

Mode of Transaction

Practicum: Task and Assignment

Mode of Assessment

References:

Syllabus yet to be prepared for Pedagogy of Telugu II – Part 2

14(vi): Pedagogy of Mathematics II – Part 2

The same syllabus as given in course -13(vii)

14(vii): Pedagogy of Physical Science II– Part 2

The same syllabus as given in course -13(viii)

14(viii): Pedagogy of Biological Science II – Part 2

The same syllabus as given in course -13(ix)

FOURTH YEAR - SEMESTER VII**Edn 15: PE - CREATING AN INCLUSIVE SCHOOL****Theory****Credits 2****Essence of the course:**

This course covers the concept of special schools, mainstreaming and inclusion, national policies, initiatives, programmes and acts for inclusive education, nature and needs of the children having disabilities and their integration.

The objectives of this course is to highlight and reinforce a firm belief in positive and varied outcomes of inclusion. It will help student teachers in identification of factors affecting learning and participation while formulating a policy of good practice and review. This course focus on the understanding of integrating children with special needs with the normal children

Objectives:**At the end of the course, the student teacher will be able to**

- acquire knowledge of terms and concepts used in disability and inclusion
- understand integrate education and the importance of inclusive school for disabilities and assessment methods
- apply the policies and practices related to special education and Service programme for the disabled
- develop the skills a dynamic approach of pupil diversity and opportunities for enriching learning among the disability child
- develop interest on support and active participation of all in the field of inclusive education
- develop the attitude towards students to interrogate their own beliefs and also of school teacher from social point of view.

CONTENT OUTLINE**Unit 1: Historical and modern perspectives on Inclusion**

Meaning, definition – Characteristics of special education – History of special education - scope of special Education – principles of special Education – teacher’s role in special Education– factors affecting inclusion- present situation of special Education in India

Unit 2: Policy and programme for Inclusive Education

Challenges and prospects of Inclusive Education –Disability – five year plan allotment - Kothari Commission 1964 –National Education Policy, 1968 - NPE, 1986 - Special Educational Needs and Disability Act 2001 - Disability Discrimination Act 1995 - Persons with Disability Act (PDA) 1995- - RTE Act 2009 – Rights of the child UNESCO, 1989 – Rights of Persons with Disabilities UNESCO, 2006 – national level practices on education of Children with disabilities DPEP, - SSA – Polices and legislative measures pertaining to the disabled - Service programme for the disabled.

Unit 3: Different Learners in Inclusive Education

Types of learning disability: – physical- visual impaired, hearing impaired, Orthopaedic – Mentally impaired – Learning disability – Dyslexia, Dyscalculia, Dysgraphia – Attention deficit hyperactive disorder (ADHD) – Autism – cerebral palsy

Unit 4: Identification and Inclusion

Early detection of disability – issues – challenges and parameters of inclusive education – parental attitude – community Awareness - models of inclusion:- Wang’s adoptive environment model - Team teaching inclusionary model- SAALE model – role of parent, community, peers, headmasters, Teachers in inclusion.

Unit 5: Mainstreaming and integrated Education

Meaning – characteristics of integrated education - Equality and quality of integrated education – sustainable practice - create positive and innovative outcome - Safeguarding the needs of pupils with special educational needs - Assessment methods for inclusive school – Norm reference tests (NRT) and Criterion reference tests (CRT) – Behavioural and Clinical assessment – continuous and comprehensive assessment.

Mode of transaction:

Lecture, Discussion, Assignment, Visit special school, Film show

Practicum: Task and Assignment

1. Make a survey and write a report based on disability learner’s status in your nearby schools
2. Study the attitude of parents and teachers as inclusive
3. Visit to inclusive school to observe classroom interaction of anyone such schools in your area.
4. Case study of one/two people with special needs in secondary
5. Preparation of teaching aids for children having any one type of disability

Mode of Assessment:

Oral test, Case study, Special school Report, Written test, Task and assignment

References:

1. Alpher, S., & Ryndak, D.L. (1992). *Educating students with severe handicaps in regular classes*. Elementary school journal, 92 (3), 373-87.
2. Arul, M., & Timmons, V. (2009). *Inclusive Education Across cultures crossing boundaries, sharing ideas*. New Delhi: SAGE publications India Pvt Ltd.
3. Berdine, W.H & Blackhurst, A.E. (1985). *An Introduction to Special Education*. Harper Collins Publishers: USA
4. Booth, T., Ainscow, M. Black-Hawkins, K., Vaughan, M., & Shaw, L. (2000). *Index for Inclusion: Developing learning and participation in schools*. (Bristol, Center for Studies on Inclusive Education).
5. Chapman, C., & King, R. (2009). *Differentiated Instructional Strategies for Reading in the content areas*. Thousand Oaks, CA: Corwin Press.
6. Cook, G.B., (2004). Inclusive Teacher’s Attitudes Towards their students with disabilities: A replication and Extension. The elementary school journal, 104 (4), 307-320.
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12. Rao, V.K., (2004). *Special Education*. New Delhi: APH Publishing Corporation.
13. Nayak, A.K, &Rao, V.K., (2004). *Classroom Teaching: Methods and Practices*. New Delhi: APH Publishing Corporation.
14. Adam Abdelnoor., (1999). *Preventing Exclusion*. Oxford: Heinemann Educational Publishers.
15. Venkatesan, S. (2003). *Children with developmental disabilities: A training guide for parents, teachers and care givers*. New Delhi: Sage Publications.

Edn 16: C&PS - ASSESSMENT FOR LEARNING – I**Theory****Credits 4****Essence of the course:**

The course is designed keeping in mind the role of assessment in enhancing learning. It will focus on various tools and techniques of evaluation. There will also be focus on continuous and comprehensive evaluation. The course will also deal with critical understanding of issues in assessment and also explore realistic, comprehensive and dynamic assessment process. The course will also give emphasis on the need for formative and summative evaluation as well as quantitative and qualitative assessment for learning.

Objectives:**At the end of the course, the student teacher will be able to**

- acquire basic concepts in assessment and evaluation.
- develop the awareness about different areas of assessment.
- discriminate different perspectives in assessment.
- develop understanding about the meaning and the process of CCE
- know different techniques of evaluation, tools of evaluation and their uses.
- know different characteristics of instruments of evaluation.
- discriminate teacher made test vs standardized tests in assessment
- prepare, administer and interpret of results of tests and different evaluation techniques
- compute simple statistics to assess the learning.
- develop awareness about use of technology in assessment and evaluation.

COURSE CONTENT**Unit 1: Basics of Educational Testing, Measurement, Assessment and Evaluation**

Meaning of Testing, Measurement, Concept of Assessment and Evaluation in Education – Steps of evaluation process – Characteristics of the evaluation - comprehensive and continuous – Formative and summative evaluation – Norm reference & criterion reference tests – Uses of evaluation

Unit 2: Different domains/ areas of learning

Educational objectives in different domains – cognitive, affective and psychomotor – Learning outcomes as behavioural changes – Relationship between educational objectives, learning experiences and evaluation – writing educational objectives-different kinds like knowledge, understanding, application, skill, affect attributes, behavioural terms and level of performance – Measurable and non-measurable learning outcomes.

Unit 3: Traditional and constructivist assessment

Traditional assessment – constructivist assessment– difference – traditional and constructivist teacher –Purposes of assessment in a 'constructivist' paradigm: to engage with learners' minds in order to further learning in various dimensions – Assessment for learning and assessment of learning; relative merits and demerits – Assessment of different types of content – Achievement, Performance, Values, Attitude and Aptitude. –Assessment for different purposes – Placement, Diagnosis and Grading

Unit 4: Continuous and Comprehensive Evaluation

Aim, objective and characteristics of CCE – Continuous and Comprehensive Evaluation (CCE)–Scholastic area– Co-Scholastic area – functions of continuous and comprehensive evaluation– Recording and reporting: measurement of students’ achievements, grading system and type – importance of progress report – Feedback as an essential component of assessment

Unit 5: Major tools of Evaluation and their uses

Paper pencil tests, Oral tests, and Performance tests – Achievement tests : standardized and teacher made tests – Diagnostic tests – Intelligence tests and aptitude tests – Rating scale – Check list – Anecdotal records – Socio-metric technique – Interview, Questionnaire and Inventory – Use of test data: placement, promotion, grouping, diagnosis and remediation. – Self reporting techniques/Reflection as assessment technique for learning. – Interview and focus group discussion

Mode of Transaction:

Lecture cum discussion, Seminar, Team Teaching, Practical work, Power point presentation

Practicum: Task and Assignment

1. Preparation, administration and interpretation of results of tests and different evaluation techniques
2. Writing educational objectives, learning experience and corresponding evaluation techniques, General and specific objectives
3. Framing measurable and non-measurable learning outcomes
4. Finding out the content validity of the given question paper
5. Designing Rating scale, Questionnaire, Interview Schedule in a given a topic
6. Framing Different types of questions
7. Preparation of Blue Print and a question paper
8. Prepare graphs and use statistics for analysis of test result
9. Preparation of interaction analysis report after the observation of any five teachers and peer teachers working in schools

Mode of Assessment:

Submission of Assignments, Preparation of tests various types of test items, Data collection and statistical analysis, Participation in Group discussion

References:

1. Assessment for Learning and Teaching in Primary Schools by Mary Briggs, Angela Woodfield, Peter Swatton
2. Ashford, S. J. (1986). Feedback-seeking in individual adaptation: A resource perspective. *Academy of Management Journal*, 29, 465–487.
3. Ashford, S. J., Blatt, R., & Vande Walle, D. (2003). Reflections on the looking glass: A review of research on feedback-seeking behavior in organizations. *Journal of Management*.
4. Assessment Action Group (AAG)/AIFL Programme Management Group (APMG). (2002–2008). AIFL– Assessment is for learning. Retrieved from
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7. George Thompson .G. and Gardner Ericf, Trancisvesta. J.DI.Surjeet publications.
12. Gupta, S. K. (1994). *Applied Statistics for Education*. Mittal Publications.
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<http://www.ltscotland.org.uk/assess>
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10. Mangal.S.K. *Advanced Educational Psychology*. New Delhi: Prentice Hall of India Publisher.
13. Mehta, S. J., and Shah, I. K. (1982). *Educational Evaluation*. Ahmedabad: Anand Prakashan (Gujarati).
11. Muhammad Mohsin. *Teacher's handbook of Exceptional Children* .New Delhi: Anmol Publisher.
14. Rani, P. (2004). *Educational Measurement and Evaluation*. New Delhi: Discovery Publishers.
15. Rawat, D. S. (1970). *Measurement, Evaluation and Statistics in Education*. , New Delhi: New Raj Book Depot.
12. Reddy.R.S.*Curriculum Development for learning to live together*. New Delhi: Rajat publication.
16. Reynolds, C.R., Livingston, R.B., and Willson, V. (2011).*Measurement and Assessment in Education*. New Delhi: PHI Learning PVT. LTD.
13. Santrock, J.W. 2006. *Educational psychology: Classroom update: Preparing for PRAXISTM and practice*. 2nd ed. New York: McGraw Hill.
14. Sharma.R.A. (2007) .*Essential of measurement in Education and Psychology*. Meerut: Surya Publisher.
15. Tan O.S., Parsons, R.D., Hinson, S.L., &Sardjo–Brown, D. 2003. *Educational psychology: A practitioner–researcher approach*. Australian: Thomson.
17. Ten Brink, T. D. (1974). *Evaluation - A Practical Guide for Teachers*. New York: McGraw Hill Book Co.
18. Thorndike, R.M. (2010). *Measurement and Evaluation in Psychology and Education*. New Delhi: PHI Learning PVT. LTD.
19. Yadav, M. S. and Govinda, R. (1977). *Educational Evaluation*, Ahmedabad: SahityaMudranalaya.

Edn 17: PE - SCHOOL MANAGEMENT – II**Theory****Credits 4****Essence of the course:**

The focus of the course is on the essentials of school management and the challenges therein. This course is designed to throw light on the concepts of management related to School. The purpose is to foster proper understanding of these essential concepts and to create necessary managerial skills and capabilities among student teachers so as to enable them efficiently manage schools.

Objectives:**At the end of the course, the student teacher will be able to**

- Understand the basic concepts of school management.
- Understand different components of school management
- Realize the multifaceted role of teacher/head teacher.
- Sensitize the student teachers about the concept of child rights in the process of School Management.
- Explain the factors contributing to the success of supervision and to acquaint with the modern trends in Supervision and Inspection.
- Discuss the present examination system and suggest some innovations.

CONTENT OUTLINE**Unit 1: Community & School**

Nature and meaning of Community in Social, Cultural & Economic context - Relationship between School and Community - Strategies for Community Mobilization - Role of H.M, and Teacher in bringing Co-ordination between School & Community - Need and Importance of Parent-Teacher Association, Constitution of PTA/School Education Committees, Views of Commissions.

Unit 2: Child Rights and School Management

Child Rights and School Management - Child Rights and Democratic Education - Concept and Ladder of Child Participation - Models of Child participation.

Unit 3: Co-Curricular Activities

Meaning, Importance of Co-curricular activities - Organisation of Co-curricular activities: School Assembly, Debates, Discussions, Seminars, Symposia, Cultural Activities, Scouts & Guides, National Green Corps, Physical Education Activities

Unit 4: Inspection and Supervision

Need and Importance of Supervision and Inspection - Meaning, Aims & Scope of Inspection and Supervision - New Trends in Supervision and Inspection - Principles of Good Supervision - Qualities and duties of effective supervisor.

Unit 5: Latest Trends & Innovations in School Management

School Complex - Village Education Committees - School based in-service programme - centrally sponsored Schemes, Sarva Siksha Abhiyan [SSA], RMSA- Use of Computers in School Management - Action Research in School Management: Concept, Importance, Steps

Mode of Transaction:

Lecture, Discussion, Project work, Field visits, Assignment, Seminar, Workshop, etc

Practicum: Task and Assignment

1. Analysis of working of PTA/School Education Committees/ School-Community Interactions
2. Observe and record the leadership styles of any five heads of the school and present them to the class for reflection.
3. Prepare a programme for parent's meetings in a school.
4. Assume you are the head of the school; how will you manage the human resource of your school. Report it in your class and record the reflections.
5. If you want to become a creative headmaster rather than to be a status qua head master. Record an expected positive and negative problems

Mode of Assessment:

Written test, task and assignment.

References:

1. J.C. Aggarwal, Vikas Publishing House Pvt. Ltd., New Delhi.
2. Jagannath Mohanty, Deep & Deep Publications, New Delhi
3. Sashi Prabha Sharma, Kanishka Publishers & Distributors, New Delhi.
4. A New Approach to School Management - Dr. M.S. Sachdeva
5. Administration of Education in India - P.D. Shukla
6. Child Rights Convention – UNICEF-2000
7. Education for all (1993): The Indian Scene, New Delhi, Department of Education, Ministry of Human Resource Development, Govt. of India.
8. Educational Administration: Bhatnagar (1988)
9. Educational Administration, Supervision and School Management
10. Essentials of Educational Technology – Teaching Learning Innovations in Education.
11. Guidance of Sarva Siksha Abhiyan, M.H.R.D., Govt. of India
12. Modern Approach to School Organisation and Administration - Dr. M.S. Sachdeva
13. School Education and Management - Vijaya Kumari Kaushik, Sharma S.R.
14. School Organisation and Administration - Dr. K.S. Sidhu
15. Secondary School Administration - S.K. Kochhar
16. Teacher Education: Principles, Theories and practices
17. Teachers Role, Status, Service Conditions and Education in India (Doaba House)

Edn 18: C&PS - PEDAGOGY OF SCHOOL SUBJECT I

18(i): Pedagogy of Tamil I – Part 3

தமிழ் கற்பிக்கும் முறைகள் I - part 3

Theory

Credits 4

அடிப்படைக் கோட்பாடு

மொழிப் பாடத்தில் கலைத்திட்ட வளர்ச்சிக்கான கூறுகளைக் கற்றறிந்து அவை தொடர்பான அறிவைப் பெற்றிருப்பர். சங்க கால இலக்கியங்களையும் இலக்கணங்களையும் அறிந்து அவற்றின் சிறப்புகளை அறிந்து கொள்வர். இக்கால இலக்கியங்களின் வளர்ச்சிப் போக்குகளை அறியும் திறன் பெற்றிருப்பர். தமிழ் மொழி வளர்ச்சிக்கு உரைநடை ஆசிரியர்களின் பங்களிப்பை அறிந்திருப்பர். தமிழ் மொழியின் வரலாற்று மூலங்களை அறிந்திருப்பர். கணிப்பொறியைப் பயன்படுத்தி மொழிக் கற்பித்தல் திறனைப் பெற்றிருப்பர். மறுமலர்ச்சி இலக்கியங்களின் தேவையை உணர்ந்திருப்பர்.

நோக்கங்கள்:

- கலைத்திட்ட அமைப்பினைப் புரிந்து கொள்ளச் செய்தல்.
- கற்பித்தலுக்கு முன்தயாரிப்பு முறைகளை அறியச் செய்தல்.
- இக்கால இலக்கியங்களைப் பற்றிய அறிவைப் பெறச் செய்தல்
- அடிப்படை இலக்கணங்களில் பயிற்சி பெறச் செய்தல்.
- இலக்கியத் திறனாய்வு குறித்த அறிவு பெறச் செய்தல்.
- உரைநடை ஆசிரியர்களின் மொழிநடைத் திறனை அறிய செய்தல்.
- தமிழ்மொழி வரலாற்று மூலங்களின் அறிவைப் பெறச் செய்தல்.
- கணிப்பொறி வழிக் கற்றலின் முக்கியத்துவத்தை உணர்த்துதல்.
- மறுமலர்ச்சி இலக்கியங்களை அறியச் செய்தல்.

அலகு 1: கலைத்திட்டம்

நோக்கங்கள் - பாடப்பொருள் - இலக்குகள் - தொடர்பு - வகைகள் - வரிசையமைப்புப் பாடத்திட்டம் - அடுக்குப் பாடத்திட்டம் - பாடமையத்திட்டம் - செயல்மையத்திட்டம் - வாழ்வுச்சூழல் மையத்திட்டம் - தற்காலப் பாடத்திட்டம் - பாடத்திட்டம், பாட ஏற்பாடு, பாடநூல் ஆகியவற்றிகிடையேயான தொடர்பு.

அலகு 2: முன் தயாரிப்பு

பாடத்திட்டத்தின் வழி மாணவர் பெற வேண்டிய திறன்களை முடிவு செய்தல் - பாடக் கற்பிப்புக் குறிப்பு (Notes of lesson) - பாடம் தொடர்பான பிற செய்திகள் திரட்டுதல் - துணைக்கருவிகள் - பயிற்சிகள் தயாரித்தல் - மாணவர்கள் முன் புதிய எடுத்துக்காட்டுகளை உருவாக்குதல் - மாணவர்களின் பின்புலம் குறித்து அறிதல்.

அலகு 3: இக்கால இலக்கிய அறிமுகம்

நாட்டுப்புறவியல் - பயண இலக்கியம் - புலம்பெயர் இலக்கியம் - வாழ்க்கை வரலாற்று இலக்கியம் - சிறுவர் இலக்கியம்.

அலகு 4: இலக்கியத் திறனாய்வு

திறனாய்வு வரையறை - திறனாய்வாளரின் தகுதிகள்- திறனாய்வின் வகைகள், பண்புகள்.

அலகு 5: தமிழ்க் கவிஞர்கள் அறிமுகம்

திருவள்ளூர், பாரதியார், பாரதிதாசன், கவிமண தேசிய விநாயகம், நாமக்கல் கவிஞர் ஆகியோரின் பாடல்களில் காணப்படும் கல்விச் சிந்தனைகள்

கற்பிக்கும் முறைகள்

விரிவுரை, கலந்துரையாடல், மாணவர் கருத்தரங்கம், ஒப்பார்குழு விவாதம், குழுக் கற்பித்தல், செய்துகாட்டல், பதாகை வழிக் கற்பித்தல், செய்து கற்றல், ஆய்வரங்கம், பணிமனை, செயல்திட்டக் கற்பித்தல், விதிவருமுறை, விதிவிளக்குமுறை, விளையாட்டுமுறை, கணினி வழிக் கற்பித்தல், இணையம் வழிக் கற்பித்தல், பாடல் மூலம், நாடகம் மூலம் கற்பித்தல், சொற்பொழிவு, சிறப்புச் சொற்பொழிவு, காட்சிக் கேள்விக் கருவிகள் மூலம் கற்பித்தல், மொழிப்பயிற்றாய்வுக் கூடம் வழிக் கற்பித்தல்.

மதிப்பீடு:

வகுப்புத் தேர்வு, வாய்மொழித் தேர்வு, ஒப்படைப்புகள், வகுப்புக் கருத்தரங்கம், மாதிரிப் பாடம் எடுத்தல். வகுப்பில் மாணவர்கள் பங்கேற்பை மதிப்பிடல்

செய்முறைப் பயிற்சிகள்:

1. விளம்பரப் பதாகைகள் உருவாக்குதல்.
2. செய்தித்தாள்களில் தமிழ்த் தொடர்பான தகவல்களைத் திரட்டுதல்.
3. செய்திவாசிக்கப் பயிற்சி அளித்தல்.
4. உரைநடையாசிரியர்களின் மொழிநடையைப் பின்பற்றி மாதிரிக் கட்டுரை எழுதுதல்.
5. நாட்டுப்புறப் பாடல்கள், பழமொழி போன்றவற்றின் துணையுடன் பேசுதல் பயிற்சி.

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18(ii): Pedagogy of English I – Part 3**Theory****Credits 4****Essence of the course:**

To have qualitative improvement in English language teaching the present course is designed. The English teacher should have strong content knowledge and also methodology of teaching in English. This teaching of English at the school level is given a very high importance in the globalization of process of education and economics. The fluency in English is helping the school student get employment opportunities as well as for further academic courses. Teacher as a facilitator helps learners to construct their knowledge. The teacher should be able to participate meaningfully to transact the syllabus and textbooks effectively along with teaching– learning materials. Therefore, the student teacher should be well-versed not only with the subject content but also with the pedagogy of learning. This course is visualized as a range of language based activities, which will aid in strengthening the ability to 'read', 'think', 'discuss and communicate' as well as to 'write' in the language of instruction.

Objectives:**At the end of the course, the student teacher will be able to**

- acquire knowledge of current trends in teaching of English
- acquaint with the techniques of oral presentation and practice of language items.
- understand the structure of English language and components skills
- improve proficiency level in using-English for utilitarian purposes
- familiarize student teachers with the text book contents related to high school and Higher Secondary classes.
- acquire good pronunciation and fluency of speech
- help student teachers acquire a working knowledge of the grammatical terminology and the grammatical system in English.
- develop the writing skill of the trainees.
- analyze the units of English text book of 8 & 9th standard.
- acquaint with the preparation of various learning aids in English.

CONTENT OUTLINE**Unit 1: Analysis of English text book and question paper**

Comparative study of a text book of English from any class of state board - Detailed analysis of Course book of class 8th or 9th -Analysis of question paper of class 8th or 9th in light of content requirement and in terms of understanding and skills.

Unit 2: Advanced Grammar II

The sentence connection – Devices for cohesion and coherence. Concepts-different ways in which various concepts are expressed – modal, auxiliaries and other expression, commands, instructions, suggestions, prohibition, permission, probability and likelihood, possibility, necessary, purpose and result, cause reason, comparison and contrast conditions and supposition.

Unit 3: Reference and study skills in English

Dictionary skills – SQ3R- methods of reading – note making and summarizing – library and reference work – bibliography and annotated bibliography.

Unit 4: Words and expressions

Figures of Speech – Idioms and Phrases – Idioms derived from nouns and adjectives – the same words used as different parts of speech – words confused and misused.

Unit 5: Analyses of Errors in English

Analysis of grammatical errors - Common mistakes/Error in spelling, pronunciation, speaking, reading and writing, Causes and types of errors- remedial measures.

Mode of Transaction:

Discussion, Lecture, Demonstration of content analysis, Demonstration of teaching specific, grammar items, Seminar on different expressions, Narration, anecdotes of great personalities, Web based resources, Use of flash cards, Presentation of common errors through illustrations, Situation based error identification, Presentation of translation work

Practicum: Task and Assignemnt

1. Practicing extensive reading passages-Practicing the oral skills in pair and small group situation-Narrating stories with proper voice, modulation, compeering, presentation of views-Short speeches on topics of day to day relevance for gaining fluency / confidence.
2. Practice in spoken English –stress, rhythm and intonation
3. Preparation of Teaching Aids for speech sounds.

Mode of assessment

Analysis of Group discussion, Assessment of expressing ideas and thoughts through suitable examples, Monitoring performance of communicative tasks, Evaluation based on documentation (written), Performance evaluation(Seminar, Assignment &Project), Feedback

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18(iii): Pedagogy of Hindi I – Part 3

Credit: 4

पृष्ठभूमि:

राष्ट्रीय पाठ्यचर्यारूपरेखा 2005 तथा शिक्षा का अधिकार एक्ट 2009 विद्यालयी शिक्षा तथा शिक्षण प्रशिक्षण के निकट संबंधों को ध्यान में रखते हुए शिक्षक की भूमिका में एक बहुत बड़े परिवर्तन की माँग करती है। पाठ्यचर्या में अभी तक शिक्षक को ही ज्ञान के स्रोत के रूप में केन्द्रीय स्थान मिलता रहा है, वह सीखने-सिखाने की समूची प्रक्रिया के संरक्षक और प्रबंधक के रूप में मुख्य भूमिका निभाने का काम करते आए हैं। पर 2005 की स्कूली पाठ्यचर्या उनसे माँग करती है कि वे सूचनाओं के वितरक और ज्ञान के स्रोत बन कर न रहें बल्कि विद्यार्थियों द्वारा ज्ञान हासिल करने की प्रक्रिया में स्वयं को सहायक मानें। इन सब परिवर्तनों को उनके व्यवहार का हिस्सा बनाने के लिए ज़रूरी है कि अध्यापक शिक्षा के पाठ्यक्रम में परिवर्तन आए। विद्यालयी शिक्षा व्यवस्था में परिवर्तन की पहल तभी संभव है जब इस व्यवस्था से जुड़े लोगों की सोच और दृष्टिकोण में परिवर्तन आए और शिक्षक की भूमिका इस व्यवस्था में सबसे महत्वपूर्ण है। इस दृष्टि से भाषा-शिक्षण का पाठ्यक्रम और भी महत्वपूर्ण हो जाता है, क्योंकि भाषा पूरी शिक्षा की आधारशिला का काम करती है, जहाँ सिर्फ भाषा पढ़ना-सीखना नहीं बल्कि भाषा के द्वारा अन्य विषयों में भी निपुणता प्राप्त करने की बात आती है। इसके साथ ही भाषा से जुड़े नए बिन्दु आते हैं जैसे - बहुभाषिक कक्षा, समझ का माध्यम, शांति की शिक्षा में भाषा की भूमिका आदि की समझ शिक्षक के लिए ज़रूरी है जो अध्यापक शिक्षा में व्यापक बदलाव की माँग करते हैं।

वर्तमान पाठ्यक्रम भाषा के नए सरोकारों और सीखने-सिखाने की नई दृष्टियों को ध्यान में रखकर तैयार किया गया है। आशा है कि शिक्षक प्रशिक्षणार्थियों को इससे भाषा-शिक्षण की तैयारी में सहायता मिलेगी।

पाठ्यक्रम के विशेष उद्देश्य

- भाषा की अलग-अलग भूमिकाओं को जानना
- भाषा सीखने की सृजनात्मक प्रक्रिया को जानना
- भाषा के स्वरूप और व्यवस्था को समझना
- स्कूल की भाषा, बच्चों की भाषा और समझ के बीच के संबंध को जानना
- भाषा के संदर्भ में पढ़ने के अधिकार, शांति और पर्यावरण के प्रति सचेत होना
- भाषा सीखने के तरीके और प्रक्रिया को जानना और समझना
- पाठ्यचर्या, पाठ्यक्रम और पाठ्यपुस्तक का विश्लेषण कर कक्षा विशेष और बच्चों की समझ के अनुसार ढालना
- भाषा और साहित्य के संबंध को जानना
- हिंदी भाषा के विविध रूपों और अभिव्यक्तियों को जानना
- भावों और विचारों की स्वतंत्र अभिव्यक्ति करना
- भाषायी बारीकियों के प्रति संवेदनशील होना
- अनुवाद के महत्व और भूमिका को जानना
- विद्यार्थियों की सृजनात्मक क्षमता को पहचानना
- बच्चों के भाषायी विकास के प्रति समझ बनाना और उसे समुन्नत करने के लिए विद्यालय में तरह-तरह के मौके जुटाना
- भाषा के मूल्यांकन की प्रक्रिया को जानना
- साहित्यिक और गैर साहित्यिक मौलिक रचनाओं की समझ और सराहना
- भाषा सीखने-सिखाने के सृजनात्मक दृष्टिकोण को समझना

इकाई 1: भाषा की भूमिका भाषा-साहित्य और सौंदर्य - 1

(विभिन्न अभिव्यक्तियाँ भाषा की बारीकियों को जानने का सबसे अच्छा माध्यम हैं।)

सृजनात्मक भाषा के विविध रूप - साहित्य के विविध रूप को जानना, स्कूली पाठ्यक्रम में साहित्य को पढ़ना-पढ़ाना, अनुवाद कला और सौंदर्य में भाषा; स्कूली पाठ्यचर्या में मीडिया की भूमिका, उद्देश्य प्रासंगिकता; अनुवाद का महत्व और जरूरत; सृजनात्मक अभिव्यक्ति के रूप में हिंदी अनुवाद (अंग्रेजी और अन्य भारतीय भाषाओं के सर्दर्थ में) चुने हुए उदाहरण के आधार पर बताया जाएगा।

इकाई 2: भाषा साहित्य और सौंदर्य - 2

साहित्यिक अभिव्यक्ति के विविध रूप - कविता को पढ़ना-पढ़ाना; गद्य की विविध विधाओं को पढ़ना-पढ़ाना; नाटक को पढ़ना-पढ़ाना; समकालीन साहित्य की पढ़ाई (बाल साहित्य, दलित साहित्य, स्त्री साहित्य); हिंदी के विविध विधाओं के आधार पर गतिविधियों का निर्माण; कविता, कहानी, नाटक, निबंध, उपन्यास की पाठ विधि तैयार करना।

इकाई 3: पाठ्यक्रम और पाठ्य-सामग्री का निर्माण और विश्लेषण

(पाठ्यपुस्तक शिक्षण का एक साधन है, एकमात्र साधन नहीं)

पाठ्यचर्या और पाठ्यक्रम एक पाठ्य-सामग्री अनेक - पाठ्यचर्या, पाठ्यक्रम तथा पाठ्यपुस्तकों का संबंध; पाठ्यक्रम को बच्चों के अनुरूप ढालना (शिक्षण को स्कूल वेफ बाहरी जीवन से जोड़ते हुए तथा रटत-प्रणाली का निषेध करते हुए सामग्री चयन, गतिविधि और अभ्यास सामग्री का निर्माण), शोधकर्ता के रूप में शिक्षक (अलग-अलग बच्चों की आवश्यकताओं को ध्यान में रखते हुए)

इकाई 4: सहायक शिक्षण सामग्री

प्रिंट मीडिया तथा अन्य पाठ्य सामग्री जैसे बच्चे द्वारा चुनी गई सामग्री, पत्रिकाएँ, अखबार, कक्षा-पुस्तकालय आदि, आई.सी.टी. - दृश्य - श्रव्य सामग्री, रेडियो, टेलीविज़न फ़िल्में, भाषा प्रयोगशाला, सहसंज्ञानात्मक गतिविधियों की रूपरेखा (चर्चा, वादविवाद, खेल, कार्यशालाएँ, गोष्ठी आदि)

इकाई 5: आकलन की भूमिका और महत्त्व

(मूल्यांकन की भूमिका बच्चों की मौलिकता और भाषा प्रयोग में उनकी सृजनात्मकता को पैना बनाना है।)

1. भाषा विकास की प्रगति का आकलन - सतत् और समग्र मूल्यांकन, स्वमूल्यांकन, आपसी मूल्यांकन, समूह मूल्यांकन, पोर्टफोलियो
2. प्रश्नों का स्वरूप, प्रश्नों के आधार बिंदु - समस्या समाधान संबंधी प्रश्न, सृजनात्मक चिंतन वाले प्रश्न, समालोचनात्मक चिंतन वाले प्रश्न, कल्पनाशीलता को जीवित करने वाले प्रश्न, परिवेशीय सजगता वाले प्रश्न, गतिविधि और टास्क (खुले प्रश्न, बहुविकल्पी प्रश्न)
3. फीडबैक (विद्यार्थी, अभिभावक और अध्यापक) और रिपोर्ट

प्रायोगिक कार्य

विश्वस्तर पर हिन्दी की उपयुक्तता एवं उपयोगिता पर विचारगोष्ठी - मौखिक एवं लेखन अभिव्यक्ति गतिविधियाँ -मुहावरे, लोकोक्तिया. का प्रयोग करते हुए कहानी, लेख आदि लिखवाना -विषयवस्तु आधारित अभ्यास -सूक्ष्म एवं व्यापक पाठ योजनाए. बनाना -पावर प्वाइंट प्रस्तुतीकरण - दृश्य-श्रव्य सामग्री का निर्माण - ब्लूप्रिंट, प्रश्न-पत्र, अंकयोजना तथा प्रश्नानुसार विश्लेषण - विषय वस्तु परीक्षण तथा उपलब्धि परीक्षण की संरचना - परीक्षण आंकड़ा. का प्रस्तुतीकरण - पाठ से संबंधित प्रायोगिक कार्य

मूल्यांकन के माध्यम

सामूहिक चर्चा का विश्लेषण - स्व मूल्यांकन तथा निकट समूह मूल्यांकन - उपलब्धि मूल्यांकन - अभिलेखन एवं अभिव्यक्ति आधारित मूल्यांकन - प्रत्यक्ष-अप्रत्यक्ष सूचना आधारित मूल्यांकन

संदर्भ-स्रोत

1. अनन्त चौधरी, नागरी लिपी और हिन्दी वर्तनी, बिहार हिन्दी ग्रन्थ अकादमी, पटना।
2. के० क्षत्रिया, मात्रभाषा शिक्षण, विनोद पुस्तक मंदिर, आगरा।
3. के० जी० रस्तोगी, भाषा सम्प्राप्ती मूल्यांकन, केन्द्रीय हिन्दी संस्थान, आगरा।
4. के० के० सुखिया, हिन्दी ध्वनियाँ और उनका शिक्षण, रामनारायण लाल, इलाहाबाद।
5. जयनारायण कौशिक, हिन्दी शिक्षण, हरियाणा साहित्य अकादमी, चण्डीगढ़।
6. जयनारायण कौशिक एवं विमला कौशिक, पाठ-योजना निर्देशिका हिन्दी शिक्षण, आर्य बुक डिपो, करोलबाग, नई दिल्ली।
7. जयनारायण कौशिक, शुद्ध हिन्दी लेखन, आर्य बुक डिपो, करोलबाग, नई दिल्ली।
8. निरंजन कुमार सिंह, माध्यमिक विद्यालयों में हिन्दी शिक्षण, राजस्थान ग्रंथ अकादमी, जयपुर।
9. भगवती प्रसाद शुक्ल, हिन्दी उच्चारण और वर्तनी, आर्य बुक डिपो, करोलबाग, नई दिल्ली।
10. भोलानाथ तिवारी, भाषा विज्ञान, किताब महल, इलाहाबाद।
11. भोलानाथ तिवारी तथा कैलाश भाटिया, हिन्दी शिक्षण, लिपी प्रकाशन, दिल्ली।
12. योगेन्द्रजीत, हिन्दी भाषा शिक्षण, विनोद पुस्तक मंदिर, आगरा।
13. रघुनाथ सफाया, हिन्दी शिक्षण, पंजाब किताब घर, जालंधर।
14. रमन बिहारी लाल, हिन्दी शिक्षण, रस्तोगी पब्लिकेशन, मेरठ।
15. रामशकल पांडेय, हिन्दी शिक्षण, विनोद पुस्तक मंदिर, आगरा।
16. लक्ष्मीनारायण शर्मा, भाषा की शिक्षण विधियाँ एवं पाठ-नियोजन, विनोद पुस्तक मंदिर, आगरा।
17. वैद्यनाथ प्रसाद वर्मा, बिहार हिन्दी ग्रन्थ अकादमी, पटना।
18. सीताराम चतुर्वेदी, भाषा की शिक्षा, हिन्दी साहित्य कुटीर, वाराणसी।
19. सावित्री सिंह, हिन्दी शिक्षण, लायल बुक डिपो, मेरठ।
20. शारदा भसीन, स्वनिम विज्ञान और हिन्दी की स्वनिम व्यवस्था, आर्य बुक डिपो, करोल बाग, नई दिल्ली।
21. हरिदेव बिहारी, व्यवहारिक हिन्दी व्याकरण, लोक भारतीय प्रकाशन, इलाहाबाद।

18(iv): Pedagogy of Malayalam I – Part 3**Theory****Credits 4****Essence of the course:**

Malayalam is the medium for comprehending ideas, for reflection and thinking, as well as for expression and communication. This course deals with aims and objectives of teaching Malayalam. It includes activities for developing fluency in language, learning process and practical experience. It also opens a gateway to Malayalam literature with special reference to prominent contributors in the language.

Objectives:**At the end of the course, the student teacher will be able**

- To understand the aims and objectives of teaching Malayalam
- To develop fluency and discourse oriented presentation
- To get acquainted with the student, learning process and acquire practical experience in creating conducive environment for effective learning
- To contribute to enrich Malayalam Literature.
- To understand Functional Malayalam
- To get acquainted with Planning of Instruction based on theories of Learning.
- To get acquainted with instruction based on Linguistics poetics, vocabulary, grammar and composition.
- To understand the principles of organizing curriculum
- To understand the techniques of using text books, Teachers hand books and other relevant materials for transacting language curriculum.

COURSE CONTENT**Unit 1: Aims and objectives of teaching Malayalam**

Aims of Teaching Malayalam - Objectives of Teaching Malayalam at Secondary Level - Taxonomy of Educational Objectives and the objectives based on cognitive learning theories

Unit 2: developing fluency and discourse

Reading aloud prose passages and poems - Describing and interpreting pictures, tables, graphs, maps etc. - Telling stories and narrating incidents - Communication games - Dialogues and role play – Dramatization – Debates – Interviews - Extempore speeches on given topics.

Unit 3: learning process and practical experience

Physical, Psychological, Social and Emotional nature of the student - Peculiarities of learning activities - Specific peculiarities of language class - Nature of learning and learning strategies Role of teacher in the language class - Role of students in the language class -Techniques of creating conducive and democratic environment for learning - Qualities of a good learning activity - Appropriateness with the latest approach – interesting – Challenging – Feasibility - Sense of need - Considering multilevel of students.

Unit 4 Contributors to enrich Malayalam Literature

Contributions of foreign writers to the development of Malayalam Literature - Contributions of Gundert. - Contributions of Christian Priests to the development of Malayalam Literature - Contributions of A.R. Raja Raja Varma - Contributions of Cherusseri, Thunjath Ezhuthachan, Kunjan Nambiar, Ulloor, Vallathol, Kumaranashan, P. Kunhiraman Nair, Vailoppilly etc -

Contribution of Chandu Menon, C.V.Raman Pillai, O.V. Vijayan, M.T. Vasudevan Nair, K.P.Ramanunni, K.R. Meera, Perumbadavam Sreedharan, Ponkunnam Varki, T. Padmanabhan, Karoor Neelakanda Pilla etc. - Contribution of Kunhayeen Musaliyar, Kashi Mohammed (Mohiadden Mala), Chalilakath-Kunhammed Haji, Makti Thangal, Moyinkutty – Vaidyar, Ponkunnam Sayed Mohammed, P. Ubaid etc.

Unit 5: Influence of foreign language and Malayalam literature

The influence of Arabi – Malayalam in Malayalam Language and Literature - The influence of Arabic, Sanskrit, Hindi, Persian and Western Languages on Malayalam - Use of Scientific and Technical Words in Malayalam

Mode of Transaction:

Dialogue, seminars, discussions, and group-work

Practicum: Task and Assignment

1. Preparation of Aid for Teaching Malayalam speech sounds.
2. Review of any three novels and five short stories.
3. Creative writing-Dialogues, Expansion of ideas, paraphrasing, precise writing, verbs, short stories and letter writing.

Mode of assessment:

Written test and Task and assignment

References:

1. A.R. Raja Raja Varma – Vrithamanjari, Kerala Panineeyam, Bhashabhushanam.
2. Damodaran Nair. P – Apasabda Nighantu
3. Sankarakurup. G – Sahithya Parichayam
4. Parameswaran Nair. P.K – Malayala Sahithya Charithram
5. Raghavan Payyanad – Folklore
6. Balasahithyam Thatwavum Charithravum – State Institute of Children Literature
7. Sahithya Charithram, Prasthanangaliloode – National Book Stall, Kottayam.
8. Raman Nair. K.P – Aksharaslokavum Kavyakeliyum oru padanam
9. Iranjyam Ravi – Malayala Vyakarana Nighandu
10. Adhunika Bhasha Sastram – K.M. Prabakaravariar
11. Bhashayum Manasastravum – K.M. Prabakaravariar
12. Malayala Bhashadhyapanam – Erumeli Parameswaran Pillai.
13. Pazhamchol Prapandham – Pro-P.C. Kartha.
14. Kairaliyude Katha – N. Krishna Pillai (DC Books)
15. Keralathinte Samskarika Charithram – Dr. P.K. Gopalakrishnan
16. Mahathaya Mappila Samskara Parambaryam – P.N. Ahd. Moulavi & Mohd Abdul
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27. Gronlund, N. E. (1970) *Stating Behavioural objectives for class room instruction*. London: MacMillan
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31. Lado, R (1979). *Language teaching- a scientific approach*. New York: McGraw Hill INC
32. Lee, W. R. (1972). *Language teaching games and contexts*. London: Oxford University press.
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34. Nair, Chandrashekharan, C. K. (2002) *Mathrubhasha Bhodhanam*. Trivandrum. Kerala bhasha institute.
35. NCERT (2005) *National Curriculum Framework*. New Delhi: NCERT
36. SCERT (2007), *Kerala Curriculum Frame work*. Trivandrum: SCERT
37. Passi, B. K. (Ed) (1976). *Becoming better teacher: A micro teaching approach*. Ahmadabad
38. Pillai, P. E. (1991) *Malayala bhasha bhodanam*. Kerala: chris printers kottayam.
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Fourth Year

Semester 7

18(v): Pedagogy of Telugu I – Part 3

Theory

Credits 4

Essence of the course:

Objectives:

CONTENT OUTLINE

Mode of Transaction

Practicum: Task and Assignment

Mode of Assessment

References:

Syllabus yet to be prepared for Pedagogy of Telugu I – Part 3.

18(vi): Pedagogy of French I – Part 3

Theory

Credits 4

Essence of the course:

Equipping the student with French knowledge for communication. Learning the different approaches to teach French at schools. Learning to use the ICT tools for education in foreign language classroom. The course focuses on developing the ability of the future teachers to transact language in inclusive classroom.

Objectives:

At the end of the course, the student teacher will be able to

- develop French Language teaching competency.
- understand and appreciate the importance of French.
- have a critical study of learning French as a second language in the multilingual Indian Society.
- understand the role of French in India and to improve French Language attainment.
- produce the different methods, techniques and strategies of teaching French.
- prepare and use appropriate teaching aids to make teaching more effective.
- develop the various micro skills to teach French language.
- acquire the skill of preparing lesson plans to teach French.

CONTENT OUTLINE**Unit 1: Foundation and importance of French language teaching**

Enseignement du FLE (French as a foreign language), FLM (French as a mother tongue), FLS (French as second language), FOS (French for specific objectives). Importance d'apprendre le français dans le monde actuel.

(La classe de langue, p. 13-18)

Unit 2: Aims and objectives of teaching French as a second language

Buts de l'enseignement du français – Objectifs d'enseignement du FLE au niveau primaire, secondaire et au niveau lycée. Petite étude du terrain (étude sur le système d'enseignement du français en Inde)

Unit 3: Teaching skills

Micro enseignement – Définition - Etapes dans le micro-enseignement – Aptitudes: Sensibilisation - Facilité à poser des questions – Renforcement – Varier les stimuli – Savoir enchaîner les questions – Contrôler la compréhension - Usage d'auxiliaires visuels

Unit 4: Planning of the lesson

Définition et rôle du plan de cours – Avantages d'élaborer un plan de cours - Conseils méthodologiques pour préparer les leçons

Unit 5: Methods of teaching French

Différence entre “Méthode”, “Methodologie”, “Approche” and “Perspective”.

Grammar translation method – Direct method – SGAV method – Communicative approach – Task oriented approach – Eclectic approach

(Manuel de formation pratique: P. 74-75, La classe de langue: P.50-60, 63-65, 68-69)

Mode of Transaction:

Use of multimedia resources, Library resources, Accessing Online input on the topic, Print versions of texts focusing on communication, Usage of ICT, Introductory lecture, Micro-teaching through video lessons, Lesson Plan preparation, Demonstration, Mind mapping, Small group discussions, Dictionary and Online referencing, Language Lab activities

Practicum: Task and assignment

1. Seminar on foundation and significance of English language teaching
2. Oral Communication tasks
3. Language Lab activities
4. Preparation of micro lesson plan
5. Preparation of micro lesson plan using computer assisted instruction
6. Sessions in small or medium groups

Mode of Assessment:

Evaluation based on documentation (written) – Address the level of pupil involvement in Group Discussion – Performance evaluation (seminar, project and assignment) – Monitor the ability to distinguish between similar concepts – Use of Checklist to monitor, rate performance in each skill – Monitoring performance of communicative tasks

References:

1. ABRY D., VELDEMAN-ABRY J. *La phonétique: audition, prononciation, correction*, CLE, 2007, 1CD
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4. CUQ J.-P., GRUCA I., *Cours de didactique du français langue étrangère et seconde*, Grenoble, PUG, 2002.
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8. TAGLIANTE., CHRISTINE., *La classe de langue*, coll, Techniques de classe, CLE international, 2006

18 (vii): Pedagogy of Mathematics I – Part 3**Credit: 4****Essence of the course:**

This course is to enable students to specialize in Mathematics and to develop an understanding of the curriculum, linking school knowledge with community life. The course includes reconstruction of Mathematical Knowledge through appropriate pedagogic processes and to communicate meaningfully with children.

Objectives:**At the end of the course, the student teacher will be able to**

- acquire the knowledge of competence in teaching Mathematics
- develop clear perception of the Secondary School Mathematics.
- develop awareness of recent trends and principles of construction of Mathematics curriculum.
- know the importance of computers in teaching and learning of Mathematics
- understand the various psychological aspects involved in teaching Mathematics
- know the importance of aesthetic and recreational Mathematics
- develop an understanding of resources of teaching and learning Mathematics.
- help the student teacher for the professional self-development
- enable the student teachers to identify gifted and slow learners in Mathematics and to meet the requirements.
- stimulate to pose and solve meaningful problems and creativity in Mathematics.
- develop insight into individual differences in learning Mathematics to cater to the needs and requirements of students.
- develop skills in construction of appropriate assessment tools for evaluating Mathematics learning

COURSE CONTENT**Unit 1: Revisiting of Content in Mathematics**

Definitions, Concepts, Generalizations, Formulae, Laws, Rules, Properties, Axioms, Structures, Constructions, Graphs, Operations, Procedures and Processes, Axioms and Postulates, Theorems and their converse, Propositions, Proofs, Problems etc. in Mathematics
Critical analysis of content course of Standard VI to X Mathematics.- Basic concepts in Secondary School Mathematics.

Unit 2: Mathematics Curriculum

Need and importance of Mathematics in School Curriculum - Recent trends in Curriculum Construction - Principles of formulating Mathematics Curriculum - Organization of Syllabus – Topical and Spiral, Logical and Psychological Approaches - Comparison of CBSE and State Board Mathematics syllabi.

Unit 3: Planning and Designing Instruction in Mathematics

Planning Instruction- Need and Importance - Decision Making as the Basis for Planning - Concept of Pedagogic Content Knowledge (PCK) and Components of PCK - Pedagogic Content Knowledge Analysis for selected units in Mathematics at the secondary level in terms of Content, Pre-requisites, Instructional Objectives– Selecting suitable Teaching Methods and

Strategies, Techniques, Models, Learning Activities, Selecting suitable evaluation techniques, Identifying the misconceptions and appropriate remedial measures.

Unit 4: Learning Resources in Mathematics

Mathematics Text Book – Mathematics Library – Mathematics Club and Mathematics Exhibition

Preparation of teaching Aids - Audio-visual Aids and Multimedia Selection and Teaching in Mathematics - Computer applications in Teaching and Learning Mathematics-Uses of ICT in Teaching-learning process.

Unit 5: Psychological foundations of Mathematics Education

Jean Piaget's Cognitive theory, Bruner's Discovery learning, Gagne's eight types of learning and Constructivism - Critical Analysis of Mathematics Curriculum at the secondary level (state board) based on principles and organization of Mathematics curriculum and NCF 2005.

Modes of Transactions:

Lecturing on Theoretical Concepts, Logical Reasoning of Mathematical problems, Analytic and Synthetic Methods of Teaching, Project Method, Tasks and Assignments, seminars.

Learning Activities:

Learning the Content and practicing them appropriately, Oral work, drill, Review and Practicing Pedagogical Aspects for different areas of School Curriculum.

Practicum: Task and Assignment

1. Critically analyze the Mathematics Curriculum at the Secondary Level and prepare a report.
2. Prepare any two improvised teaching aids.
3. prepare the stick album based on the mathematical shapes
4. Search and collect the scrap for Mathematics
5. Prepare a power-point presentation on Mathematical Concepts, Principles and Properties.

Mode of Assessment:

Paper-Pencil Tests, Performance tests, Formal and Informal Testing and Continuous Comprehensive Evaluation.

References:

1. Anice James (2014). Teaching of Mathematics. Hyderabad: Neelkamal Publications Pvt. Ltd.
2. Arul Jothi, Balaji D.L. and Nishit Mathur (2009). Teaching of Mathematics II. New Delhi: Centrum Press.
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15. Schwartz, S. L. (2007). Teaching young children Mathematics. London: Atlantic Publishers & Distributors (P) Ltd.
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18(viii): Pedagogy of Physical Science I – Part 3**Credit: 4****Essence of the course:**

After having learning this Course, student teachers understand the nature of physical science teacher, the learner, resource material including ICT for teaching physical science and evaluation process. This course comprise, pedagogical approaches for organizing science related activities; and assessment of the learner.

The student-teachers will work with theoretical studies as well as on the field with school children from various backgrounds. They will capable to critically teach the science in their internship school and examine teaching learning processes also developing of self.

Objectives:**At the end of the course, the student teacher will be able to**

- acquire knowledge about the term and concepts used in teaching physical science.
- understand nature of the learner and classroom situation.
- apply the knowledge in constructing test and developing ICT resource in teaching physical science.
- enhance skill in organizing and maintaining of physical science laboratory.
- create interest in organizing science related activities.
- develop a desirable positive attitude towards science teaching.

COURSE CONTENT**Unit 1: Pedagogical shift in Physical Science:**

Pedagogical shift from science as fixed body of knowledge to the process of constructing knowledge – Critical pedagogy, democratising science learning and role of teachers – Pedagogical shift: planning teaching learning experiences.

Unit 2: Exploring Learners

Uniqueness in learner – Motivating learners to bring their previous knowledge into Classroom – Involving Learners in teaching-learning Process – Encouraging learners to raise and ask questions, collect materials from local resources.

Unit 3: Curriculum in Physical Science

Meaning – curriculum and syllabus – Principles and approaches of curriculum construction – selection of content – Recommendations of various commission since Kothari commission to NCF on science curriculum–Physical science syllabi and textbooks at upper primary, secondary stage.

Unit 4: ICT Resources in Learning Physical Science

Dale's Cone of experience (modified) – Teaching physical science with: audio broadcast, educational television, multimedia: audio, slideshow, animated video, simulation, games, and e-picture/poster – Blended learning: eBooks, Web, Wikis, Moodle, social networking–ICT tool used in classroom– advantages of using ICT in learning–teaching processes

Unit 5: Organizing Science Related Activities

Science libraries, science Museum, science club, science hobbies, field trips/excursions, science Fairs/exhibitions, Science corner.

Mode of transaction:

Lecture-demonstration method, Project method, Problem-solving method, CAI, Observation method (field visit/exhibition/internship), Seminar/ discussion

Practicum: Task and Assignment

1. During internship, analyze and record learning abilities of pupils and their activities in class situation (observation).
2. Study any one of 6th to 8th or 9th to 10th the science curriculum used in india (Report)
3. Surf the Internet for searching information for various concepts of physical sciences for primary/secondary/higher secondary stages. Review them and make a list of relevant websites that you would recommend to your students. Share and discuss about the websites with your friends and teacher(Discussion)
4. Write self-study report based on your visit to science exhibition or science centre (Visit).
5. Evaluate any 2 school science text book(Rating)

Mode of Assessment:

Written test, Task and assignment, Laboratory work, Observation

References:

1. National Council of Educational Research and Training (2013), *Pedagogy of Physical Science I & II*, New Delhi. ISBN 978-93-5007-224-0(Part I) ISBN 978-93-5007-225-7 (Part II)
2. Radha Moahan. (2013), *Teaching of Physical Science*. Hyderabad: Neelkamal publication pvt. Ltd., ISBN 978-81-8316-204-3
3. SonikaRajan. (2012), *Methodology of Teaching Science*. New Delhi: Pearson Education. ISBN 978-81-31770-22-1
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7. Mangal, S, K. and Uma Mangal. (2009), *Essentials of Educational Technology*. New Delhi: PHI Learning Pvt. Ltd., ISBN-978-81-203-3723-7
8. Monika davar. (2012), *Teaching of science*, New Delhi: PHI Learning Pvt. Ltd., ISBN 978-81-203-4624-6 and 81-203-4624-6.
9. Central Board of Secondary Education. (2010), *Manual for Teachers on School Based Assessment Classes VI to VIII*. Delhi.
10. Jonathan Anderson. (2010), *ICT Transforming Education- A Regional Guide*. UNESCO Bangkok. ISBN 978-92-9223-325-9 ISBN 978-92-9223-326-6.
11. Henry E. Garrett. (2008), *statistics in Psychology and Education*. Delhi: Surjeet Publications.

18(ix): Pedagogy of Biological Science I – Part 3

Theory

Credits 4

Essence of the course:

This course will introduce the student teachers to know about the advanced methods of teaching the biological science and make them to acquaint to have knowledge about conduct of practical's, critically examine teaching learning process based on activity and get insight about meta – learning. This course further seeks to be self-improving through the processes of reflection, feedback, and critical inquiry. Consequently, science teacher must help their students to understand their role within the broader social community.

Objectives:**At the end of the course, the student teachers will be able to**

- acquire knowledge about Individual learning strategies
- understand approaches of learning Biological science.
- apply the knowledge in constructing test and developing ICT resource and professional development in teaching Biological science.
- develop skill in practical work and organizing and maintaining of biological science laboratory.
- develop interest in using teaching resources and research in science education.
- develop a desirable positive attitude towards. tools and techniques of assessment of learning biological science

COURSE CONTENT:**Unit 1: Approaches of learning Biological science**

5E learning model – Expository approach - Collaborative - Activity based learning approach– Concept attainment – Experiential learning– Inquiry approach.

Unit 2: Community and learning resources

Learning resources from immediate environment – using community resources – Community based learning resources in teaching of science. – Field visit to botanical garden, Science Park and zoo - scientific Lab and its equipment

Unit 3: Teaching resources

Machine operated aids: Overhead projector, digital projector, smart interactive board.

Non– Machine operated aids:

Graphical aids: flash cards, charts, flip chart, graphs, pictures, poster, and cut–outs and its effective uses.

Display Board: chalkboard, bulletin, flannel, magnetic, peg board and its effective uses.

3D aids: objects, specimens, models.

Unit 4: Biology Laboratory

Location, planning, organization and maintenance-practical preparation – laboratory registers – safety in the lab – common accidents and first aid – practical ethics

Unit 5: Biology practical work

Organizing and importance of practical work – problems in conducting practical – guidelines for teachers, evaluation of practical work – practical record work in biology

Modes of transaction:

Lecture method, Assignment Method, Report writing, Field visit & Preparation of Field report, Laboratory Method, Presentation by students, Demonstration of scientific experiments.

Practicum: Task and Assignment

1. Report writing about finding resources on teaching science using web
2. Preparation of laboratory instructional cards.
3. Prepare any one working model related to bio-science.
4. Preparation of Posters / articles / stories related to science concepts / environment. (send it for publication at student journals)
5. Study and observation of how science is taught in various schools and prepare a report on teaching aids availability and show how it can be improvised further.

Mode of Assessment:

Observation, Report preparation & keeping Records, Assignment submissions, Seminar presentation, Article publications, student presentation.

References:

1. Arulselvi, E. (2007). Teaching of science. Chennai: Saradha Publications.
2. Brandwein, P. F. (1955). The gifted as future scientist. New York, Earcourt Dcace.
3. Central Board of Secondary Education. (2010), *Manual for Teachers on School Based Assessment Classes VI to VIII*. Delhi.
4. Jonathan Anderson. (2010), *ICT Transforming Education– A Regional Guide*. UNESCO Bangkok. ISBN 978–92–9223–325–9 ISBN 978–92–9223–326–6.
5. Mangal, S. K., &Mangal, S. (2005). Essentials of educational technology and management. Meerut: Loyal Book Depot.
6. Mangal, S, K. and Uma Mangal. (2009), Essentials of Educational Technology. New Delhi: PHI Learning Pvt. Ltd., ISBN–978–81–203–3723–7
7. Monika davar. (2012), Teaching of science, New Delhi: PHI Learning Pvt. Ltd., ISBN 978–81–203–4624–6 and 81–203–4624–6.
8. NCERT. (2006), Elementary level syllabus vol–I. New Delhi. ISBN 81–7450–593–8
9. Sharma, R. A. (2008). Technological foundation of education. Meerut: R.Lall Books Depot.
10. Sharma, R. C. (2007). Teaching of science. Delhi: Dhanpatrai publications.
11. Sharma, P.C. (2006). Modern science teaching. New Delhi: Dhanpat Rai Publications.
12. SonikaRajan. (2012), Methodology of Teaching Science. New Delhi: Pearson Education. ISBN 978–81–31770–22–1
13. Tomar, Archana (2006) Teaching of Biology, Delhi: Kalpaz publication
14. Yadav, S., & Singh, A. K. (2005). Teaching of life science. Delhi: Dominant Publications

18(x): Pedagogy of Social Science I – Part 3**Theory****Credits 4****Essence of the course:**

This course helps to sensitize the learners the relevance of social science in the current context. It makes them familiar about the techniques and approaches of teaching social science. It helps the learner well acquaint the preparation and administration of learning resources in the meaningful way. It also develops the competency in making use of appropriate assessment system to apprise the learning outcomes. This course deals about the various social issues and mould them to face the same in a plausible way.

Objectives:**At the end of the course, the student teacher will be able to**

- acquire basic knowledge and skills to analyse and transact the Social Science curriculum effectively following wide-ranging teaching
- acquire a conceptual understanding on the process of teaching and learning Social Science
- sensitise and equip student teachers to handle social issues and concerns in a responsible manner.
- Develop ability for critical and logical thinking and apply the acquired knowledge and skills in unfamiliar situations
- Acquaint with different methods, approaches and techniques of teaching social science
- Develop ability to design different evaluation tools
- Develop practical skills for analysing socio-economic, political and physical phenomena

CONTENT OUTLINE**Unit 1: Curriculum of Social Science**

Meaning of Curriculum – Importance of Curriculum in Education – Types of Curriculum – Factors Influencing in Curriculum development –Principles of Curriculum development - Selection of Content for Social Studies Curriculum – Organization of the Social Studies Curriculum - Curriculum of Social Science at Primary Stage – Curriculum of Social Science at Secondary stage

Unit 2: Curriculum Reforms in Social Science

Role of Teacher in curriculum implementation and evaluation; national policies of education – reforms in social science curriculum at the secondary education level, national curriculum framework for school education (NCERT)

Unit 3: Approaches of curriculum construction

Correlated, Integrated, Topical, Unit, Patch, Concentric, and Spiral approaches.

Unit 4: Models of Teaching

Jurisprudence Model of Inquiry, Concept Attainment Model, Asubel’s Advanced organiser model and its application in social science

Unit 5: Use of ICT in Social Science Teaching

Uses of Computer – Internet and Intranet – e-learning – Mobile learning.

Mode of Transaction

Lecture cum discussion, Problem Solving, Dramatization, Seminar, Field visit, Debate, Group Discussion.

Practicum: Task and Assignment

1. Analysis of any three years' public examination social science questions papers and submission of report.
2. Discussion on Contemporary issues.
3. Organizing a Mock Parliament Session.

Mode of Assessment

Unit test, Project, Preparation of assignments, Assessment of Learning Resources, Seminar Presentation.

References:

1. Aggarwal J.C., Teaching of Social Studies, Vikas Publishing House, New Delhi, Third Edition:1999,
2. Bank James A (1977) Teaching Strategies for the Social Studies: Enquiry, Valuing and Decision Making, Addition –Wesley Publishing Co., Reading, Massachusetts.
3. Binning and Binning (1952) Teaching of Social Studies in Secondary Schools, Mc Graw Hills, New York
4. Dhamija Neelam (1993) Multimedia Approaches in Teaching Social Studies, Harmen Publishing House, New Delhi
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6. Khan.M.A., Teaching of Social Studies, Commonwealth Publication, New Delhi, 2004.
7. Kocha S K (1970) Fundamentals of Teaching Social Studies, Mahendra Capital Publishers
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9. Sharma.R.K., Teaching of Social Studies, International Publication House, Meerut, 2004.
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11. Yagnik K S (1966) The Teaching of Social Studies in India, Bombay, Orient Longman Ltd.
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18(xi): Pedagogy of Computer Science I – Part 3**Credit: 4****Essence of the course:**

This course is to enable students to specialize in Computer science and to develop an understanding of the curriculum, linking school knowledge with community life. The course includes reconstruction of Computer Knowledge through appropriate pedagogic processes and to communicate meaningfully with children

Objectives:

At the end of the course, the student teacher will be able to

- enable the student teachers acquire knowledge about Informational Communicational Technology in Education
- develop an understanding about the Internet and Its applications
- guide the student teachers about planning and maintaining the Computer laboratories
- familiarize the student teachers with the Modern Trends in Teaching of Computer Science
- enable the student teachers acquire knowledge about blended learning and its models
- familiarize the student teachers with the multimedia, web designing, and Computer programming

CONTENT OUTLINE**Unit 1: Information Communication Technology**

Technology in Education: Introduction – Concept of Information Technology, Communication Technology, Instructional Technology – Need & Significance of Educational Technology – Emerging Trends in Educational Technology; ICT in Education: Introduction – Definition – Need of Information and Communication Technology – Significance of ICT

Unit 2: Internet and its Applications

Introduction - History of the internet – Application of Network – Benefits – Types of Computer Network- Basic Elements – Network Topology – Popular uses of Web Internet and Extranet - Understanding WWW – How to connect – Web browsers and it types – Favorites and Bookmarks;

Unit 3: Planning and Maintenance of a Computer Laboratory

Need for planning the computer laboratory – special features of computer lab – Essential infrastructure – laboratory management – organization of practical for pupils – maintenance of records – Rules for staff and pupils.

Unit 4: Modern Instructional Strategies

Introduction to modern instructional strategies – Significance and Uses – Modern Instructional Strategies: Interactive Whiteboard – Blog: Educational Blog, Types, role of teacher in educational blog – Web based learning – Video Conferencing – Virtual Learning – Online Learning. Computer Assisted Instruction (CAI), steps for developing CAI, modes of CAI, benefits of CAI, limitation of CAI, role of teacher in CAI.

Unit 5: Blended learning perspectives

Meaning, Definition, Characteristics, Importance, Benefits and Challenges of Blended Learning – Models of Blended Learning: Rotation Model – Station Rotation Model – Lab Rotation Model – Flipped Classroom Model – Flex Model - Self Blend Model – Virtual Enriched Model.- Advantages – Disadvantages of Blended Learning.

Mode of Transaction:

Lecturing on Theoretical Concepts, use of computers in lab, Analytic and Synthetic Methods of Teaching, Project Method, Tasks and Assignments

Practicum: Task and Assignment

1. Develop the Multimedia package (Any one lesson at secondary or senior secondary level)
2. Create an Educational Blog (Individually)
3. Draw the Computer based Concept maps
4. Prepare self-blended learning module
5. Write a C programme – Students Mark list using array
6. Create a simple website for your class (Upload: Assignment, Exam details, Study materials)
7. Organize the Team Teaching among student trainees
8. Prepare the rating scale for self- Assessment of student teachers (use during the teaching practice)

Mode of Assessment

Paper-Pencil Tests, Performance tests, Formal and Informal Testing and Continuous Comprehensive Evaluation

References:

1. Aggarwal J.C (2006). Essential of educational technology: innovation in Teaching-Learning. New Delhi: Vikas Publishing House.
2. Asokek. Ghosh (2001), Microsoft Web Publishing, New Delhi, Prentice Hall of India.
3. Arulsamy S. and Sivakumar.P, (2002). Application of ICT in Education, Hyderabad: Neelkamal Publication.
4. Balagurusamy E. (2011).Programming C (Fifth Edition). New Delhi: Tata McGra Hill Education Private Limited.
5. Burry Nance (1996). Introduction to Networking. New Delhi: Prentice Hall of India.
6. Harjeet Kaur Bhatia (2012). Reflections on blended learning and peer collaboration in Teacher Education, New Delhi: Global books organisation.
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9. Sampath et. al (2000). Introduction to Education Technology. New Delhi: Sterling Publishers.
10. Yashavant P.Kanetkar (2010). Let Us C (Tenth Edition). New Delhi: BPB Publications

Edn 19: C&PS - PEDAGOGY OF SCHOOL SUBJECT II

19(i): Pedagogy of Tamil II – Part 3

தமிழ் கற்பிக்கும் முறைகள் II - பகுதி 3

Theory

Credits 4

அடிப்படைக் கோட்பாடு

சமூகத்தில் மொழியின் அவசியத்தையும் பங்களிப்பையும் பற்றிய அறிவினைப் பெற்றிருப்பர். இன்றைக்கு மொழியும் அறிவியலும் ஒன்றுக் கொன்று தொடர்புடையதாக உள்ளதை அறிந்திருப்பர். மொழியைக் கற்பிக்கும், கருவி நூலாக உள்ள, பாடநூல் எவ்வாறு அமைந்திருக்க வேண்டும் என்பதை மாணவர் அறிந்திருப்பர். நம்மை மற்றவரோடு தொடர்புபடுத்திக் கொள்வதற்கு கருவியாக அமைந்துள்ள மொழியாய்வகம் பற்றி அறிவைப் பெற்றிருப்பர். மனக் கருத்துக்களை வெளிப்படுத்தும் முறைகளில் ஒன்றான கட்டுரை எழுதும் அறிவைப் பெற்றிருப்பர். மொழிப் பயிற்சிப் பற்றிய சிந்தனைகளையும் பெற்றிருப்பர். மொழிப்பாடம் கற்பித்தலுக்குத் தற்காலத்திற்கேற்ற வகையில் கற்பித்தல் புதுமைகளை வெளிக் கொணரும் அறிவைப் பெற்றிருப்பர். மொழிப்பாடம் திறன்பாடம் என்பதால் படைப்பாற்றலை வளர்த்துக்கொள்ளும் திறனைப் பெற்றிருப்பர்.

நோக்கங்கள்:

- சமுதாயத்தில் மொழியின் செயல்பாட்டினை அறிய செய்தல்.
- பாடநூல் குறித்த அறிவைத் தருதல்.
- மொழிப் பயிற்றாய்வுக் கூடம் குறித்து அறியச் செய்தல்.
- வினாத்தாள் வடிவமைப்புப் பற்றிய அறிவைப் பெறச் செய்தல்.
- கட்டுரை எழுதும் திறன் பெறச் செய்தல்.
- படைப்பாற்றலை வளர்ப்பதற்கான பல்வேறு வழிமுறைகளை அறியச் செய்தல்.
- தமிழில் ஆய்வுகள் குறித்த அடிப்படைச் செய்திகளை உணர்த்துதல்.

அலகு 1: சமுதாயத்தில் மொழி

மொழியும் சமூகமும் - மொழியும் அதிகாரமும் - மொழியும் அடையாளமும் - மொழியும் பண்பாடும் - மொழியும் பால்வேறுபாடும் - மொழியும் அரசியலும் - மொழியும் வர்க்கமும் - மொழியும் இலக்கியமும் - மொழியும் அறிவியலும் - மொழியும் வணிகமும் - மொழியும் சுற்றுச்சூழலும் - மொழியும் உலகமயமும் - இவைகளுக்கிடையேயான உறவு நிலைகளும் ஒப்பீடும்

அலகு 2: பாடநூல் வடிவமைத்தல்

பாடநூல் அமைப்பு - தேசியக் கல்விக்கொள்கையின் குறிக்கோள்கள் - பத்துவகை அழகு - நூற்குற்றம் - பாடநூலின் அகத்தோற்றம் - புறத்தோற்றம் - பண்புகள்.

அலகு 3: மொழிப்பயிற்றாய்வுக் கூடம்

மொழிப் பயிற்றாய்வுக் கூடம் - தேவையும் பயனும் - அமைப்பு - செயல்பாடுகள் - பயன்கள் - இரண்டாவது மொழியாகத் தமிழைக் கற்பித்தல்.

அலகு 4: கட்டுரைப் பயிற்சி

வாய்மொழிக் கட்டுரை- எழுத்துக் கட்டுரை - பல்வேறு கட்டுரைகள் - மடல் வகைகளும் படிநிலைகளும் - வல்லினம் மிகா இடங்கள், மிகும் இடங்கள் - தொடர் அமைப்பு - பத்தி அமைப்பு - நிறுத்தற் குறியீடுகளின் அவசியம் - சொற்றொடர் - பழமொழி - மேற்கோள் பயன்பாடு.

அலகு 5: மொழிப் பயிற்சி

சொற்களஞ்சியம் அவசியம் - அறிந்த சொற்களஞ்சியம்- பயன்படுத்தும் சொற்களஞ்சியம் - சொற்களஞ்சியங்களைப் பெருக்கும் வழிமுறைகள் - வாக்கியங்களை அமைத்தல் -சுருக்கி வரைதல் - இலக்கியநயம் உணர்தல் - அகராதியைப் பயன்படுத்துதல் - துணுக்குகள் - காரணம் உணர்தல் - பகுத்தாரய்தல் - பொருத்துதல்.

மதிப்பீடு

வகுப்புத் தேர்வு, வாய்மொழித் தேர்வு, ஒப்படைப்புகள், வகுப்புக் கருத்தரங்கம், மாதிரிப் பாடம் எடுத்தல். வகுப்பில் மாணவர்கள் பங்கேற்பை மதிப்பிடல்.

செய்முறைப் பயிற்சிகள்:

1. சொல் விளையாட்டு தயாரித்தல்.
2. குறிப்பிட்டத் தலைப்பில் தமிழ் உரை தயாரித்தல்.
3. தனித் தமிழ் நடையில் பேசுதல்.
4. கதை, கவிதை, கட்டுரை எழுதுதல்.
5. மொழிப் பயிற்றாய்வுக் கூடத்திற்குப் பயிற்சி தயாரித்தல்.

பார்வை நூல்கள்

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19(ii): Pedagogy of English II – Part 3**Theory****Credits 4****Essence of the course:**

Equipping the student teacher with English knowledge for communication and appreciation. Developing the skill of communication in order to help children at various school levels towards effective communication. The course focuses on developing the ability of the future Teachers to transact language in inclusive classroom.

Objectives:**At the end of the course, the student teacher will be able to**

- enable the student teachers to
- develop English Language teaching competency.
- understand and appreciate the importance of English.
- have a critical study of learning English as a second language in the multilingual Indian Society.
- understand the role of English in India and to improve English Language attainment.
- produce the different methods, techniques and strategies of ELT.
- Prepare and use appropriate teaching aids to make teaching more effective.
- develop the various micro skills to teach English language.
- acquire the skill of preparing lesson plans to teach English.

CONTENT OUTLINE**Unit 1: Lesson plan format grammar**

Planning for teaching Grammar and usage -Steps of preparing a lesson plan for grammar. – Types of grammar (Formal and Functional) - Methods of teaching grammar (Inductive and Deductive)

Unit 2: Lesson plan format - composition

Planning for teaching composition- Kinds of composition (Guided, Controlled and Free)-Steps of preparing a lesson plan for teaching composition-Correction of a composition work.

Unit 3: Approaches to teaching English language

Structural approach- Situational approach- Communicative approach- Eclectic approach- constructive approach- S-O-S approach.

Unit 4: Teaching pronunciation

Teaching Pronunciation and Spoken English. Standard Indian Pronunciation with reference to GIE/RP. - English sound system – Vowels, Consonants - Minimal contrasts – consonant clusters- Focusing on difficult sounds – comparison with sounds of Indian languages. Syllabification – stress, intonation, rhythm.

Unit 5: Teaching of vocabulary

Essentials of teaching vocabulary-Types of vocabulary – Active and passive; Content words and structural words- Selection and gradation of vocabulary -Teaching meaning of words - Expansion of vocabulary.

Mode of Transaction:

Demonstration of teaching specific grammar items, Seminar on different expressions, Comparative study of various forms of compositions, Demonstration of steps followed in different methods, Introductory lecture, Observation of video clips, Through Situational presentations, Usage of Language games, Presentation of good models by native speakers, Through language lab, Framing, evaluating and interpreting a question paper.

Practicum: Task and Assignment

1. Projects on methods of teaching grammar
2. Language games on grammatical structure
3. Activities & competitions for Creative writing,
4. Practicing Formal and Informal Letter
5. Perform any one of the activities for developing the language skill: Quiz, Debate, Dialogue, Role play, Brain storming

Mode of assessment:

Analysis of Group discussion, Participant Observation, Monitoring performance of communicative tasks, Evaluation based on documentation (written), Performance evaluation (Seminar, Assignment & Project)

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19(iii): Pedagogy of Hindi II – Part 3

Theory

Credits 4

पृष्ठभूमि:

राष्ट्रीय पाठ्यचर्यापरिरेखा 2005 तथा शिक्षा का अधिकार एक्ट 2009 विद्यालयी शिक्षा तथा शिक्षण प्रशिक्षण के निकट संबंधों को ध्यान में रखते हुए शिक्षक की भूमिका में एक बहुत बड़े परिवर्तन की माँग करती है। पाठ्यचर्या में अभी तक शिक्षक को ही ज्ञान के स्रोत के रूप में केन्द्रीय स्थान मिलता रहा है, वह सीखने-सिखाने की समूची प्रक्रिया के संरक्षक और प्रबंधक के रूप में मुख्य भूमिका निभाने का काम करते आए हैं। पर 2005 की स्कूली पाठ्यचर्या उनसे माँग करती है कि वे सूचनाओं के वितरक और ज्ञान के स्रोत बन कर न रहें बल्कि विद्यार्थियों द्वारा ज्ञान हासिल करने की प्रक्रिया में स्वयं को सहायक मानें। इन सब परिवर्तनों को उनके व्यवहार का हिस्सा बनाने के लिए ज़रूरी है कि अध्यापक शिक्षा के पाठ्यक्रम में परिवर्तन आए। विद्यालयी शिक्षा व्यवस्था में परिवर्तन की पहल तभी संभव है जब इस व्यवस्था से जुड़े लोगों की सोच और दृष्टिकोण में परिवर्तन आए और शिक्षक की भूमिका इस व्यवस्था में सबसे महत्वपूर्ण है। इस दृष्टि से भाषा-शिक्षण का पाठ्यक्रम और भी महत्वपूर्ण हो जाता है, क्योंकि भाषा पूरी शिक्षा की आधारशिला का काम करती है, जहाँ सिर्फ भाषा पढ़ना-सीखना नहीं बल्कि भाषा के द्वारा अन्य विषयों में भी निपुणता प्राप्त करने की बात आती है। इसके साथ ही भाषा से जुड़े नए बिन्दु आते हैं जैसे - बहुभाषिक कक्षा, समझ का माध्यम, शांति की शिक्षा में भाषा की भूमिका आदि की समझ शिक्षक के लिए ज़रूरी है जो अध्यापक शिक्षा में व्यापक बदलाव की माँग करते हैं।

पाठ्यक्रम के विशेष उद्देश्य

- भाषा के अलग-अलग भूमिकाओं को जानना
- भाषा सीखने की सृजनात्मक प्रक्रिया को जानना
- भाषा के स्वरूप और व्यवस्था को समझना
- स्कूल की भाषा, बच्चों की भाषा और समझ के बीच के संबंध को जानना
- भाषा के संदर्भ में पढ़ने के अधिकार, शांति और पर्यावरण के प्रति सचेत होना
- भाषा सीखने के तरीके और प्रक्रिया को जानना और समझना
- पाठ्यचर्या, पाठ्यक्रम और पाठ्यपुस्तक का विश्लेषण कर कक्षा विशेष और बच्चों की समझ के अनुसार ढालना
- भाषा और साहित्य के संबंध को जानना
- हिंदी भाषा के विविध रूपों और अभिव्यक्तियों को जानना
- भावों और विचारों की स्वतंत्र अभिव्यक्ति करना
- भाषायी बारीकियों के प्रति संवेदनशील होना
- अनुवाद के महत्व और भूमिका को जानना
- विद्यार्थियों की सृजनात्मक क्षमता को पहचानना
- बच्चों के भाषायी विकास के प्रति समझ बनाना और उसे समुन्नत करने के लिए विद्यालय में तरह-तरह के मौके जुटाना
- भाषा के मूल्यांकन की प्रक्रिया को जानना
- साहित्यिक और गैर साहित्यिक मौलिक रचनाओं की समझ और सराहना
- भाषा सीखने-सिखाने के सृजनात्मक दृष्टिकोण को समझना

इकाई 1:

(क) मातृभाषा और अन्य भाषाएं । - (ख) मातृभाषा की महत्ता और पाठ्यक्रम में उसका स्थान । - (ग) मातृभाषा शिक्षण के उद्देश्य । - (घ) अन्य भाषा का महत्व एवं अन्य भाषा शिक्षण के उद्देश्य । - (ङ.) त्रिभाषा सूत्र और उसका कार्यान्वयन । - (च) भाषा-शिक्षण के सामान्य सिद्धान्तों का परिचय ।

इकाई 2:

- (क) भाषा के चार कौशल-श्रवण,भाषण,पठन,लेखन का सामान्य ज्ञान एवं परिचय। - (ख) श्रवण कौशल शिक्षण । -
 (ग) भाषा कौशल शिक्षण । - (घ) पठन(वाचन)कौशल शिक्षण । - (ङ.) लेखन कौशल शिक्षण । - (च)
 भाषा अधिव्यक्ति के दो रूप-मौखिक और लिखित । - (छ) उच्चारण शिक्षण ।

इकाई 3: हिन्दी की लिपि और वर्तनी का परिचय

- (क) देवनागरी लिपि का उद्भव और विकास । - (ख) देवनागरी लिपि की वैज्ञानिकता विशेषताएं तथा कमियां। -
 (ग) वर्णों का मानक रूप । - (घ) वर्तनी, वर्तनी के नियम वर्तनी संबंधी त्रुटियों के सुधार संबंधी उपाय ।

इकाई 4:

- (क) हिन्दी भाषा का उद्भव और विकास तथा हिन्दी की बोलियां - (ख) संपर्क भाषा और राजभाषा के रूप में हिन्दी ।

इकाई 5:

- (क) भाषा शिक्षण में भाषा विज्ञान का योगदान । - (ख) व्याकरण शिक्षण । - (ग) रचना शिक्षण ।

हिन्दी की विभिन्न विधाओं का शिक्षण

- (क) कविता शिक्षण एवं पाठ योजना । - (ख) गद्य शिक्षण एवं पाठ योजना । - (ग) कहानी शिक्षण एवं पाठ योजना । - (घ) नाटक शिक्षण एवं पाठ योजना । - (ङ.) पत्र लेखन,निबंध लेखन, सार लेखन आदि का शिक्षण ।

संदर्भ-ग्रंथ

- | | | | |
|----|-------------------------------------|---|--|
| 1. | डॉ. विजयराघव रेड्डी | - | हिन्दी शिक्षण अन्य भाषा के संदर्भ में |
| 2. | कामता प्रसाद गुरु | - | हिन्दी व्याकरण |
| 3. | डॉ. रामचन्द्र वर्मा | - | अच्छी हिन्दी |
| 4. | डॉ. नामवर सिंह | - | आधुनिक साहित्य की प्रवृत्तियां |
| 5. | डॉ.रामसजन पाण्डेय | - | विविध साहित्यिक वाद |
| 6. | डॉ.लक्ष्मीनारायण शर्मा | - | देवनागरी लिपि और वर्तनी |
| 7. | डॉ.रघुनाथ सफाया | - | हिन्दी शिक्षण |
| 8. | डॉ.रामदेव पी. कथूरिया | - | सूक्ष्म शिक्षण |
| 9. | केन्द्रीय हिन्दी संस्थान के प्रकाशन | | 1. हिन्दी का वैज्ञानिक व्याकरण 2. देवनागरी लेखन तथा हिन्दी वर्तनी व्यवस्था 3. हिन्दी शिक्षण विविध आयाम 4. हिन्दी शिक्षण अन्तर्राष्ट्रीय परिपेक्ष्य 5. द्वितीय भाषा शिक्षण में अभिक्रान्त अधिगम की तैकनालॉजी 6. भाषा शिक्षण तथा भाषा विज्ञान |

Practicum: Task and Assignment

Minimum 2 activities relevant to the syllabus.

19(iv): Pedagogy of Malayalam II – Part 3**Theory****Credits 4****Essence of the course:**

This course equipping the student teacher with Malayalam knowledge for communication and its values for appreciation. This course deals with Malayalam usage and society. Usage of ICT, research in Malayalam language, professional traits of Malayalam teachers are reflected. The course focuses on developing the ability of the future teachers to transact language in inclusive classroom.

Objectives**At the end of the course, the student teacher will be able to**

- appreciate the role of Malayalam in the society
- familiarize the IT related professional inputs of teaching.
- understand the meaning, importance and concept of models of teaching in Malayalam language teaching.
- Use of Malayalam on Computers
- Apply phonetics of Malayalam
- Critical thinking and creative writing
- Know about action research
- be a professional Malayalam teacher.
- acquaint with the co-curricular activities in Malayalam.

CONTENT OUTLINE**Unit 1: Reading and Writing**

The method best suited to Malayalam – mixed and composite method. The use of pictures, flash cards, charts sentence strips, etc., in taking to read, word selection, word frequency – the aims of silent reading and reading aloud training in each – introduction to independent reading initiation reading chart - Increasing use of silent reading and rapid silent reading – initiation to extensive to improve it – introduction to literary work use of a dictionary - Intensive and extensive reading – training in skimming and skipping – library work – dictionary – encyclopedia of different types – further training in effective loud reading - Writing with pen and ink – graded copy book – graphic devices in writing transcription – characteristics of good handwriting – legibility, beauty, proportion and speed – how to serve them – handwriting scales.

Unit 2: Malayalam language and Society

Malayalam language and society, language and culture, Mother tongue and folklore, colloquial language and dialects - Community resources – Types and utilization.

Unit 3: ICT usages in Malayalam

ICT in language teaching - Computer aided teaching, e-learning resources in teaching Malayalam, Video conferencing - Module preparation for e-content - Models of Teaching – meaning and scope - Suitable models for Malayalam language teaching – Concept Attainment and Synetics.

Unit 4: Malayalam on computers

Text editing tools – word processing and desktop publishing – Free Malayalam computing – Malayalam keyboard – Inscript keyboard – Zero width joiner (ZWJ) – Phonetic keyboard – Unicord - Malayalam unicord script - Malayalam softwares - Font – lalitha, sulekha, swanalekha, kartika – Aspal Malayalam – Payyans dictionary – Fix M.R – Malayalam Capcha – Fortune Malayalam – Mozhi, varnam, paral peru, sharika – Auto correct for Malayalam – Malayalam Wikipedia – Digital technology in classroom.

Unit 5: Phonetics of Malayalam

The different speech organs and their role - The individual sounds – vowels and consonants – their place and manner of articulation- Errors in pronunciation and the remedial measures to be employed- The text sentence connection – Devices for cohesion and coherence. The sentence – Types of sentences – Subordinate and co-ordinate clauses – Question forms – Analysis and classification of grammatical errors.

Mode of Transaction

Dialogue, seminars, discussions, and group-work

Practicum: Task and assignment

1. Prepare a newsletter on the topic Malayalam language in Kerala.
2. Prepare and presentation of a minimum 5 discourses in language class.
3. Prepare a collection of poems and stories of your choice.
4. Planning and Preparing of language games to teach grammar and vocabulary items.
5. Preparing instructional materials in teaching Malayalam.

Mode of assessment:

Written test and Task and assignment

References:

1. Sabdhasodhini
2. Keralapanineeyam
3. Bhashabhooshanam
4. Malayalasaili
5. Vrithasilpam
6. Keralabhasahavijnaneeyam
7. Vrithavicharam
8. Kairaliyute Katha
9. The teaching of Mother tongue by W.M. Rhyburn
10. Malayalasaahithaycharithram
11. Enthanu Blog? Blogging engane thudangam
12. Vijayam nedan social media.
13. Brooks,N(1964). *Language and language learning: Theory and practice*, NewYork:Harcourt, Brace &world, Inc.
14. Sivarajan,k & Sreemannuni,P.S.(2003) *Malayalabhashadhyapanam.Central cooperative stores,Calicut university*.
15. Variyar, Prabhakaran,K.M & A. Santha(1998). *Modern linguistics*, Trivandrum: kerala

bhasha institute.

16. NCERT(2005)National Curriculum Framework. New Delhi:NCERT
17. SCERT(2007),Kerala Curriculum Frame work.Trivandrum:SCERT
18. Kumar,S.P.K & Bindhu C.M.(2002) *Instructional Learning Strategies and Cognitive Entry Behaviour-An Experimental Analysis*. Kanishka Publishers: NewDelhi.
19. Prof. Erumeli Parameswaran Pillai (2005) Malayala Sahithyam – Kalakhatangalilode, Prathiba books, Mavelikkara.
20. Dr. C.K. Chandrasekharan Nair (2002) Malayalabodhanam, The State Institute of languages, Thiruvananthapuram.
21. Dr. Sivarajan. K, Sreemanunni. P (2006) Malayalam Bhashadhyapanam, Calicut University Press.

19(v): Pedagogy of Telugu II – Part 3

Theory

Credits 4

Essence of the course:

Objectives:

CONTENT OUTLINE

Mode of Transaction

Practicum: Task and Assignment

Mode of Assessment

References:

Syllabus yet to be prepared for Pedagogy of Telugu II – Part 3.**19(vi): Pedagogy of Mathematics II – Part 3**

The same syllabus as given for course -18(vii)

19(vii): Pedagogy of Physical Science II – Part 3

The same syllabus as given for course – 18(viii)

19(viii): Pedagogy of Biological Science II – Part 3

The same syllabus as given for course – 18(ix)

Edn: EPC 6 - YOGA, HEALTH AND PHYSICAL EDUCATION II**Practicum****Credits 2****Essence of the course:**

The focus of the present course is on understanding the physical, mental fitness for healthy life. This course discourses the yogic exercise, health, and its importance. It also helps to understand the recent diseases and precaution.

Objectives:**At the end of the course, the student teacher will be able to**

- create awareness on difference aspects of health and fitness.
- acquire the knowledge of Yoga & exercises
- understand the physical fitness & Yoga.
- learn good health habits.
- develop total personality and suitable leadership
- enable student teacher organize physical activities

CONTENT OUTLINE**Unit 1: Yogic exercises**

Yogic exercises: breath – normal – yogic breath: inhale, exhale – Asanas: Padmasana, Vajrasana, Yogamudra, Salabasana, Sarvangasana, Halasana, Pujangasana, Dhanurasana and Suryanamaskaram – role of yoga meditation in life situation – importance of yoga in school education.

Unit 2: Yoga in daily life

Yoga in daily life – mudras – yoga exercises for numbness in fingers – 13 stages and its uses. Bandage – accidents in classrooms, burns – preparing first aid, fainting – kits (use and its maintenance), sprain, massage.

Unit 3: Growth and requirements

Human body: Growth & development a children at different ages, their needs and interests, psychological development – Physical, emotional and mental changes during adolescence.

Sexual abuse: Myths and misconceptions regarding growing up, Management of stress and strain and life skills.

Nutrition: Dietary requirements needs according to age, sex – Need for diet planning: Food and water.

Unit 4: Communicable and Non-communicable diseases

Heart Diseases, Cancer, HIV/AIDs, Swine Flue, Reproductive Helpless Health, Osteoporosis, Depression, Intentional & Unintentional Injuries, Diabetes, and Obesity, Uncommon Diseases- Autistic, Cerebral Palsied, Blood Borne Diseases-Beta Thal Major, Sickle Cell Anemia, Hemophilia; Diagnosis, Prevention & Prognosis.

Pollution: Types, Causes, effect and control of various pollution

Unit 5: Health and sports

Fundamental skills of games & sports: Sports for recreation and competition, Rules and regulations of sports, Sports ethics, Sports awards and scholarships, Sports – personship –

Develop of physical fitness, Postures, Importance of relaxation, Health and physical education and its relationship with other the subject areas like science, social science & languages.

Mode of Transaction

Lecture, Discussion, Observation, Debate, Field visit, Project, poster presentation

Practicum: Task and Assignment

1. General guidelines for performance of the practice of yoga for the beginners
 1. Guidelines for the practice of *kriyas*
 2. Guidelines for the practice of *asanas*
 3. Guidelines for the practice of *prāṇāyāma*
 4. Guidelines for the practice of *kriya yoga*
 5. Guidelines for the practice of *meditation*
2. Project on health / Sports and Yoga
3. Organisation of games & sports
4. Visit sports stadium and report
5. Participating various games and discuss all the games in class.
6. Health education and yoga – Analysing various topics by using various charts, photographs and other materials.
7. Surfing to know the different sport and games in India and report
8. Prepare the portfolio for Yoga and its advantages.
9. Make a sports album.

Mode of Assessment

Written test, Task and Assignment.

References:

1. Krishna. G(1993) The purpose of Yoga, NewDelhi UBS publishers LTD.
2. Tiwari. O.P.(2002) Asana: Why and how . India: Kanalyadhama
3. Raja Yoga – Methods and practices – Dalmite
4. Mangal , S.K – (2005) Health & Physical education. Ludhiyana: Tandon Publications, Book market.
5. Hedge (1997) How to maintain good health, NewDelhi: UBPSD Publishers
6. Kancle., B.s., & Kumar, C.P.(1996) Text book on health and physical education, Ludhiyana Kalyana publishers.
7. Health Education for school age children – A frame work central Health education Burean& NCERT , NewDelhi – 16.
8. Dhananjoy. S & Seema.K.(2007) Lesson Planning : Teaching methods and class management in physical education. NewDelhi: Khal Sathiya Kendra
9. Dr. J. P. Thomas (1954) Organization of Physical education, Chennai: Y.M.C.A. College of physical education.
10. Agarwal, Satya P. (1998), The social role of the Gītā: how and why, MotilalBanarsidass, ISBN 978-81-208-1524-7, retrieved 17 June 2010
11. Goel Devraj&Goel Chhaya (2013). Universe of Swami Vivekananda & Complete Wholistic Social Development, CASE Publication under UGC SAP, M.S. University of Baroda, Vadodara.

12. Jason Liu and Dr. Gwendalle Cooper (2009) *Scientific Analysis of the Effects of Falun Dafa* Presented at International Conference of Psychologists, February 27, 2009 by Catherine Hennessy
13. Mehroo D. Bengalee (1976). *CHILD GUIDANCE*. Sheth Publishers, Educational Publishers, 35, Everest, Pedder Road, Bombay-400026
14. Ministry of Health & Family Welfare, Government of India, *Annual Report to the People on Health*, December 2011.
15. Porter, Noah. (2003). *FALUN GONG in the United States: An Ethnographic Study*, Master Thesis, Department of Anthropology, College of Arts and Sciences, University of South Florida.
16. Wu JY, Feng, L, Park , H-T, Havlioglu N, Wen L, Tang H, Bacon KB, Jiang Z, Zhang X, Rao Y. *Molecule that guides Nerve Calls Directs Immune Cells*, Science Daily, Apr.20, 2001.
17. www.FalunDafa.org
18. [www.http://greatist.com/health/19-worst-tech-related-health-risks](http://greatist.com/health/19-worst-tech-related-health-risks)

Edn: EPC 7 - UNDERSTANDING SELF**Practicum****Credits 2****Essence of the course:**

Most of us are neither aware of our strengths nor weaknesses. The focus of the present course is on understanding the self-physical, mental, emotional and spiritual. The course culminates into realization of the universal self. Various processes for understanding the self have also been specified.

Objectives:**At the end of the course, the student teacher will be able to**

- Understand the meaning and importance of self-concept and self-esteem.
- Be aware of different factors related to self-concepts and self-esteem.
- Record a brief history of the history of development of yoga through the ages.
- Discuss how yoga and yoga practices are important for healthy living.
- Explain some important principles of yoga.
- Explain the different limbs of Aṣṭāṅga yoga.
- State the different types of yoga.
- Derive how Haṭha yoga and Aṣṭāṅga yoga are complementary to each other.
- Name the śatkarma and describe their use in cleansing the body and the mind.
- Demonstrate some important āsanās, and prāṇayāma.

CONTENT OUTLINE**Unit 1: Self-concept**

Meaning and Definition of self-concept – Importance of self-concept – Components of self-concept – Factors influencing self-concept – Development of self-concept – Impact of Positive and negative self-concept - Trust building – revisiting one's childhood experiences – empathising with other childhoods and peers.

Unit 2: Professional identity of teacher

Sensibilities, dispositions, resilience and skills personal growth: communication skills ability to listen and observe – holistic and integrated understanding self and personality – Teambuilding, respecting, sharing responsibility – the change agent –designing and leading change /social action

Unit 3: Modes of expression

Opening self, reflection, self-expression: explore dreams, aspirations, concerns, including poetry and humour, creative movement, aesthetic representations –culture for listening and accepting through story making, self-disclosure, art, dance and theatre

Unit 4: Self-esteem and Identities of self

Meaning and concept of self-esteem – Importance of self-esteem – Types of self-esteem – Strategies for positive behaviour – Keys to Increasing Self-Esteem
Gender, relational, cultural –beliefs, stereotypes and prejudices – identities awareness in political, historical, and social forces– personal narratives, life stories, group interactions, film reviews, addressing conflicts, Nature walk/field visit, adventure.

Unit 5: Meditation and Yoga enhance abilities of body and mind

Meditation and Yoga, meaning, practice and importance– Live in peace and harmony with one’s surroundings –promote sensibilities – appreciate the philosophy of yoga and its role – practice and use of yoga in different contexts

Mode of transaction

Lecture-cum-discussion, workshop sessions, assignments, presentations by students

Practicum: Task and Assignment

1. Sharing case studies/biographies/stories of different children who are raised in different circumstances and how this affected their sense of self and identity formation.
2. Watching a movie/documentary where the protagonist undergoes trials and finally discovers her/his potential despite odds.
3. Issues of contemporary adolescence/youth need to be taken up as student-teachers first need to understand themselves; and themselves in relation to their students and classroom situations.
4. Different modes of expression can be used in each of the sessions (so that each of the students get a chance to express herself through any of the modes that they are comfortable in) and at the end of the year, the resource person and the coordinating faculty can reflect back on whether all modes of expression were included through the sessions or not.
5. The exercise of developing reflective journals and providing regular feedback on those journals can also be used here
6. Workshop for development of the inner self and the professional identity as a teacher trainee
7. Programmes to develop social relation and effective communication skills
8. Team building to draw up collective strengths as an individual in society
9. Yoga and the practice of yoga

Mode of Assessment

Written test, Task and Assignment

References:

1. **Stevens, N. (2008).** *Learning to Coach*. United Kingdom: Howtobooks.
2. **Rohrer, J. (2002).** *ABC of Awareness*. Oberurnen: UTD Media.
3. **Adair, J. & Allen, M. (1999).** *Time Management and Personal Development*. London: Hawksmere.
4. **Simanowitz, V. and Pearce, P. (2003).** *Personality Development*. Beckshire: Open University Press.

FOURTH YEAR - SEMESTER VIII

Edn 20: C&PS - PEDAGOGY OF SCHOOL SUBJECT I

20(i): Pedagogy of Tamil I – Part 4

தமிழ் கற்பிக்கும் முறைகள் I - part 4

Theory

Credits 4

அடிப்படைக் கோட்பாடு

மொழிப் பாடத்தில் கலைத்திட்ட வளர்ச்சிக்கான கூறுகளைக் கற்றறிந்து அவை தொடர்பான அறிவைப் பெற்றிருப்பர். சங்க கால இலக்கியங்களையும் இலக்கணங்களையும் அறிந்து அவற்றின் சிறப்புகளை அறிந்து கொள்வர். இக்கால இலக்கியங்களின் வளர்ச்சிப் போக்குகளை அறியும் திறன் பெற்றிருப்பர். தமிழ் மொழி வளர்ச்சிக்கு உரைநடை ஆசிரியர்களின் பங்களிப்பை அறிந்திருப்பர். தமிழ் மொழியின் வரலாற்று மூலங்களை அறிந்திருப்பர். கணிப்பொறியைப் பயன்படுத்தி மொழிக் கற்பித்தல் திறனைப் பெற்றிருப்பர். மறுமலர்ச்சி இலக்கியங்களின் தேவையை உணர்ந்திருப்பர்.

நோக்கங்கள்:

- கலைத்திட்ட அமைப்பினைப் புரிந்து கொள்ளச் செய்தல்.
- கற்பித்தலுக்கு முன்தயாரிப்பு முறைகளை அறியச் செய்தல்.
- இக்கால இலக்கியங்களைப் பற்றிய அறிவைப் பெறச் செய்தல்
- அடிப்படை இலக்கணங்களில் பயிற்சி பெறச் செய்தல்.
- இலக்கியத் திறனாய்வு குறித்த அறிவு பெறச் செய்தல்.
- உரைநடை ஆசிரியர்களின் மொழிநடைத் திறனை அறிய செய்தல்.
- தமிழ்மொழி வரலாற்று மூலங்களின் அறிவைப் பெறச் செய்தல்.
- கணிப்பொறி வழிக் கற்றலின் முக்கியத்துவத்தை உணர்த்துதல்.
- மறுமலர்ச்சி இலக்கியங்களை அறியச் செய்தல்.

அலகு 1: உரைநடை ஆசிரியர்கள் அறிமுகம்

உ.வே.சாமிநாதய்யர் - திரு.வி.க - மறைமலையடிகள் - இரா.பி சேதுப்பிள்ளை - அறிஞர் அண்ணா - மு.வரதராசனார்

அலகு 2: அடிப்படை இலக்கணம்

ஐவகை இலக்கணம் அறிதல் - எழுத்து - சொல் - பொருள் - யாப்பு - அணி (6 ஆம் வகுப்பு முதல் 10 வகுப்பு வரை)

அலகு 3: தமிழ் வரலாற்று மூலங்கள்

செப்பேடுகள் - ஓலைச்சுவடிகள்- அகழ்வராய்ச்சிகள்- கல்வெட்டுகள்- உரையாசிரியர்கள்- வெளிநாட்டார் எழுதிய குறிப்புகள்.

அலகு 4: மொழியும் கணிப்பொறியும்

கற்பித்தலில் கணிப்பொறியின் தேவை - பதிப்புத் துறையில் கணினியின் பங்களிப்பு - தமிழ் மென்பொருள் - தமிழ் இணையம் - தமிழ் இணையப் பல்கலைக்கழகம்- இணையச் செயல்பாடுகள் - மின் கற்றல்- தொலைவிண்ணரங்கம்- செயற்கைக்கோள் வழி மொழிக் கற்றல்- பல்லாடகத்தின் பங்களிப்பு.

அலகு 5: மறுமலர்ச்சி இலக்கியங்கள்

காந்தியம் - மார்க்சியம் - தலித்தியம் - பெண்ணியம் - மூன்றாம் பாலின இலக்கியங்கள்-
வரையறை - இலக்கிய பங்களிப்பு

கற்பிக்கும் முறைகள்

விரிவுரை, கலந்துரையாடல், மாணவர் கருத்தரங்கம், ஒப்பார்குழு விவாதம், குழுக் கற்பித்தல், செய்துகாட்டல், பதாகை வழிக் கற்பித்தல், செய்து கற்றல், ஆய்வரங்கம், பணிமனை, செயல்திட்டக் கற்பித்தல், விதிவருமுறை, விதிவிளக்குமுறை, விளையாட்டுமுறை, கணினி வழிக் கற்பித்தல், இணையம் வழிக் கற்பித்தல், பாடல் மூலம், நாடகம் மூலம் கற்பித்தல், சொற்பொழிவு, சிறப்புச் சொற்பொழிவு, காட்சிக் கேள்விக் கருவிகள் மூலம் கற்பித்தல், மொழிப்பயிற்றாய்வுக் கூடம் வழிக் கற்பித்தல்.

மதிப்பீடு:

வகுப்புத் தேர்வு, வாய்மொழித் தேர்வு, ஒப்படைப்புகள், வகுப்புக் கருத்தரங்கம், மாதிரிப் பாடம் எடுத்தல். வகுப்பில் மாணவர்கள் பங்கேற்பை மதிப்பிடல்

செய்முறைப் பயிற்சிகள்:

1. வினாடி வினா தயாரித்தல்.
2. கணினி உதவியுடன் பாடக் குறிப்புத் தயாரித்தல்.
3. ஏதாவது ஒரு படைப்பைத் திறனாய்வு செய்தல் (காந்தியம், மார்க்சியம், தலித்தியம், பெண்ணியம், மூன்றாம் பாலினம்)
4. பாடத்திட்ட நோக்கில் பாடநூலை ஆய்வு செய்தல்.

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20(ii): Pedagogy of English I – Part 4**Theory****Credits 4****Essence of the course:**

To have qualitative improvement in English language teaching the present course is designed. The English teacher should have strong content knowledge and also methodology of teaching in English. This teaching of English at the school level is given a very high importance in the globalization of process of education and economics. The fluency in English is helping the school student get employment opportunities as well as for further academic courses. Teacher as a facilitator helps learners to construct their knowledge. The teacher should be able to participate meaningfully to transact the syllabus and textbooks effectively along with teaching– learning materials. Therefore, the student teacher should be well-versed not only with the subject content but also with the pedagogy of learning. This course is visualized as a range of language based activities, which will aid in strengthening the ability to 'read', 'think', 'discuss and communicate' as well as to 'write' in the language of instruction.

Objectives:**At the end of the course, the student teacher will be able to**

- acquire knowledge of current trends in teaching of English
- acquaint with the techniques of oral presentation and practice of language items.
- understand the structure of English language and components skills
- improve proficiency level in using-English for utilitarian purposes
- familiarize student teachers with the text book contents related to high school and Higher Secondary classes.
- acquire good pronunciation and fluency of speech
- help student teachers acquire a working knowledge of the grammatical terminology and the grammatical system in English.
- develop the writing skill of the trainees.
- analyze the units of English text book of 8 & 9th standard.
- acquaint with the preparation of various learning aids in English.

CONTENT OUTLINE**Unit 1: Developing Fluency**

Use of conventional formulae – greeting, apology, invitation, refusal, accepting, thanking – reading aloud prose passages and poems – describing and interpreting pictures, tables, graphs, maps etc. telling stories and narration incidents.

Unit 2: Communicative Activities

Communicative games, dialogues, role play, play reading, dramatization, debates, interviews, extempore speeches.

Unit 3: Language and literature

Literature in the school curriculum: Needs and objectives- Teaching of different forms of English literature: prose, poetry, drama –Indian Writers in English: R.K Narayan, Sarojini Naidu and Tagore.

Unit 4: Language Translation

Translation as a creative activity: Importance and need- Translation tools- Analyze any one translation text into English from different Indian languages.

Unit 5: Media Perspective of Language

Print Media - Newspaper Language, Radio and TV language- Language of advertisement
Social Networking and Language- Educational scope of social networking sites (face book, twitter, you tube, what's app) Blogging and E-Learning.

Mode of Transaction:

Discussion, Lecture, Demonstration of content analysis, Demonstration of teaching specific, grammar items, Seminar on different expressions, Narration, anecdotes of great personalities, Web based resources, Use of flash cards, Presentation of common errors through illustrations, Situation based error identification, Presentation of translation work

Practicum: Task and Assignemnt

1. Review of any one novel and two short stories.
2. Practice in black board sketches for the purpose of introducing new items.
3. Creative writing-Dialogues, Expansion of ideas, paraphrasing, precise writing, short stories and letter writing.
4. Report on the teaching of composition to the second language learners and suggest their weaknesses.

Mode of assessment

Analysis of Group discussion, Assessment of expressing ideas and thoughts through suitable examples, Monitoring performance of communicative tasks, Evaluation based on documentation (written), Performance evaluation(Seminar, Assignment &Project), Feedback

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20(iii): Pedagogy of Hindi I – Part 4

Theory

Credits 4

पृष्ठभूमि:

राष्ट्रीय पाठ्यचर्यारूपरेखा 2005 तथा शिक्षा का अधिकार एक्ट 2009 विद्यालयी शिक्षा तथा शिक्षण प्रशिक्षण के निकट संबंधों को ध्यान में रखते हुए शिक्षक की भूमिका में एक बहुत बड़े परिवर्तन की माँग करती है। पाठ्यचर्या में अभी तक शिक्षक को ही ज्ञान के स्रोत के रूप में केन्द्रीय स्थान मिलता रहा है, वह सीखने-सिखाने की समूची प्रक्रिया के संरक्षक और प्रबंधक के रूप में मुख्य भूमिका निभाने का काम करते आए हैं। पर 2005 की स्कूली पाठ्यचर्या उनसे माँग करती है कि वे सूचनाओं के वितरक और ज्ञान के स्रोत बन कर न रहें बल्कि विद्यार्थियों द्वारा ज्ञान हासिल करने की प्रक्रिया में स्वयं को सहायक मानें। इन सब परिवर्तनों को उनके व्यवहार का हिस्सा बनाने के लिए ज़रूरी है कि अध्यापक शिक्षा के पाठ्यक्रम में परिवर्तन आए। विद्यालयी शिक्षा व्यवस्था में परिवर्तन की पहल तभी संभव है जब इस व्यवस्था से जुड़े लोगों की सोच और दृष्टिकोण में परिवर्तन आए और शिक्षक की भूमिका इस व्यवस्था में सबसे महत्वपूर्ण है। इस दृष्टि से भाषा-शिक्षण का पाठ्यक्रम और भी महत्वपूर्ण हो जाता है, क्योंकि भाषा पूरी शिक्षा की आधारशिला का काम करती है, जहाँ सिर्फ भाषा पढ़ना-सीखना नहीं बल्कि भाषा के द्वारा अन्य विषयों में भी निपुणता प्राप्त करने की बात आती है। इसके साथ ही भाषा से जुड़े नए बिन्दु आते हैं जैसे - बहुभाषिक कक्षा, समझ का माध्यम, शांति की शिक्षा में भाषा की भूमिका आदि की समझ शिक्षक के लिए ज़रूरी है जो अध्यापक शिक्षा में व्यापक बदलाव की माँग करते हैं।

वर्तमान पाठ्यक्रम भाषा के नए सरोकारों और सीखने-सिखाने की नई दृष्टियों को ध्यान में रखकर तैयार किया गया है। आशा है कि शिक्षक प्रशिक्षणार्थियों को इससे भाषा-शिक्षण की तैयारी में सहायता मिलेगी।

पाठ्यक्रम के विशेष उद्देश्य

- भाषा की अलग-अलग भूमिकाओं को जानना
- भाषा सीखने की सृजनात्मक प्रक्रिया को जानना
- भाषा के स्वरूप और व्यवस्था को समझना
- स्कूल की भाषा, बच्चों की भाषा और समझ के बीच के संबंध को जानना
- भाषा के संदर्भ में पढ़ने के अधिकार, शांति और पर्यावरण के प्रति सचेत होना
- भाषा सीखने के तरीके और प्रक्रिया को जानना और समझना
- पाठ्यचर्या, पाठ्यक्रम और पाठ्यपुस्तक का विश्लेषण कर कक्षा विशेष और बच्चों की समझ के अनुसार ढालना
- भाषा और साहित्य के संबंध को जानना
- हिंदी भाषा के विविध रूपों और अभिव्यक्तियों को जानना
- भावों और विचारों की स्वतंत्र अभिव्यक्ति करना
- भाषायी बारीकियों के प्रति संवेदनशील होना
- अनुवाद के महत्व और भूमिका को जानना
- विद्यार्थियों की सृजनात्मक क्षमता को पहचानना
- बच्चों के भाषायी विकास के प्रति समझ बनाना और उसे समुन्नत करने के लिए विद्यालय में तरह-तरह के मौके जुटाना
- भाषा के मूल्यांकन की प्रक्रिया को जानना
- साहित्यिक और गैर साहित्यिक मौलिक रचनाओं की समझ और सराहना
- भाषा सीखने-सिखाने के सृजनात्मक दृष्टिकोण को समझना

इकाई 1: शब्द और शब्द रचना, शब्द और उसके प्रकार

1. अर्थ की दृष्टि से (एकार्थी, अनेकार्थी, पर्यायवाची, विलोम)

2. प्रयोग की दृष्टि से (सामान्य, तकनीकी)
3. इतिहास की दृष्टि से (तत्सम, तद्भव, देशज और विदेशी)
4. उपसर्ग, प्रत्यय, संधि और समास की अवधारणाएँ तथा शब्द रचना म. उनकी भूमिका, उनके प्रकार और प्रयोग

इकाई 2: हिन्दी की लिपि और वर्तनी का परिचय

1. देवनागरी लिपि का उद्भव और विकास
2. देवनागरी लिपि की वैज्ञानिकता, विशेषताएँ तथा कमियाँ
3. वर्णों का मानक रूप
4. वर्तनी, वर्तनी के नियम, वर्तनी संबंधी त्रुटियाँ. के सुधार संबंधी उपाय

इकाई 3: हिन्दी भाषा का उद्भव और विकास

1. संपर्क भाषा, राजभाषा और राष्ट्रभाषा के रूप म. हिन्दी
2. व्याकरण शिक्षण - व्याकरण का अर्थ, महत्व, भाषा म. स्थान, शिक्षण के उद्देश्य एवं पाठ-योजना

इकाई 4: भाषा शिक्षण संबंधी विविध युक्तियाँ

1. स्वाद
2. अभिनय
3. वाद-विवाद
4. साक्षात्कार
5. भाषा शिक्षण म. व्यावहारिक शब्द वाक्या. के प्रयोग संबंधी ज्ञान जैसे - क्षमा याचना, आमंत्रण देने एवं अस्वीकार करने धन्यवाद ज्ञापन आदि

इकाई 5: पाठ-नियोजन एवं अभ्यास**सिखाने का माध्यम**

व्याख्यान -समूहिक चर्चा -निदर्शन एवं सामग्री विश्लेषण -विचारगोष्ठी - विभिन्न साहित्यकाराए लेखका. एवं कविया. के विषय म. चर्चाएँ -पुस्तकालय संसाधना. का उपयोग -भाषा प्रयोगशाला -वीडियो क्लिप्स का प्रयोग -दृश्य-श्रव्य पाठा. के माध्यम से सूक्ष्म शिक्षण -व्याकरण प्रकरणा. के शिक्षण हेतु पावर प्वाइंट प्रस्तुतीकरण -पाठ योजना प्रस्तुतीकरण -अन्तर्सक्रिय सत्र -प्रश्न पत्र निर्माण, मूल्यांकन एवं विश्लेषण -शब्दकोष तथा ऑन लाइन संदर्भ

प्रायोगिक कार्य

विश्वस्तर पर हिन्दी की उपयुक्तता एवं उपयोगिता पर विचारगोष्ठी - मौखिक एवं लेखन अभिव्यक्ति गतिविधियाँ -मुहावरे, लोकोक्तिया. का प्रयोग करते हुए कहानी, लेख आदि लिखवाना -विषयवस्तु आधारित अभ्यास -सूक्ष्म एवं व्यापक पाठ योजनाए. बनाना -पावर प्वाइंट प्रस्तुतीकरण - दृश्य-श्रव्य सामग्री का निर्माण - ब्लूप्रिंट, प्रश्न-पत्र, अंकयोजना तथा प्रश्नानुसार विश्लेषण - विषय वस्तु परीक्षण तथा उपलब्धि परीक्षण की संरचना - परीक्षण आंकड़ा. का प्रस्तुतीकरण - पाठ से संबंधित प्रायोगिक कार्य

मूल्यांकन के माध्यम

सामूहिक चर्चा का विश्लेषण – स्व मूल्यांकन तथा निकट समूह मूल्यांकन – उपलब्धि मूल्यांकन – अभिलेखन एवं अभिव्यक्ति आधारित मूल्यांकन – प्रत्यक्ष-अप्रत्यक्ष सूचना आधारित मूल्यांकन

संदर्भ-स्रोत

1. अनन्त चौधरी, नागरी लिपी और हिन्दी वर्तनी, बिहार हिन्दी ग्रन्थ अकादमी, पटना।
2. के० क्षत्रिया, मात्रभाषा शिक्षण, विनोद पुस्तक मंदिर, आगरा।
3. के० जी० रस्तोगी, भाषा सम्प्राप्ति मूल्यांकन, केन्द्रीय हिन्दी संस्थान, आगरा।
4. के० के० सुखिया, हिन्दी ध्वनियाँ और उनका शिक्षण, रामनारायण लाल, इलाहाबाद।
5. जयनारायण कौशिक, हिन्दी शिक्षण, हरियाणा साहित्य अकादमी, चण्डीगढ़।
6. जयनारायण कौशिक एवं विमला कौशिक, पाठ-योजना निर्देशिका हिन्दी शिक्षण, आर्य बुक डिपो, करोलबाग, नई दिल्ली।
7. जयनारायण कौशिक, शुद्ध हिन्दी लेखन, आर्य बुक डिपो, करोलबाग, नई दिल्ली।
8. निरंजन कुमार सिंह, माध्यमिक विद्यालयों में हिन्दी शिक्षण, राजस्थान ग्रंथ अकादमी, जयपुर।
9. भगवती प्रसाद शुक्ल, हिन्दी उच्चारण और वर्तनी, आर्य बुक डिपो, करोलबाग, नई दिल्ली।
10. भोलानाथ तिवारी, भाषा विज्ञान, किताब महल, इलाहाबाद।
11. भोलानाथ तिवारी तथा कैलाश भाटिया, हिन्दी शिक्षण, लिपी प्रकाशन, दिल्ली।
12. योगेन्द्रजीत, हिन्दी भाषा शिक्षण, विनोद पुस्तक मंदिर, आगरा।
13. रघुनाथ सफाया, हिन्दी शिक्षण, पंजाब किताब घर, जालंधर।
14. रमन बिहारी लाल, हिन्दी शिक्षण, रस्तोगी पब्लिकेशन, मेरठ।
15. रामशकल पांडेय, हिन्दी शिक्षण, विनोद पुस्तक मंदिर, आगरा।
16. लक्ष्मीनारायण शर्मा, भाषा की शिक्षण विधियाँ एवं पाठ-नियोजन, विनोद पुस्तक मंदिर, आगरा।
17. वैद्यनाथ प्रसाद वर्मा, बिहार हिन्दी ग्रन्थ अकादमी, पटना।
18. सीताराम चतुर्वेदी, भाषा की शिक्षा, हिन्दी साहित्य कुटीर, वाराणसी।
19. सावित्री सिंह, हिन्दी शिक्षण, लायल बुक डिपो, मेरठ।
20. शारदा भसीन, स्वनिम विज्ञान और हिन्दी की स्वनिम व्यवस्था, आर्य बुक डिपो, करोल बाग, नई दिल्ली।
21. हरिदेव बिहारी, व्यवहारिक हिन्दी व्याकरण, लोक भारतीय प्रकाशन, इलाहाबाद।

20(vi): Pedagogy of Malayalam I – Part 4**Theory****Credits 4****Essence of the course:**

Malayalam is the medium for comprehending ideas, for reflection and thinking, as well as for expression and communication. This course deals with aims and objectives of teaching Malayalam. It includes activities for developing fluency in language, learning process and practical experience. It also opens a gateway to Malayalam literature with special reference to prominent contributors in the language.

Objectives:**At the end of the course, the student teacher will be able**

- To understand the aims and objectives of teaching Malayalam
- To develop fluency and discourse oriented presentation
- To get acquainted with the student, learning process and acquire practical experience in creating conducive environment for effective learning
- To contribute to enrich Malayalam Literature.
- To understand Functional Malayalam
- To get acquainted with Planning of Instruction based on theories of Learning.
- To get acquainted with instruction based on Linguistics poetics, vocabulary, grammar and composition.
- To understand the principles of organizing curriculum
- To understand the techniques of using text books, Teachers hand books and other relevant materials for transacting language curriculum.

COURSE CONTENT**Unit 1: Functional Malayalam**

Punctuation, spacing, footnote, index, note taking, note making, summary, description, bio data, paraphrase, advertisement, brochures, pamphlets, posters, minutes, notice and notification, ambiguous words, government orders, amendments, references, gazette certificates, language in revenue documents, official terminology.

Unit 2: Planning of Instruction based on theories of Learning

Need and significance of Planning - Planning of Instruction - Year plan - Unit plan - Lesson plan (teaching manual) - Techniques and theories of developing year plan, unit plan and lesson plan - Techniques of developing learning equipment - Techniques of implementing learning activities and its evaluation - Process and utility of maintaining response sheet of the teaching manual.

Unit 3: Linguistics poetics, vocabulary, grammar and composition

The place of linguistics in language study - Importance of poetics in language study - Aims of teaching grammar at different levels-introduction of new approaches in teaching grammar - Aims of writing composition-General principles-composition for fostering creativity - Vocabulary – selection and gradation, Types (active, passive, content and structural) - Techniques of presenting vocabulary - Vocabulary expansion techniques - Spelling – Reasons causing spelling mistakes.

Unit 4: Organizing curriculum

Curriculum – A conceptual analysis - Curriculum and syllabus - Principles of curriculum construction - Nature of language curriculum - Modern trends in curriculum construction – spiral and open ended curriculum.

Unit 5: Teachers hand books

Importance and significance of resource materials for teaching-learning process - Techniques of using teacher's hand book, periodicals, magazines, handouts, books, and other local resources as learning materials - Techniques of using text books (prose and poetry) as learning materials.

Mode of Transaction:

Dialogue, seminars, discussions, and group-work

Practicum: Task and Assignment

1. Preparation of an album about life and literature of some prominent writers in Malayalam.
2. An analytical study of the grammar and vocabulary in textbooks used in schools from standard VIII to standard X.

Mode of assessment:

Written test and Task and assignment

References:

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4. Parameswaran Nair. P.K – Malayala Sahithya Charithram
5. Raghavan Payyanad – Folklore
6. Balasahithyam Thatwavum Charithravum – State Institute of Children Literature
7. Sahithya Charithram, Prasthanangaliloode – National Book Stall, Kottayam.
8. Raman Nair. K.P – Aksharaslokavum Kavyakeliyum oru padanam
9. Iranjyam Ravi – Malayala Vyakarana Nighandu
10. Adhunika Bhasha Sastram – K.M. Prabakaravariar
11. Bhashayum Manasastravum – K.M. Prabakaravariar
12. Malayala Bhashadhyapanam – Erumeli Parameswaran Pillai.
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20(v): Pedagogy of Telugu I – Part 4

Theory

Credits 4

Essence of the course:

Objectives:

CONTENT OUTLINE

Mode of Transaction

Practicum: Task and Assignment

Mode of Assessment

References:

Syllabus yet to be prepared for Pedagogy of Telugu I – Part 4.

20(vi): Pedagogy of French I – Part 4

Theory

Credits 4

Essence of the course:

Equipping the student with French knowledge for communication. Learning the different approaches to teach French at schools. Learning to use the ICT tools for education in foreign language classroom. The course focuses on developing the ability of the future teachers to transact language in inclusive classroom.

Objectives:

At the end of the course, the student teacher will be able to

- develop French Language teaching competency.
- understand and appreciate the importance of French.
- have a critical study of learning French as a second language in the multilingual Indian Society.
- understand the role of French in India and to improve French Language attainment.
- produce the different methods, techniques and strategies of teaching French.
- prepare and use appropriate teaching aids to make teaching more effective.
- develop the various micro skills to teach French language.
- acquire the skill of preparing lesson plans to teach French.

CONTENT OUTLINE**Unit 1: Technology resources for French language teaching**

Outils traditionnels: Magnétophone, radio, télévision Outils TICE modernes: Apprentissage Web, Tableau blanc interactif, Espace numérique de travail

Unit 2 : Teaching of Culture

Terme « Interculture », « Interculturel », « Co-culturel » - compétence interculturelle - Stereotypes culturels en didactique des langues

Prescribed book : Manuel de formation pratique. P. 147-150, 154-155

Unit 3: Challenges in teaching French language

Problèmes qui surviennent lors de l'enseignement aux écoles indiennes. Difficultés affrontées par les enseignants de français et les suggestions pour résoudre ces problèmes

Unit 4: Analysis of syllabus, textual materials and professional competency of French teachers

Comprendre la relation entre le curriculum, syllabus et livre de texte. Qualités d'un bon texte Sélection du manuel - des matériaux -Développement des activités et tâches.

Unit 5: Assessment and evaluation in French

Concept de l'évaluation. Types d'évaluation – « Achievement Test », essais d'aptitude, tests diagnostiques, pronostiques. -préparation d'un « Achievement Test » -Concept et nécessité des cours de rattrapage.

Mode of Transaction:

Use of multimedia resources, Library resources, Accessing Online input on the topic, Print versions of texts focusing on communication, Usage of ICT, Introductory lecture, Micro-teaching

through video lessons, Lesson Plan preparation, Demonstration, Mind mapping, Small group discussions, Dictionary and Online referencing, Language Lab activities

Practicum: Task and assignment

1. Language games on grammatical structure
2. Dramatization and miming.
3. Project on formation of new words
4. Planning of 10 vocabulary building exercises and techniques to teach the students in the classroom.
5. Assignments & Library work
6. Preparation of audio visual aids(PPT, Charts, Models)
7. Listening to radio news and responding to questions.

Mode of Assessment:

Evaluation based on documentation (written) – Address the level of pupil involvement in Group Discussion – Performance evaluation (seminar, project and assignment) – Monitor the ability to distinguish between similar concepts – Use of Checklist to monitor, rate performance in each skill – Monitoring performance of communicative tasks

References:

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20(vii): Pedagogy of Mathematics I – Part 4**Theory****Credits 4****Essence of the course:**

This course is to enable students to specialize in Mathematics and to develop an understanding of the curriculum, linking school knowledge with community life. The course includes reconstruction of Mathematical Knowledge through appropriate pedagogic processes and to communicate meaningfully with children.

Objectives:

At the end of the course, the student teacher will be able to

- acquire the knowledge of competence in teaching Mathematics
- develop clear perception of the Secondary School Mathematics.
- develop awareness of recent trends and principles of construction of Mathematics curriculum.
- know the importance of computers in teaching and learning of Mathematics
- understand the various psychological aspects involved in teaching Mathematics
- know the importance of aesthetic and recreational Mathematics
- develop an understanding of resources of teaching and learning Mathematics.
- help the student teacher for the professional self-development
- enable the student teachers to identify gifted and slow learners in Mathematics and to meet the requirements.
- stimulate to pose and solve meaningful problems and creativity in Mathematics.
- develop insight into individual differences in learning Mathematics to cater to the needs and requirements of students.
- develop skills in construction of appropriate assessment tools for evaluating Mathematics learning

COURSE CONTENT**Unit 1: Development of Problem-Solving Ability and Creativity in Mathematics**

Meaning – Problems, Problem Solving and Problem Posing – Characteristics of a Good Problem - Problem-solving Strategies and steps in Problem Solving - Gagne's views on Problem Solving - Strategies of Mathematics Problem posing - Divergent Thinking and Creativity in Mathematics - The relation of Creativity to Problem solving and Problem Posing in Mathematics.

Unit 2: Mathematics education for all

Factors influencing the learning of Mathematics-Motivation, Perception, Attitude and Aptitude, Thinking (Divergent and Creativity), etc. - Gifted Children in Mathematics – Meaning, Characteristics and Enrichment programmes, NTSE – Mathematics Olympiad.

Unit 3: Evaluation

Construction and Use of Diagnostic test in Mathematics: Stages, Preparation of Diagnostic Chart (Error Analysis)-Co-operative and collaborative strategies: Learning together, Jigsaw technique – steps -Meaning – Test, Measurement, Assessment and evaluation- Evaluation-General Purposes – Placeof evaluation in Instruction - Types of Evaluation – Placement, Formative, Diagnostic and Summative - Characteristics of a Good Measurement tool -

Achievement test – Uses and Construction – Item Analysis - Comprehensive and Continuous Evaluation- Meaning and Functions - Statistics –Central Measures, Measures of Deviation and Graphical Representation

Unit 4: Recreational programme in learning Mathematics

Mathematics Recreational activities and Mathematics Quiz – importance and Organization. Problems: fear and failure, disappointing curriculum, crude assessment – inadequate teacher preparation- Music Mathematics.

Unit 5: Identification of learning difficulties

Identification of Learning difficulties - Slow Learners in Mathematics – Meaning, Characteristics, Reasons for Slow Learning and learning difficulties: dyslexia, dysgraphia and dyscalculia - remedial measures.

Modes of Transactions:

Lecturing on Theoretical Concepts, Logical Reasoning of Mathematical problems, Analytic and Synthetic Methods of Teaching, Project Method, Tasks and Assignments, seminars.

Learning Activities:

Learning the Content and practicing them appropriately, Oral work, drill, Review and Practicing Pedagogical Aspects for different areas of School Curriculum.

Practicum: Task and Assignment

1. Prepare remedial measures for any difficulties in learning Mathematics or prepare enrichment programmes for gifted children.
2. Create the collection of mathematical puzzles, riddles for secondary students
3. Collect the mathematical shapes and record it.
4. Search the NET about the mathematical correlation with other subjects
5. Construct any five problems that have multiple right solutions.

Mode of Assessment:

Paper-Pencil Tests, Performance tests, Formal and Informal Testing and Continuous Comprehensive Evaluation.

References:

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20(viii): Pedagogy of Physical Science I – Part 4

Theory

Credits 4

Essence of the course:

After having learning this Course, student teachers understand the nature of physical science teacher, the learner, resource material including ICT for teaching physical science and evaluation process. This course comprises, pedagogical approaches for organizing science related activities; and assessment of the learner.

The student-teachers will work with theoretical studies as well as on the field with school children from various backgrounds. They will capable to critically teach the science in their internship school and examine teaching learning processes also developing of self.

Objectives:

At the end of the course, the student teacher will be able to

- acquire knowledge about the term and concepts used in teaching physical science.
- understand nature of the learner and classroom situation.
- apply the knowledge in constructing test and developing ICT resource in teaching physical science.
- enhance skill in organizing and maintaining of physical science laboratory.
- create interest in organizing science related activities.
- develop a desirable positive attitude towards science teaching.

COURSE CONTENT**Unit 1: Laboratory as a Learning Resource**

Objectives of laboratory work – Planning laboratory work – Approaches to laboratory work – Working plan for group of students (Batch) in the laboratory –Motivating students to maintain the regular record of laboratory work – Safety in laboratories and precautionary measures.

Unit 2: Organization and Maintenance of Physical Science Laboratory

Structure and design of general, chemistry and physics laboratory– Storage of chemicals and apparatus – preparation of indent – maintenance of registers – accidents and first aids – Improvisation of apparatus – science kits and advantages.

Unit 3: Assessment of children's learning in Physical Science

Test, examination, measurement, assessment and evaluation –Continuous and Comprehensive Evaluation (CCE), objectives –Scholastic area: Formative, Summative Assessment– Co-Scholastic area, life skill – national talent search examination.

Unit 4: Tools and techniques of assessment in physical science

Purpose of assessment – tool and techniques of assessment: Project work, Field trips and field diary, Laboratory work, Concept mapping, Interview/oral test, written test including types and construction. – Recording and reporting: measurement of students' achievements, grading system and type. – Measures of central tendency – measures of variability – correlation.

Unit 5: Professional Development of Physical Science Teachers

Teaching as a profession – need for pre-service professional development programmes – special qualities of a science teacher – ethics of a teacher – need for in-service professional development programmes – opportunities for in-service professional development – reflective practice – Teacher as researcher – Action research in physical science.

Mode of transaction:

Lecture-demonstration method, Project method, Problem-solving method, CAI, Observation method (field visit/exhibition/internship), Seminar/ discussion

Practicum: Task and Assignment

1. Demonstrate the experiment to the peers in your college laboratory (Experimentation)
2. Creatively construct any 3 improvised apparatus (Exhibit).
3. Observe a school and draw general, physics and chemistry laboratory (Drawing)
4. Analyse and study continuous and comprehensive evaluation which is followed in your internship school (Report)
5. Construct a tool for an oral interview to assess the school children toward their academic interest (Survey).
6. Collect information related to in-service programme provided for professional development (Collection).

Mode of Assessment:

Written test, Task and assignment, Laboratory work, Observation

References:

1. National Council of Educational Research and Training (2013), *Pedagogy of Physical Science I & II*, New Delhi. ISBN 978-93-5007-224-0 (Part I) ISBN 978-93-5007-225-7 (Part II)
2. Radha Mohan. (2013), *Teaching of Physical Science*. Hyderabad: Neelkamal publication pvt. Ltd., ISBN 978-81-8316-204-3
3. SonikaRajan. (2012), *Methodology of Teaching Science*. New Delhi: Pearson Education. ISBN 978-81-31770-22-1
4. Vanaja, M. (2006), *Methods of teaching physical science*. Hyderabad: Neelkamal publication pvt. Ltd., ISBN 81-8316-018-0
5. Panneerselvam, A and Rajendiran, E,K. (2009), *Teaching of Physical Science*. Chennai: Shantha publishers; ISBN 978-81-86689-53-0
6. NCERT. (2006), *Elementary level syllabus vol-I*. New Delhi. ISBN 81-7450-593-8
7. Mangal, S, K. and Uma Mangal. (2009), *Essentials of Educational Technology*. New Delhi: PHI Learning Pvt. Ltd., ISBN-978-81-203-3723-7
8. Monika davar. (2012), *Teaching of science*, New Delhi: PHI Learning Pvt. Ltd., ISBN 978-81-203-4624-6 and 81-203-4624-6.
9. Central Board of Secondary Education. (2010), *Manual for Teachers on School Based Assessment Classes VI to VIII*. Delhi.
10. Jonathan Anderson. (2010), *ICT Transforming Education- A Regional Guide*. UNESCO Bangkok. ISBN 978-92-9223-325-9 ISBN 978-92-9223-326-6.
11. Henry E. Garrett. (2008), *statistics in Psychology and Education*. Delhi: Surjeet Publications.

Web Resources:

1. www.ncert.nic.in/departments/nie/desm/publication/.../phy_sci_partI.pdf
2. www.ncert.nic.in/departments/nie/desm/publication/.../phy_sci_PartII.pdf
3. <http://www.edudemic.com/how-to-use-social-media-as-a-learning-tool-in-the-classroom/>
4. UNESCO Competency Framework for Teacher
www.unesdoc.unesco.org/images/0021/002134/213475e.pdf
5. <http://www.unesco.org/new/en/unesco/themes/icts/lifelong-learning/21st-century-skills/>
6. ICT transforming education: a regional guide
<http://unesdoc.unesco.org/images/0018/001892/189216e.pdf>
7. <http://www.sciencechannel.com/games-and-interactives/newtons-laws-of-motion-interactive/>

20(xi): Pedagogy of Biological Science I – Part 4**Theory****Credits 4****Essence of the course:**

This course will introduce the student teachers to know about the advanced methods of teaching the biological science and make them to acquaint to have knowledge about conduct of practical's, critically examine teaching learning process based on activity and get insight about meta – learning. This course further seeks to be self-improving through the processes of reflection, feedback, and critical inquiry. Consequently, science teacher must help their students to understand their role within the broader social community.

Objectives:**At the end of the course, the student teachers will be able to**

- acquire knowledge about Individual learning strategies
- understand approaches of learning Biological science.
- apply the knowledge in constructing test and developing ICT resource and professional development in teaching Biological science.
- develop skill in practical work and organizing and maintaining of biological science laboratory.
- develop interest in using teaching resources and research in science education.
- develop a desirable positive attitude towards. tools and techniques of assessment of learning biological science

COURSE CONTENT:**Unit 1: Research in science education**

Types of Educational research – Status of research in science education in India – Educational research and innovation committee – utilization of science educational research

Unit 2: ICT Resources in learning bio–science

Dale's Cone of Experience (modified) – Teaching Bio–science with: audio broadcast, educational television, multimedia: audio, slideshow, animated video, simulation, games, and e–picture/poster. – Blended learning: eBooks, web, wikis, Moodle, social networking. – ICT tool used in classroom – advantages of using ICT in learning–teaching processes.

Unit 3: Professional development of biological teacher

Professional development programmes of science teacher –seminar, conferences, online sharing – members of professional organization. –Teacher as a community of learners – collaboration of school with colleges and universities and other institutions – role of reflective practice in professional development. –Teacher as a researcher – action research in biological science– Special qualities of a science teacher.

Unit 4: Exploring Learners

Identification of Diverse learners in classroom-addressing the diversity of learners in the classroom.– Motivating learners to bring their previous knowledge into classroom – involving learners in teaching learning process – encouraging learners to raise and ask questions- and its techniques.

Unit 5: Tools and techniques of assessment of learning biological science

Performance based assessment techniques – assessment of project work – assessment of participation in collaborative learning. –construction of test items (open ended and structure) and administration of tests – developing assessment frame work. – continuous and

comprehensive evaluation – assessment of experimental work. –Grading system and type – measures of central tendency – measures of variability – correlation.

Modes of transaction:

Lecture method, Assignment Method, Report writing, Field visit & Preparation of Field report, Laboratory Method, Presentation by students, Demonstration of scientific experiments.

Practicum: Task and Assignment

1. Designing and carrying out of any five simple investigation of Biology (keep it in a record).
2. Prepare a digital content (ie. Powerpoint) on any topic related to bio-science.
3. Write any one articles or science research project report. (send it for publication at student journals)
4. Visit your nearby any 2 high school and higher secondary school observe and draw Biology laboratory.
5. Arrange for a field trip and write a report

Mode of Assessment:

Observation, Report preparation & keeping Records, Assignment submissions, Seminar presentation, Article publications, student presentation.

References:

1. Arulselvi, E. (2007). Teaching of science. Chennai: Saradha Publications.
2. Brandwein, P. F. (1955). The gifted as future scientist. New York, Earcourt Dcace.
3. Central Board of Secondary Education. (2010), *Manual for Teachers on School Based Assessment Classes VI to VIII*. Delhi.
4. Jonathan Anderson. (2010), *ICT Transforming Education– A Regional Guide*. UNESCO Bangkok. ISBN 978–92–9223–325–9 ISBN 978–92–9223–326–6.
5. Mangal, S. K., &Mangal, S. (2005). Essentials of educational technology and management. Meerut: Loyal Book Depot.
6. Mangal, S, K. and Uma Mangal. (2009), Essentials of Educational Technology. New Delhi: PHI Learning Pvt. Ltd., ISBN–978–81–203–3723–7
7. Monika davar. (2012), Teaching of science, New Delhi: PHI Learning Pvt. Ltd., ISBN 978–81–203–4624–6 and 81–203–4624–6.
8. NCERT. (2006), Elementary level syllabus vol–I. New Delhi. ISBN 81–7450–593–8
9. Sharma, R. A. (2008). Technological foundation of education. Meerut: R.Lall Books Depot.
10. Sharma, R. C. (2007). Teaching of science. Delhi: Dhanpatrai publications.
11. Sharma, P.C. (2006). Modern science teaching. New Delhi: Dhanpat Rai Publications.
12. SonikaRajan. (2012), Methodology of Teaching Science. New Delhi: Pearson Education. ISBN 978–81–31770–22–1
13. Tomar, Archana (2006) Teaching of Biology, Delhi: Kalpaz publication
14. Yadav, S., & Singh, A. K. (2005). Teaching of life science. Delhi: Dominant Publications

20(x): Pedagogy of Social Science I – Part 4**Theory****Credits 4****Essence of the course:**

This course helps to sensitize the learners the relevance of social science in the current context. It makes them familiar about the techniques and approaches of teaching social science. It helps the learner well acquaint the preparation and administration of learning resources in the meaningful way. It also develops the competency in making use of appropriate assessment system to apprise the learning outcomes. This course deals about the various social issues and mould them to face the same in a plausible way.

Objectives:**At the end of the course, the student teacher will be able to**

- acquire basic knowledge and skills to analyse and transact the Social Science curriculum effectively following wide-ranging teaching
- acquire a conceptual understanding on the process of teaching and learning Social Science
- sensitise and equip student teachers to handle social issues and concerns in a responsible manner.
- Develop ability for critical and logical thinking and apply the acquired knowledge and skills in unfamiliar situations
- Acquaint with different methods, approaches and techniques of teaching social science
- Develop ability to design different evaluation tools
- Develop practical skills for analysing socio-economic, political and physical phenomena

CONTENT OUTLINE**Unit 1: Social Science Teacher**

Social Science Teacher –The profile of a competent Social Science Teacher – Characteristics, Attitude for professional development– participation in professional bodies - Role of Teacher as a National Builder – Problems of Social science Teachers

Unit 2: Social Science Text-Book

Meaning and Definition of Text book – Types of Text book – Essential features of text book – Criteria for evaluation of the Social Science Text book – Qualities of Good Text book

Unit 3: Co-curricular activities in Social Science

Co-curricular activities for developing critical thinking and attitude, planning and organization of activities like exhibition, quiz, competition, Panel discussion and Social science club.

Unit 4: Remedial Teaching in Social Science

Diagnostic Test – Meaning and Definition of Remedial Teaching – relevance of remedial teaching – procedure for remedial work – Remedial strategies of Social Science Teaching

Unit 5: Social Science Laboratory: Design and Management

Principles of designing the Social Science laboratory for secondary schools; location, norms with reference to lighting, ventilation, working space and flexibility – store room, community corner, preparation room.

Mode of Transaction

Lecture cum discussion, Problem Solving, Dramatization, Seminar, Field visit, Debate, Group Discussion.

Practicum: Task and Assignment

1. Organizing Awareness campaign or Rally.
2. Conducting educational survey of a slum area in a neighbouring village
3. preparation of report on social customs, traditions, and supercilious beliefs

Mode of Assessment

Unit test, Project, Preparation of assignments, Assessment of Learning Resources, Seminar Presentation.

References:

1. Aggarwal J.C., Teaching of Social Studies, Vikas Publishing House, New Delhi, Third Edition:1999,
2. Bank James A (1977) Teaching Strategies for the Social Studies: Enquiry, Valuing and Decision Making, Addition –Wesley Publishing Co., Reading, Massachusetts.
3. Binning and Binning (1952) Teaching of Social Studies in Secondary Schools, Mc Graw Hills, New York
4. Dhamija Neelam (1993) Multimedia Approaches in Teaching Social Studies, Harmen Publishing House, New Delhi
5. Dhaskara Rao.D., Teaching of Social Studies, Discovery Publication House, New Delhi,2003.
6. Khan.M.A., Teaching of Social Studies, Commonwealth Publication, New Delhi, 2004.
7. Kocha S K (1970) Fundamentals of Teaching Social Studies, Mahendra Capital Publishers
8. Sharma R. A., Teaching of Social Science, Surya Publishing House, Meerut, First Edion:2004.
9. Sharma.R.K., Teaching of Social Studies, International Publication House, Meerut, 2004.
10. UNESCO: New Source Book for Teaching of Geography, UNESCO
11. Yagnik K S (1966) The Teaching of Social Studies in India, Bombay, Orient Longman Ltd.
12. Yagnik K S (1966) The Teaching of Social Studies in India, Bombay, Orient Longman Ltd.

20(xi): Pedagogy of Computer Science I – Part 4**Credit: 4****Essence of the course:**

This course is to enable students to specialize in Computer science and to develop an understanding of the curriculum, linking school knowledge with community life. The course includes reconstruction of Computer Knowledge through appropriate pedagogic processes and to communicate meaningfully with children

Objectives:

At the end of the course, the student teacher will be able to

- enable the student teachers acquire knowledge about Informational Communicational Technology in Education
- develop an understanding about the Internet and Its applications
- guide the student teachers about planning and maintaining the Computer laboratories
- familiarize the student teachers with the Modern Trends in Teaching of Computer Science
- enable the student teachers acquire knowledge about blended learning and its models
- familiarize the student teachers with the multimedia, web designing, and Computer programming

CONTENT OUTLINE**Unit 1: Modern Techniques in the Teaching of Computer Science**

Seminar – Symposium – Group Discussion – Panel discussion – Workshop techniques – Collaborative learning – Team teaching;
Portfolio – Electronic Portfolio – Equipment for creating portfolio – Features of an Electronic portfolio – Developing Electronic portfolio – Requirements and Advantages of Electronic portfolio;

Unit 2: Multimedia in Education

Introduction – Multimedia application – Elements: Sound, Animation and Video animation – 3D animation – popular multimedia formats – Multimedia hardware and software – Inline sound and video – Using multimedia elements in content.

Unit 3: Fundamentals of C and C++ Programming

Elements of C language: Character Set – C Constant – C variables, Operators, Control structures – Loop structures – arrays and structures – functions – library functions – developing simple C programs; C++ Programming Concepts: Class, objects, Inheritance, Polymorphism and Overloading.

Unit 4: Web pages and Web Designing

Introduction – Elements of Hyper Text Markup Language (HTML) – Heading Section – Body Section – Hyperlink and Images – Creating web page with Microsoft front page – Websites – Elements – Difference between websites and Blog..

Unit 5: Computer Science Teacher and Evaluation

Academic and Professional qualification of Computer Science Teachers – Special qualities required for a computer science teacher; Evaluation by pupils and Self-evaluation – Classroom interaction analysis;

Mode of Transaction:

Lecturing on Theoretical Concepts, use of computers in lab, Analytic and Synthetic Methods of Teaching, Project Method, Tasks and Assignments

Practicum: Task and Assignment

9. Develop the Multimedia package (Any one lesson at secondary or senior secondary level)
10. Create an Educational Blog (Individually)
11. Draw the Computer based Concept maps
12. Prepare self-blended learning module
13. Write a C programme – Students Mark list using array
14. Create a simple website for your class (Upload: Assignment, Exam details, Study materials)
15. Organize the Team Teaching among student trainees
16. Prepare the rating scale for self- Assessment of student teachers (use during the teaching practice)

Mode of Assessment

Paper-Pencil Tests, Performance tests, Formal and Informal Testing and Continuous Comprehensive Evaluation

References:

11. Aggarwal J.C (2006). Essential of educational technology: innovation in Teaching-Learning. New Delhi: Vikas Publishing House.
12. Asokek. Ghosh (2001), Microsoft Web Publishing, New Delhi, Prentice Hall of India.
13. Arulsamy S. and Sivakumar.P, (2002). Application of ICT in Education, Hyderabad: Neelkamal Publication.
14. Balagurusamy E. (2011). Programming C (Fifth Edition). New Delhi: Tata McGra Hill Education Private Limited.
15. Burry Nance (1996). Introduction to Networking. New Delhi: Prentice Hall of India.
16. Harjeet Kaur Bhatia (2012). Reflections on blended learning and peer collaboration in Teacher Education, New Delhi: Global books organisation.
17. Mangal S.K. Mangal Uma. (2012). Essential of educational technology. New Delhi: PHI publication.
18. Nehru R.S.S. (2014). Blended learning, New Delhi: APH Publishing House.
19. Sampath et. al (2000). Introduction to Education Technology. New Delhi: Sterling Publishers.
20. Yashavant P. Kanetkar (2010). Let Us C (Tenth Edition). New Delhi: BPB Publications

Edn 21: C&PS - PEDAGOGY OF SCHOOL SUBJECT II

21(i): Pedagogy of Tamil II – Part 4

தமிழ் கற்பிக்கும் முறைகள் II - பகுதி 4

Theory

Credits 4

அடிப்படைக் கோட்பாடு

சமூகத்தில் மொழியின் அவசியத்தையும் பங்களிப்பையும் பற்றிய அறிவினைப் பெற்றிருப்பர். இன்றைக்கு மொழியும் அறிவியலும் ஒன்றுக் கொன்று தொடர்புடையதாக உள்ளதை அறிந்திருப்பர். மொழியைக் கற்பிக்கும், கருவி நூலாக உள்ள, பாடநூல் எவ்வாறு அமைந்திருக்க வேண்டும் என்பதை மாணவர் அறிந்திருப்பர். நம்மை மற்றவரோடு தொடர்புபடுத்திக் கொள்வதற்கு கருவியாக அமைந்துள்ள மொழியாய்வகம் பற்றி அறிவைப் பெற்றிருப்பர். மனக் கருத்துக்களை வெளிப்படுத்தும் முறைகளில் ஒன்றான கட்டுரை எழுதும் அறிவைப் பெற்றிருப்பர். மொழிப் பயிற்சிப் பற்றிய சிந்தனைகளையும் பெற்றிருப்பர். மொழிப்பாடம் கற்பித்தலுக்குத் தற்காலத்திற்கேற்ற வகையில் கற்பித்தல் புதுமைகளை வெளிக் கொணரும் அறிவைப் பெற்றிருப்பர். மொழிப்பாடம் திறன்பாடம் என்பதால் படைப்பாற்றலை வளர்த்துக்கொள்ளும் திறனைப் பெற்றிருப்பர்.

நோக்கங்கள்:

- சமுதாயத்தில் மொழியின் செயல்பாட்டினை அறிய செய்தல்.
- பாடநூல் குறித்த அறிவைத் தருதல்.
- மொழிப் பயிற்றாய்வுக் கூடம் குறித்து அறியச் செய்தல்.
- வினாத்தாள் வடிவமைப்புப் பற்றிய அறிவைப் பெறச் செய்தல்.
- கட்டுரை எழுதும் திறன் பெறச் செய்தல்.
- படைப்பாற்றலை வளர்ப்பதற்கான பல்வேறு வழிமுறைகளை அறியச் செய்தல்.
- தமிழில் ஆய்வுகள் குறித்த அடிப்படைச் செய்திகளை உணர்த்துதல்.

அலகு 1: தமிழ் கற்பித்தலின் ஆய்வுகள்

ஆய்வின் இயல்புகள் - நோக்கங்கள் - ஆய்வின் தேவை - ஆய்வின் வகைகள் - ஆய்வுச் சிந்தனைகள் - பண்புகள்

அலகு 2: தமிழ் கற்பித்தலின் புதுமைகள்

கருத்துப் படமிடல்- கூட்டுமுயற்சி திட்டம் - பிரச்சனை தீர்க்கும் முறை - ஒப்புமைக் கற்றல் - விசாரணை அணுகுமுறை - பரிசோதனை - குழுக்கற்றல் - தனிமைப் படுத்திக் கற்றல்.

அலகு 3: படைப்பாற்றல் வளர்த்தல்

கதை - கட்டுரை - இலக்கிய மன்றங்கள் - ஆண்டு மலர் - உடனடிப் பேச்சு - விவாதம் - வினாடி வினா, இவைகளை பள்ளிகளில் நடத்துவதற்கான பயிற்சியை மேற்கொள்ளுதல் - இன்றைய சிந்தனை - நடைமுறைத் திறனை உருவாக்குதல்.

அலகு 4: கல்விப் புள்ளியல்

புள்ளியியல் வரையறை - மையப்போக்கு அளவைகள் - சராசரி - இடைநிலை அளவு - முகடு - சிதறல் அளவைகள் - வீச்சு - கால்மான விலக்கம் - சராசரி விலக்கம் - திட்டவிலக்கம் - ஒட்டுறவு.

அலகு 5: மதிப்பீட்டு முறைகள்

மதிப்பீட்டின் நோக்கம் -தேவைகள்- வினாத்தாள் வடிவமைப்பு- தேர்வின் வகைகள்- வளர்நிலை- தொகுநிலை- அகமதிப்பீடு, புறமதிப்பீடு -ஆசிரியரால் நடத்தப்படும் தேர்வு- தரப்படுத்தப்பட்டத் தேர்வு- குறையறித் தேர்வு- குறைத்தீர்த் தேர்வு - தேர்வின் பண்புகள்- வினாவங்கியின் பயன்கள்.

மதிப்பீடு

வகுப்புத் தேர்வு, வாய்மொழித் தேர்வு, ஒப்படைப்புகள், வகுப்புக் கருத்தரங்கம், மாதிரிப் பாடம் எடுத்தல். வகுப்பில் மாணவர்கள் பங்கேற்பை மதிப்பிடல்.

செய்முறைப் பயிற்சிகள்:

1. பாடநூல் ஆய்வு செய்தல்.
2. ஒலி உச்சரிப்புப் பயிற்சி.
3. சுற்றுச்சூழல் விழிப்புணர்வு வாசகங்கள் தயாரித்தல்.
4. வானொலி, தொலைக்காட்சி நிகழ்ச்சிகள் தயாரித்தல்.
5. செய்யுள் பகுதியை நாடகமாக மாற்றுவதல்.

பார்வை நூல்கள்

1. இரத்தின சபாபதி & இரேணு பத்மா, இர. 2008. வினாக்களின் விரிசல்கள், சாந்தா பப்ளிஷர்ஸ், சென்னை.
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21(ii): Pedagogy of English II – Part 4**Theory****Credits 4****Essence of the course:**

Equipping the student teacher with English knowledge for communication and appreciation. Developing the skill of communication in order to help children at various school levels towards effective communication. The course focuses on developing the ability of the future Teachers to transact language in inclusive classroom.

Objectives:**At the end of the course, the student teacher will be able to**

- develop English Language teaching competency.
- understand and appreciate the importance of English.
- have a critical study of learning English as a second language in the multilingual Indian Society.
- understand the role of English in India and to improve English Language attainment.
- produce the different methods, techniques and strategies of ELT.
- Prepare and use appropriate teaching aids to make teaching more effective.
- develop the various micro skills to teach English language.
- acquire the skill of preparing lesson plans to teach English.

CONTENT OUTLINE**Unit 1: Skill of speaking**

Concept of speaking in English as a second language. - Use of pronouncing dictionary- Technique of teaching speaking skills and pronunciation practice and drills – Ear Training, Repetition, Dialogues and conversation: Role of A.V. aids in teaching speaking skills.

Unit 2: Skill of writing

Mechanics of writing; Skills of writing- Discourse skill and Judgment Skill Reference skills- note making and note taking, reporting, summarizing, paragraphing, Characteristics of good hand writing, methods to develop good handwriting.

Unit 3: Challenges of teaching English language

Problems cropped up while teaching English in Indian schools - Difficulties faced by English teachers in the classrooms and suggestions to overcome them. Interference and influence of mother tongue.

Unit 4: Analysis of syllabus, textual materials and professional competency of English teachers

Understanding the relationship between curriculum, syllabus and text book. Qualities of a good text book- Selection of materials -Development of activities and tasks. Connecting learning to the outer world – rote learning to constructivism- Qualities of a good language teacher- Professional development of English teacher.

Unit 5: Assessment and evaluation in English

Concept of assessment and Evaluation in English- Concept, need and techniques of Continuous and Comprehensive Evaluation (CCE) in English- Types of tests - Achievement test,

proficiency test, Diagnostic test, Prognostic test.-Preparation of an Achievement test- Concept and need of remedial teaching.

Mode of Transaction:

Demonstration of teaching specific grammar items, Seminar on different expressions, Comparative study of various forms of compositions, Demonstration of steps followed in different methods, Introductory lecture, Observation of video clips, Through Situational presentations, Usage of Language games, Presentation of good models by native speakers, Through language lab, Framing, evaluating and interpreting a question paper.

Practicum: Task and Assignment

1. Watching video recordings
2. Oral Communication tasks
3. Language Lab activities
4. Workshop on preparation of blue prints, question papers, marking scheme and question wise analysis.
5. Construction of test items for diagnosis and achievement test and interpretation of test data

Mode of assessment:

Analysis of Group discussion, Participant Observation, Monitoring performance of communicative tasks, Evaluation based on documentation (written), Performance evaluation (Seminar, Assignment & Project)

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21(iii): Pedagogy of Hindi II – Part 4

Theory

Credits 4

पृष्ठभूमि:

राष्ट्रीय पाठ्यचर्यारूपरेखा 2005 तथा शिक्षा का अधिकार एक्ट 2009 विद्यालयी शिक्षा तथा शिक्षण प्रशिक्षण के निकट संबंधों को ध्यान में रखते हुए शिक्षक की भूमिका में एक बहुत बड़े परिवर्तन की माँग करती है। पाठ्यचर्या में अभी तक शिक्षक को ही ज्ञान के स्रोत के रूप में केन्द्रीय स्थान मिलता रहा है, वह सीखने-सिखाने की समूची प्रक्रिया के संरक्षक और प्रबंधक के रूप में मुख्य भूमिका निभाने का काम करते आए हैं। पर 2005 की स्कूली पाठ्यचर्या उनसे माँग करती है कि वे सूचनाओं के वितरक और ज्ञान के स्रोत बन कर न रहें बल्कि विद्यार्थियों द्वारा ज्ञान हासिल करने की प्रक्रिया में स्वयं को सहायक मानें। इन सब परिवर्तनों को उनके व्यवहार का हिस्सा बनाने के लिए ज़रूरी है कि अध्यापक शिक्षा के पाठ्यक्रम में परिवर्तन आए। विद्यालयी शिक्षा व्यवस्था में परिवर्तन की पहल तभी संभव है जब इस व्यवस्था से जुड़े लोगों की सोच और दृष्टिकोण में परिवर्तन आए और शिक्षक की भूमिका इस व्यवस्था में सबसे महत्वपूर्ण है। इस दृष्टि से भाषा-शिक्षण का पाठ्यक्रम और भी महत्वपूर्ण हो जाता है, क्योंकि भाषा पूरी शिक्षा की आधारशिला का काम करती है, जहाँ सिर्फ भाषा पढ़ना-सीखना नहीं बल्कि भाषा के द्वारा अन्य विषयों में भी निपुणता प्राप्त करने की बात आती है। इसके साथ ही भाषा से जुड़े नए बिन्दु आते हैं जैसे - बहुभाषिक कक्षा, समझ का माध्यम, शांति की शिक्षा में भाषा की भूमिका आदि की समझ शिक्षक के लिए ज़रूरी है जो अध्यापक शिक्षा में व्यापक बदलाव की माँग करते हैं।

वर्तमान पाठ्यक्रम भाषा के नए सरोकारों और सीखने-सिखाने की नई दृष्टियों को ध्यान में रखकर तैयार किया गया है। आशा है कि शिक्षक प्रशिक्षणार्थियों को इससे भाषा-शिक्षण की तैयारी में सहायता मिलेगी।

पाठ्यक्रम के विशेष उद्देश्य

- भाषा के अलग-अलग भूमिकाओं को जानना
- भाषा सीखने की सृजनात्मक प्रक्रिया को जानना
- भाषा के स्वरूप और व्यवस्था को समझना
- स्कूल की भाषा, बच्चों की भाषा और समझ के बीच के संबंध को जानना
- भाषा के संदर्भ में पढ़ने के अधिकार, शांति और पर्यावरण के प्रति सचेत होना
- भाषा सीखने के तरीके और प्रक्रिया को जानना और समझना
- पाठ्यचर्या, पाठ्यक्रम और पाठ्यपुस्तक का विश्लेषण कर कक्षा विशेष और बच्चों की समझ के अनुसार ढालना
- भाषा और साहित्य के संबंध को जानना
- हिंदी भाषा के विविध रूपों और अभिव्यक्तियों को जानना
- भावों और विचारों की स्वतंत्र अभिव्यक्ति करना
- भाषायी बारीकियों के प्रति संवेदनशील होना
- अनुवाद के महत्व और भूमिका को जानना
- विद्यार्थियों की सृजनात्मक क्षमता को पहचानना
- बच्चों के भाषायी विकास के प्रति समझ बनाना और उसे समुन्नत करने के लिए विद्यालय में तरह-तरह के मौके जुटाना
- भाषा के मूल्यांकन की प्रक्रिया को जानना
- साहित्यिक और गैर साहित्यिक मौलिक रचनाओं की समझ और सराहना
- भाषा सीखने-सिखाने के सृजनात्मक दृष्टिकोण को समझना

इकाई 1:

अन्य साहित्यिक विधाओं का शिक्षण जीवनी, आत्मकथा, संस्मरण, रेखाचित्र आदि विधाओं का शिक्षण

इकाई 2:

भाषा शिक्षण की विधियों का संक्षिप्त परिचय

- (क) अनुवाद विधि (ख) प्रत्यक्ष विधि (ग) वाचन विधि (घ) दृश्य श्रवण विधि – (ड.) इकाई विधि
(च) समन्वित विधि (छ) स्वाध्याय विधि (ज) सूक्ष्म शिक्षण

इकाई 3:

हिन्दी शिक्षण में शैक्षणिक सामग्री, शैक्षणिक सामग्री का महत्व, उपयोगिता तथा अल्पव्ययी श्रव्य, दृश्य सामग्री का निर्माण । – पुस्तकालय, संग्रहालय, कम्प्यूटर ।

इकाई 4: मूल्यांकन

- (क) हिन्दी शिक्षण में मूल्यांकन का महत्व । – (ख) परीक्षा और मूल्यांकन में अंतर । – (ग) परीक्षा युक्तियां । – (घ) प्रश्नों के प्रकार – निबंधात्मक, लघु उत्तरात्मक तथा वस्तु निष्ठ प्रश्न ।

इकाई 5:

(अ) भाषा शिक्षण संबंधी विविध युक्तियां – (क) संवाद – (ख) अभिनय (ग) वाद-विवाद – (घ) साक्षात्कार (ड.) भाषण – (ब) भाषा शिक्षण में व्यावहारिक शब्द, वाक्यों के प्रयोग संबंधी ज्ञान जैसे – क्षमा याचना, आमंत्रण देने एवं अस्वीकार करने धन्यवाद ज्ञापन आदि । – पाठ नियोजन एवं अभ्यास

संदर्भ-ग्रंथ

- | | | |
|--|---|--|
| 1. डॉ. विजयराघव रेड्डी | - | हिन्दी शिक्षण अन्य भाषा के संदर्भ में |
| 2. कामता प्रसाद गुरु | - | हिन्दी व्याकरण |
| 3. डॉ. रामचन्द्र वर्मा | - | अच्छी हिन्दी |
| 4. डॉ. नामवर सिंह | - | आधुनिक साहित्य की प्रवृत्तियां |
| 5. डॉ. रामसजन पाण्डेय | - | विविध साहित्यिक वाद |
| 6. डॉ. लक्ष्मीनारायण शर्मा | - | देवनागरी लिपि और वर्तनी |
| 7. डॉ. रघुनाथ सफाया | - | हिन्दी शिक्षण |
| 8. डॉ. रामदेव पी. कथूरिया | - | सूक्ष्म शिक्षण |
| 9. केन्द्रीय हिन्दी संस्थान के प्रकाशन | | 1. हिन्दी का वैज्ञानिक व्याकरण 2. देवनागरी लेखन तथा हिन्दी वर्तनी व्यवस्था 3. हिन्दी शिक्षण विविध आयाम 4. हिन्दी शिक्षण अन्तर्राष्ट्रीय परिपेक्ष्य 5. द्वितीय भाषा शिक्षण में अभिक्रान्त अधिगम की तैकनालॉजी 6. भाषा शिक्षण तथा भाषा विज्ञान |

Practicum: Task and Assignment

Minimum 2 activities relevant to the syllabus.

21(iv): Pedagogy of Malayalam II – Part 4**Theory****Credits 4****Essence of the course:**

This course equipping the student teacher with Malayalam knowledge for communication and its values for appreciation. This course deals with Malayalam usage and society. Usage of ICT, research in Malayalam language, professional traits of Malayalam teachers are reflected. The course focuses on developing the ability of the future teachers to transact language in inclusive classroom.

Objectives**At the end of the course, the student teacher will be able to**

- appreciate the role of Malayalam in the society
- familiarize the IT related professional inputs of teaching.
- understand the meaning, importance and concept of models of teaching in Malayalam language teaching.
- Use of Malayalam on Computers
- Apply phonetics of Malayalam
- Critical thinking and creative writing
- Know about action research
- be a professional Malayalam teacher.
- acquaint with the co-curricular activities in Malayalam.

CONTENT OUTLINE**Unit 1: Critical thinking and writing**

Critical thinking and creative writing - Critical appreciation of a poem - Novel, drama or a short story - Writing criticism of a contemporary novel, short story and a poem - Analysis of important critical works in Malayalam.

Unit 2: Research in Malayalam

Action research - steps in an action research - action research for language teachers.

Unit 3: Professional traits of a Malayalam Teacher

Professional development of Malayalam teacher - Teaching as a profession - Professional ethics - Personal and professional qualities of a teacher - Special qualities of Malayalam teacher - Ways and means of improving professionalism among Malayalam teachers - Traits of professionalism competencies listed by NCTE.

Unit 4: Activities in learning Malayalam

Co-curricular activities based on school related activities like literary club, drama club etc. - Malayalam language and Cinema.

Unit 5: Teaching of Prose, Poetry and Composition

Aims of teaching prose – different types of prose lessons and different approaches – Non-detailed prose – Training for independent and extensive reading – Methods of teaching the non-detailed text in lower and higher classes – Poetry – Appreciation, rhythm, dictions, ideas,

emotions, imaginary expressions, suggestions etc. – Different types of poetry – composition – General principles.

Mode of Transaction

Dialogue, seminars, discussions, and group-work

Practicum: Task and assignment

1. Prepare a review of any literary work of Indian writer in Malayalam published in last ten years.
2. Keeping in view the needs of children with special needs prepare 2 activities for Malayalam Teachers.
3. Prepare a report on challenges faced by teachers and learners in teaching and learning of Malayalam in Kerala.
4. Develop a Power Point presentation to teach any topic from Malayalam reader
5. Preparation of author's album, stick figure albums, flash cards for classroom teaching.

Mode of assessment:

Written test and Task and assignment

References:

1. Sabdasodhini
2. Keralapanineeyam
3. Bhashabhooshanam
4. Malayalasaili
5. Vrithasilpam
6. Keralabhasahavijnaneeyam
7. Vrithavicharam
8. Kairaliyute Katha
9. The teaching of Mother tongue by W.M. Rhyburn
10. Malayalasaahithaycharithram
11. Enthanu Blog? Blogging engane thudangam
12. Vijayam nedan social media.
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21(v): Pedagogy of Telugu II – Part 4

Theory

Credits 4

Essence of the course:

Objectives:

CONTENT OUTLINE

Mode of Transaction

Practicum: Task and Assignment

Mode of Assessment

References:

Syllabus yet to be prepared for Pedagogy of Telugu II – Part 4.

21(vi): Pedagogy of Mathematics II – Part 4

The same syllabus as given for course – 20(vii)

21(vii): Pedagogy of Physical Science II – Part 4

The same syllabus as given for course -20(viii)

21(viii): Pedagogy of Biological Science II – Part 4

The same syllabus as given for course – 20(ix)

Edn 22: C&PS - ASSESSMENT FOR LEARNING – II**Theory****Credits 4****Essence of the course:**

The course is designed keeping in mind the role of assessment in enhancing learning. It will focus on various tools and techniques of evaluation. There will also be focus on continuous and comprehensive evaluation. The course will also deal with critical understanding of issues in assessment and also explore realistic, comprehensive and dynamic assessment process. The course will also give emphasis on the need for formative and summative evaluation as well as quantitative and qualitative assessment for learning.

Objectives:**At the end of the course, the student teacher will be able to**

- acquire basic concepts in assessment and evaluation.
- develop the awareness about different areas of assessment.
- discriminate different perspectives in assessment.
- develop understanding about the meaning and the process of CCE
- know different techniques of evaluation, tools of evaluation and their uses.
- know different characteristics of instruments of evaluation.
- discriminate teacher made test vs standardized tests in assessment
- prepare, administer and interpret of results of tests and different evaluation techniques
- compute simple statistics to assess the learning.
- develop awareness about use of technology in assessment and evaluation.

COURSE CONTENT**Unit 1: Characteristics of Instruments of Evaluation**

Validity - different methods of finding validity – Reliability - different methods of finding reliability – Objectivity – Interdependence of validity, reliability and objectivity – Usability – Norms

Unit 2: Teacher made Achievement Tests

Essay and Objective type tests – Improving essay type questions – Different types of objective tests, their characteristics, advantages and disadvantages. – Relating test items and specific behavioural objectives – Preparation of blue print – Characteristics of a good test

Unit 3: Standardized tests

Concept and characteristics of standardized test – advantage and disadvantage using standardized tests and teacher made tests – standardized tests for measuring intelligent, attitude, aptitudes, interest, values, personality, and achievement.

Unit 4: Teaching effectiveness and assessment:

Concept and criteria for assessing teaching effectiveness – Assessing teaching using observation schedules – Student evaluation of teaching – student's ratings of teaching effectiveness, dimensions and problems. – Uses of assessment for feedback for improving instructional process – System(Flander's) for observation for recording classroom interaction patterns and uses –Use of interaction analysis in the classroom for teacher assessment.

Unit 5: Technological based Quantitative and Qualitative analysis of learning outcomes

Quantitative and Qualitative- Meaning and difference- Data-Tabulation – measures of central tendency – measures of dispersion – normal distribution – correlation and their interpretation- Graphical representation of data-Exploration of software for assessment of CCE– Managing students Data in computer – inferences, Diagnosis, feedback and remedial learning alternatives – e-portfolio assessment – evaluation Rubrics

Mode of Transaction:

Lecture cum discussion, Seminar, Team Teaching, Practical work, Power point presentation

Practicum: Task and Assignment

1. Preparation, administration and interpretation of results of tests and different evaluation techniques
2. Writing educational objectives, learning experience and corresponding evaluation techniques, General and specific objectives
3. Framing measurable and non-measurable learning outcomes
4. Finding out the content validity of the given question paper
5. Designing Rating scale, Questionnaire, Interview Schedule in a given a topic
6. Framing Different types of questions
7. Preparation of Blue Print and a question paper
8. Prepare graphs and use statistics for analysis of test result
9. Preparation of interaction analysis report after the observation of any five teachers and peer teachers working in schools

Mode of Assessment:

Submission of Assignments, Preparation of tests various types of test items, Data collection and statistical analysis, Participation in Group discussion

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Practicum: TEACHING COMPETENCY

Each student teachers will be attached to a school or two schools in one or two blocks of internship. The total duration of internship will be 16 weeks. During internship in a school, Student teachers should perform the roles of a regular teacher at the respective level under the direct guidance and supervision of the mentoring teacher (Supervising / Guide Teacher) of the school. While at school, the student teacher shall prepare the necessary teaching resources and records for teaching lessons (duration of 45 minutes each). Each student teacher will spend first week of internship for observation. During the internship student teacher will develop teaching competency by observing and teaching lessons in both the pedagogy subject chosen. The details of roles to be performed and records to be produced with respect to Pedagogy of school Subject I and II. and Course at the end or given below.

PEDAGOGY OF SCHOOL SUBJECT I**Practicum****Credits 8**

During the first week of the internship, the student teachers will observe classes taken by regular school teachers (at least 5 lessons in pedagogical subject I)

During the next 15 weeks, each student teacher has to give at least 15 lessons for Pedagogical Subject I (at least one should be ICT based) at level one and 15 lessons (at least one should be ICT) at level two

The internship for graduates must be both at upper primary (classes VI- VIII) and secondary (classes IX and X) and for post graduates, it should be at upper primary (classes VI - VIII) or secondary (classes IX and X) and senior secondary (XI and XII) levels. During the internship student teachers will also be engaged in making observation of classes taught by regular teacher (whenever possible) and the peer teachers.

During this period, (i) classroom teaching (ii) evaluation at the end of 15 lessons and (iii) diagnosis based feedback to the students should be completed by every student teacher.

The records to be produced at the end of the internship:

1. 15 lesson plans at each level
2. Lesson Observation records on observations of classes taught by both regular and peer teachers.
3. Teaching resources prepared and used including ICT based
4. Test constructed and administered on students at the end of 15 lesson at each level followed by evaluation report.
5. Record on diagnosis based remedial programme carried out on students

PEDAGOGY OF SCHOOL SUBJECT II**Practicum****Credits 8**

During the first week of the internship, the student teachers will observe classes taken by regular school teachers (at least 5 lessons in pedagogical subject II)

During the next 15 weeks, each student teacher has to give at least 15 lessons for Pedagogical Subject II (at least one should be ICT based) at level one and 15 lessons (at least one should be ICT) at level two

The internship for graduates must be both at upper primary (classes VI- VIII) and secondary (classes IX and X) and for post graduates, it should be at upper primary (classes VI - VIII) or secondary (classes IX and X) and senior secondary (XI and XII) levels. During the internship student teachers will also be engaged in making observation of classes taught by regular teacher (whenever possible) and the peer teachers.

During this period, (i) classroom teaching (ii) evaluation at the end of 15 lessons and (iii) diagnosis based feedback to the students should be completed by every student teacher.

The records to be produced at the end of the internship:

1. 15 lesson plans at each level
2. Lesson Observation records on observations of classes taught by both regular and peer teachers.
3. Teaching resources prepared and used including ICT based
4. Test constructed and administered on students at the end of 15 lesson at each level followed by evaluation report.
5. Record on diagnosis based remedial programme carried out on students

AECC: A2 - INTRODUCTION TO PUBLIC ADMINISTRATION**Theory****Credits 2**

(Compulsory Course designed as per the directions issued by Government of India, MHRD, Department of Higher Education (Central University Bureau) F.No.19-6.2014-Desk U Dated 19-05-2014)

Course Rationale:

This Course introduces the students to the elements of public administration. This would help them obtain a suitable conceptual perspective on Public Administration. In addition, the course introduces to students, the growth of such institution devices as to meet the need of changing times. The course also aims to instill and emphasize the need of ethical seriousness in contemporary Indian public administration within the Constitutional framework.

COURSE CONTENT**Unit 1: Introduction:**

Meaning, nature and Scope of Public Administration and its relationship with other disciplines- Evolution of Public Administration as a discipline – Woodrow Wilson, Henry Fayol, Max Weber and others - Evolution of Public Administration in India – Arthashastra – Colonial Administration upto 1947

Unit 2: Public Administration in India

Enactment of Indian Constitution - Union Government – The Cabinet – Central Secretariat – All India Services – Training of Civil Servants – UPSC – Niti Ayog – Statutory Bodies: The Central Vigilance Commission – CBI - National Human Rights Commission – National Women's Commission – CAG

Unit 3: State and Union Territory Administration

Differential Administrative systems in Union Territories compared to States Organization of Secretariat: - Position of Chief Secretary, Functions and Structure of Departments, Directorates – Ministry of Home Affairs supervision of Union Territory Administration – Position of Lt. Governor in UT – Government of Union Territories Act 1963 – Changing trend in UT Administration in Puducherry and Andaman and Nicobar Island

Unit 4: Emerging Issues in Indian Public Administration

Changing Role of District Collector – Civil Servants – Politicians relationship – Citizens Charter - Public Grievance Redressal mechanisms – The RTI Act 2005 – Social Auditing and Decentralization – Public Private partnership

Modes of Transaction:

Lectures and seminars

Mode of Assessment

Paper-pencil tests, Formal and Informal Testing, Continuous Comprehensive Evaluation.

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