PONDICHERRY UNIVERSITY

PUDUCHERRY 605 014

REGULATIONS

Aim of the Course:

The Degree of Master of Science in Plant Science aims to introduce the students to various aspects of plant biology. At the end of the course, the students are expected to have good working knowledge in the field of Plant Science.

Eligibility for Admission:

Candidates for admission to M.Sc. Plant Science shall be required to have passed B.Sc. in Plant Science/ Botany conducted by the Universities approved by UGC, New Delhi with Chemistry/ zoology as allied subject(s) of study or an examination accepted as equivalent thereto and 40 percentage of marks in Part III (aggregate / Part - III), subject to such conditions as may be prescribed therefore.

Lateral Entry (if applicable)

~~Candidateo who have passed Diploma in First Clooo (10*3 years of Study) are eligible to apply for the lateral entry to the 2** year of the course subject to availability of oeato, but limited to 10% of the oanctioned intake.~~

Duration of the course:

The Course shall be of two years duration spread over four semesters. The maximum duration to complete the course shall be four years (including completion of arrears, if any).

Eligibility for admission to Examination:

Sixty (60) percentage of attendance for theory Eighty (80) percentage of attendance for Practicals (i.e., % attendance required prescribed if any)

Medium:

The medium of instruction shall be English

Passing Minimum:

Passing eligibility & classification for the award of the Degree is as follows: Passing Minimum - 50%; II Class - 50 to 60%; I Class - 60 to 75%; Distinction - above 75%

PONDICHERRY UNIVERSITY

NORMS FOR AFFILIATION FOR M.Sc, PLANT SCIENCE COURSE

(Minimum requirements regarding infra structure, Faculty, library, student teacher ratio, equipment etc.)

Sl.No.	Requirement	Specification	Remarks
1.	STUDENT STRENGTH	The intake of Students should not exceed 15 (fifteen) per class.	
2.	CLASS ROOMS	For M.Sc, Plant Science course, there should be Two Class rooms; one each for 1st year and llnd year students separately. Each classroom should have a size determined by multiplying the number of students (approved intake) with 1.2 sq.mtrs plus 20% additional space for table and chair for the teacher. Each classroom should have a big board preferably of size 1.5 x 2 meters; two fans per 10 students and enough light & ventilation facilities.	Adequate toilet facilities should be provided for the students near the classrooms/labs.
3.	STAFF REQUIREMENT	TEACHING STAFF - Head of Dept. - 1 no. Lecturers.- 5 nos. NON TEACHING STAFF: Store Keeper - 1 no. Lab. Assistant - 1 no. Lab. Atteders - 2 nos. A separate room for non-teaching staff should be provided for their accommodation.	

4.	STAFF ROOM	There shall be a very big enough room to accommodate the faculty members. The size of the room should be determined by multiplying the number of faculty members with 2 sq. meters. This room should be partitioned into cubicles so that each faculty member has a cubicle and some privacy. A separate room'should be provided for the HOD.with attached toilet facilities and bookshelf facilities.	1. Attached toilet facilities should be provided for Staff. 2.Each cube should be provided with rack facilities.
5.	LABORATORIES	MAIN LABS: There should be a minimum of Two main laboratories; l.For I Year M.Sc, students 2.For II Year M.Sc, students. Each Lab should have enough space to accommodate 15 worktables of size of 1.219 meters (4ft) xl.524 meters (5ft) to be arranged in rows with interspace of 1.219 meters (4 ft). Approximately 0.743 Sq.meters per student and space	1.A11 labs should be provided with three phase electrical connections with facilities to operate heavy voltage equipments.

		for chair & table for Staff. In addition to these labs the following labs should also be provided: MICROBIOLOGY LAB: This lab should be completely airtight/air conditioned and should be provided with air filters to avoid contamination during inoculation of microbes. TISSUE CULTURE LAB: This lab should be attached along with Microbiology lab with interconnecting door and should be air- conditioned. PLANT PHYSIOLOGY & BIOCHEMISTRY LAB: This lab working space should be 0.743 sq. meters tabletop area per student. INSTRUMENTATION LAB: This lab should be fully air conditioned to accommodate	2.AU labs should be provided with interconnectin g doors. 3.Enough ventilation facilities like ceiling & exhaust fans should be provided. 4.Uninturrupt ed Power Supply(UPS) Unit with facility to
		sensitive equipments. RESEARCH/PROJECT RESEARCH LAB: To	supply power for at least three

		accommodate 15 research students and projects of the Dept.	hours in case of power disruption to be
			installed. 5.all labs should be provided

		•	with lab sinks and water tap facilities.
5.	STUDENT-TEACHER RATIO	1.For Theory classes: 1:15. 2.For Practical classes: 1:15.	
6.	EQUIPMENT	1 .One compound Microscope and one Dissection Microscope per student (Olympus/Weswox make) 2.Binocular research microscopes - 2 nos. 3.Trinocular research microscope with digital camera and computer attachment accessories - 2 nos. 4.Computers with printer and all other accessories and internet connection - 10 nos 5.Laminar air flow (for Microbiology & Biotechnology labs) - 2 nos. 6.Autoclaves - 2 nos. 7.Sprectrophotometers-U.V. range-with computer and printer facilities -2 nos. 8.Digital Balances - 2 nos. 9.Hot air ovens - - 2 nos. 9.Gel Electrophoresis apparatus with Gel doc equipment and computing facilities - I no.	

		I I .Refrigerators - 2nos. 12.Microtome with all accessories - 2nos. 13.pH meter (Digital) 2 nos. 143.centrifuges-clinical/high speed - 2nos. 15.0HP-2 nos. 16.LCD Projectors - 2 nos. 17.Reverse Osmosis System-R.O. Water purifiers - 3 nos.	
		In addition to the above-specified equipment, necessary glassware, chemicals and other equipment as required for the conduct of practicals as per syllabus should be provided.	
7.	STORE ROOM	Store room with rack facilities to accommodate the equipment, glasswares, chemicals etc., and good lighting & ventilating facilities.	

PONDICHERRY UNIVERSITY

M.Sc. PLANT SCIENCE - SEMESTER SYSTEM

Details of papers and scheme of examination

Effective from the academic year 2010-11

Semester	Title of Papers	University Examinations	Internal Assessment	Total Marks
III	Paper-VII Biochemistry & Plant Physiology	75	25	100
	Paper-VIII Cell Biology & Genetics	75	25	100
	Paper-lX Microbiology & Plant Pathology	75	25	100
	Practical - III (Covering above three papers)	75	25	100
IV •*	Paper-X Plant Molecular Biology & Bioinformatics	75	25	100
	Paper-XI Plant Biotechnology	75	25	100
	Paper-XII Project* (Individual)	75 (Project report)	25 (Viva Voce)	100
	Practical IV	75	25	100
		1200	400	1600

- Project to be valued by both examiners (internal and examiner) power point presentation.

PAPER - VII BIOCHEMISTRY AND PLANT PHYSIOLOGY

Course Objectives:

1.To understand the structure and function of the Biomolecules.

2.To understand the physiological processes in plants.

Unit I

Monosaccharides and the glycosidic bond. Structure of starch and cellulose. Protein and non-protein amino acids - reductive amination and transamination - glutamate pathway; structure and biosynthesis of Glutamic acid, serine, cysteine - Shikimic acid pathway: structure and biosynthesis of phenylalanine, tyrosine and tryptophan. Molecular configuration and conformation of proteins - primary, secondary, tertiary and quaternary structures - properties and types of proteins - simple, complex and derived proteins.

Unit II

Enzymes: Classification, kinetics, mechanism of enzyme action - enzyme inhibition-enzyme regulation-allosteric enzymes-isoenzymes-coenzymes-ribozymes. General characters and classification of Vitamins and Alkaloids. Structure of Chlorophyll, Carotenoids, phycobilins, anthocyanins and betacyanins. Plant lipids: Fatty acids, phospholipids structure of Ergosterol and cholesterol. p-Oxidation of fatty acid. Structure and properties of cutins,suberines and waxes.

Unit III

Water absorption system in Plants - Mechanism of Asent of Sap. Kinds of transpiration, Difference between Transpiration, Evaporation, Guttation and Exudation. Mechanism of stomatal movement. Stomatal movement in Succulents. Mechanism of mineral absorption: Passive (Diffusion, Ion Exchange, Donnan Equilibrium and Mass Flow Hypothesis) and Active (Carrier Concept and Electro-Chemical) Theory. Difference between Chlorosis and Etiolation. Mechanism of Phloem translocation: Pressure flow mechanism, phloem loading and unloading. Root - Microbe interaction in facilitating nutrient uptake.

Unit IV

Organization of Pigment system I and II, Absorption Spectrum, Action spectrum, Red drop and Emerson effect. Fluorescence and Phosphorescene. - Hill reaction - Non-cyclic and Cyclic Electron Tansport, Photophosphorylation - *C3* and C4 pathways,Kranz Anatomy of Leaves of C4 plants. Difference between *C3* and C4

cycle. CAM pathway. Significance of Photorespiration. Mechanism of Aerobic respiration: Glycolysis,Link reaction and Krebs Cycle^Oxidative phosphorylation. Difference between Oxidative and Photo phosphorylation. Factors affecting Photosynthesis and Respiration. Symbiotic and asymbiotic nitrogen fixation. Nitrate assimilation.

Unit V

Physiological role and mechanism of action of Auxins, Gibberellins, Cytokinns, Abscisic acid and Ethylene. Photoperiodism and Vernalizaiton. Response of plants to salt, drought, freezing, heat, oxidative and UV stresses-mechanism of stress resistance. Circadian rhythm in plants. Signal transduction: receptors and G-Protiens, phospholipid signaling,calcium-calmodulin cascade,Seed dormancy - Hormonal regulation of dormancy and germination. Physiology of fruit ripening.

Practicals

1.Preparation of titration curve and pKa value determination.

2.Determination of isoionic pH of amino acid.

3.Determination of isoelectric pH of Protein.

4.Estimation of Protein, free amino acids, carbohydrate contents in plant sources.

5.Estimation of Vitamin C in fruits - titrimetric method.

6.Paper chromatographic identification of plant pigments, sugars and amino acids.

7.Water potential by gravimetric and falling drop methods.

8.Osmotic potential by Plasmolytic method.

9.Quantitative estimation of total chlorophyll content and carotenoid contents in leaves.

11.Differentiation of C_3 and C4 plants by starch test.

12.Determination of nitrogen content in roots and root nodules.

13.Effect of temp., substrate conc.,pH and inhibitor cone, on nitrate reductase activity.

14.UV-B effect on nitrate reductase.

Text Books:

1.Mukherji,S. and Ghosh,A.K. 2005. Plant Physiology. First Central Edition, New Central Book Agency (P) Ltd.,Kolkata.

2. Lea,PU. and Leegood,R.C. 2001. Plant Biochemistry and Molecular Biology. John Wiley and Sons,New Yorlk.

3.L Noggle, G. R. and G. J. Fritz. 1986. Introductory Plant Physiology. 2nd Ed. Prentice-Hall, New Delhi. 640pp.

4.Kumar,A,and Purohit,S.S.2005. Plant Physiology , Agrobios (India), Jodhpur.

5.Berg.J.M.,Tymoczko,J.L. and Stryer,L. 2001. Biochemistry. Freeman and Co. New York.

6.3.NelsonJLD.L. and Cox.,M.M. 2000. Lehninger-Principles of Biochemistry. Worth Publishers, New York.

PAPER VIII - CELL BIOLOGY AND GENETICS

Objective of course is to understand the basic theoretical concepts and techniques of Cell Biology and Genetics

Theory:

CELL BIOLOGY

Unit I

Structural organization of plant cell, structure and function of major cellular organelles-chloroplast, mitochondria, ribosome, Endoplasmic reticulum, golgi body andmicrobodies, cell wall structure and function, modern concept of plasma membrane structure and functions, ion carriers & receptors, structure and role of pasmodesmata in movement of molecules. Tonoplast membrane and transporters

Unit II

Nucleus structure, nuclear pore complex, nucleosome organization, DNA structure and its different forms, chromosome structure and packaging of DNA, molecular organization of centromere and telomere, nucleolus structure and function, special types of chromosomes, sex chromosome, cytoskeleton and its organization

GENETICS

Unit III

Genetics of prokaryotes and eukaryotic organelleles—Mapping the bacteriophage genome, genetic transformation, conjugation and transduction in bacteria, genetics of mitochondria and chloroplast, cytoplasmic male sterility, genetic recombination and genetic mapping-concepts of linkage and crossing over, molecular mechanism of recombination, role of Rec A, B, C and D proteins in recombination, genetic markers, construction of genetic and physical map of chromosomes.

Unit IV

Physical and chemical mutagens and their mode of action, molecular basis of gene mutation, transposable elements in prokaryotes and eukaryotes, mutations induced by transposons, structural and numerical alterations in chromosome- origin, cytology and breeding behavior of duplication, deficiency, inversion and translocation heterozygotes, origin, production and meiosis of haploid and aneuploids. origin, production and significance of polyploidy, induction and characterization of trisomies & monosomies, Robertsonian and B-A transloation

Unit V

Molecular cytogenetics- nuclear DNA content, c- value paradox, cot-curve and its significance, concept and techniques of restriction mapping, multigene family and their evolution, computer assisted chromosome analysis, transfer of whole genome, transfer of individual chromosome and segments, methods tor for alien chromatin production, characterization and utility of alien addition and substitution lines, genetic basis of inbreeding and heterosis

Practicals:

1. Colorimetric estimation of DNA using diphenylamine
2. Colorimetric estimation of RNA using orcinol
3. Estimation of total RNA from plant tissues and its colorimetric estimation
4. Study of cytological cell division stages in onion root tip tissues
5. Feulgen staining of nucleic acids in onion root tissues
6. Induction of polyploidy using colchicines

Text Books:

1. Gupta, P.K. 2004. Third Edition. Cell and Molecular Biology. Rastogi Publications.
2. Lewin B. (2000) Genes VII. Oxford University Press Inc., New York
3. De Robertis, E.D.P. and De Robertis,E.M.P. 2001. Cell and Molecular Biology. 8th Edn. Lea and Febiger. Philadelphia.
4. Gupta, P.K. 1997. Cytology, Genetics & Evolution. Rastogi Publications, Meerut
5. Gardener, J, Simmons, H.J and Snustad, D.P. 1997. Principle of Genetics, John Wiley & Sons, New York. 829pp.
6. Ursula Goodenough, 1998. Genetics. Saunders college Publishing Co., Philadelphia, USA

PAPER - IX MICROBIOLOGY AND PLANT PATHOLOGY

Course Objectives:

1. To understand the classification, nutrition, and growth of microorganisms
2. To acquire knowledge about soil, water and food microorganisms
3. To understand the development of a disease, host-pathogen interaction, and the reasons for an epidemic disease.
4. To imbibe the knowledge of different control methods of plant diseases and etiology

of selective plant diseases.

Theory:

Unit I

General account of microbes: Whitaker's five kingdom concept - Prokaryotic and Eukaryotic microbes - Bacteria: classification (Bergey's manual of systematic Bacteriology)- general account of Archaebacteria, Eubacteria and Cyanobacteria. Viruses: general structure -classification - transmission - multiplication (Bacteriophage) - Viroids and Prions -Phytoplasma (including Mycoplasma).

Unit II

Nutrition and growth of microbes: Nutritional groups of microbes - Transport of nutrients: Passive and facilitated diffusion - active transport : ABC transporter, secondary active transport, group translocation. Growth: Sigmoid growth — continuous growth — synchronous growth — factors affecting growth - Liebeg's law of minimum - Shelford's law of tolerance -molecular adaptations of psychrophily and thermophily.

Unit III

Soil microbiology: Microbial associations: Neutral, positive and negative associations - biogeochemical cycles (C,N,P and S transformations). Aquatic microbiology: Microbes in lakes, ponds, streams, and the sea — Quality determination of potable water - microbes and waste water treatment. Food microbiology: Microbial spoilage of milk, vegetables, fish and meat - preservation of food.

UnitIV

General principles and concepts in plant pathology - classification of plant diseases based on symptoms. Infection process: entry of pathogen - establishment of pathogen (enzymes and toxins). Defense mechanism: Structural and Biochemical. Epidemiology: Forms of epidemics, Conditions governing epidemics. Reasons for progressive severity of epidemics and decline of epidemics - disease forecasting.

UnitV

Control methods: Cultural practices. Quarantine, chemical control (Pesticide, Fungicide and Antibiotics), Biological control of pest and pathogens - Diseases: Symptoms, causative organism, disease cycle and control of following diseases.

a)ALGAE
Red rust of tea

b)FUNGI
Blast disease of Paddy, Wheat rust Blight. Citrus canker Bhendi yellow vein clearing virus, Cucumber mosaic virus Brinjal little leaf.

c)BACTERIA

d)VIRUS

Seasamum phyllody

Practicals

1.Preparation of media.

2.Isolation and maintenance of pure culture.

3.Acid fast staining.

4.Gram staining.

5.Negative staining.

6.Bacterial analysis of water; Testing for Coliforms. Production of extra cellular enzymes; Caialase and Amylase. Dye reduction test for milk. Isolation of microbes from food samples.

10.Isolation of plant pathogens from infected plant materials.

11.Study of diseased plant materials - Rust by Puccinia.

12.Red rust and white rust.

13.Leaf spot of groundnut.

14 Mildew and leaf spot of banana,

15.Canker and Red rot.

16.Collection of plant pathology specimens -10 sheets to be valued externally.

Text Books:

1. Prescott,L,M, Harely, J.P, and Klein, D.A. 2002. Microbiology, 5th Ed. McGraw Hill Science
2. Pandey, B.R. 1997. Plant Pathology. S. Chand and Co., New Delhi.
3. PommervilleJ.C. 2006. Alcoma's fundamentals of Microbiology. Jones and Bertlett Publishers, London.
4. Prescott,L.M.,Harley,J.P. and Klein, D.A. 1996. Microbiology. Wm.CBrow Publishers, London.
5. Mehrotra,R.S. 1980. Plant pathology. Tata McGraw -Hill Publishing co. Ltd., New Delhi.
6. Atids, R.M. 1995. Principles of Microbiology Morby Publishers, St.Louis.
7. Pelczar,M,J.,Chan,E.C.S. and Krieg,N.R. 1993. Microbiology - Concepts and applications. McGrawHill Ltd.Inc, New York.

5.Agrios.G.N. 2000. Plant pathology. Elsevier, New Delhi.

PAPER X - PLANT MOLECULAR BIOLOGY AND BIOINFORMATICS

Objective of course is to understand the basic theoretical concepts and techniques of Molecular Biology and Bioinformatics

Theory:

PLANT MOLECULAR BIOLOGY

Unit I.

Basic concept and scope of molecular biology, molecular organization of euchromatin and heterochromatin, chromosomal organization of genes and nOn-coding DNA, cellular DNA organization into chromosomes, mode and mechanism of DNA replication, DNA damage and repair, transcription mechanism in prokaryotes and eukaryotes, plant promoters and transcription factors, post-transcriptional processes, mRNA transport and stability, introns and their significance, Structure and role of nuclear pore complex, nucleolus organization, and ribosomal RNA genes, rRNA biosynthesis, tRNA genes and biosynthesis of tRNA,

Unit II.

Mechanism of translation, post-translational modification of proteins, regulation of gene expression in prokaryotes and eukaryotes. chloroplast- genome organization, gene expression, nucleo-chloroplast interaction, mitochondria-genome organization, gene expression, RNA splicing and editing, Interaction of DNA and proteins, control mechanism of cell cycle, role of retinoblastoma and F^f proteins in cell cycle, mechanism of programmed cell death, initiation of cancer at cellular level, proto-oncogenes and tumor suppressor genes

Unit III.

Mechanism of protein sorting to mitochondria and chloroplast, translocation of secretory proteins across ER, structure and role of microtubules and microfilaments in muscle and flagellar movement, site of ATPases on plasmamembrane, ion- carriers, channels and pumps, introduction of stem cell and RNAi technology, Structural and Functional Genomics, Micro array technology, Overview of extracellular signaling

BIOINFORMATICS

Unit IV.

History and scope of bioinformatics, biological databases, sequence comparison using dynamic proframing, significance of alignment scores and database scores, multiple sequence alignment, profiles, motifs and feature identification- phylogeny

Unit V.

Bioinformatics in genomics and proteomics, introduction to molecular force field drug design, computational ligand designing, sile directed ligand generation, overall functioning of the building process, network bioinformatics, bioinformatics role in microarray technology and proteome analysis

Practicals

1. Colorimetric estimation of DNA using diphenylamine
2. Colorimetric estimation of RNA using orcinol
3. Isolation of plant DNA and its quantification by a spectrophotometric method
4. Isolation of plant RNA and its quantification by a spectrophotometric method
5. Separation of plant DNA by agarose gel electrophoresis and visualization by EtBr staining
6. Separation of plant RNA by agarose gel electrophoresis and visualization by EtBr staining
7. Biological sequence (Nucleic acids and Protein) searching using appropriate software.

Text Books:

1. Gupta, P.K. 2004. Cell and Molecular Biology. Third Edition. Rastogi Publications.
2. Gerald Karp. 2002 Cell and Molecular Biology, John Wiley & Sons, New York
3. Lewin, B. 2000. Genes VIII, Oxford Univ., Press, New York
4. De Robertis, E.D.P. and De Robertis.E.M.P. 2001. Cell and Molecular Biology, Lea and Febiger, Philadelphia, USA.
5. 6.David Freifelder. Essentials of Molecular Biology, Narosa Publishing House, New Delhi
6. Geoffery. H. Cooper et al., 2004. Cell – Molecular approach, ASM press, Washington.
7. Verma, P.S and Agarwal, V.K. 1993. A Textbook of cytology. S. Chand & Co, New Delhi.
8. Dnyansagar, V.R. 1987. Cell and Molecular Biology. Holt Saunders International, New York, USA.
9. Baxevanis, A.D. and Francis Quellellette, B.F. 2009. Bioinformatics: A Practical guide to the analysis of Genes and proteins by Wiley India Pvt Ltd,

PAPER - XI PLANT BIOTECHNOLOGY

Course Objectives:

1.To understand the concepts of plant biotechnology

2.To enhance the knowledge of the students in wide array of plant based industries.

Unit I

Brief history of plant tissue culture -Regeneration and totipotency - Tissue culture lab, designs, Green houses - media preparation - MS Medium - organic and inorganic constituents - growth regulators - gelling agents, Sterilization methods: Steam, dry and filter sterilization - Explant types. Callus cultures. Somatic embryogenes-is and Synthetic seed, Protoplast culture and Hybridization,Organogenesis - direct and indirect -meristem culture for virus-free plants- Apical and Axillary bud culture - Micropropagation - anther and embryo culture - Hardening - applications. Germplasm conservation, Gene bank, Seed bank, Pollen bank. Plant tissue culture industry in India.

Unit II

Gene transfer in Plants: Marker genes, Reporter genes, Organization of Ti plasmid,Gene transfer methods, *Agrobacterium* mediated DNA transformation:-^gro6acfen'w/M vectors, Transformation techniques using *Agrobacterium*, *Agrobacterium* mediated Virus infection -Agroinfection. Viruses mediated gene transfer; Caulimoviruses and Gemini viruses.

UnitIII

Transgenic Plants: Transgenics in crop improvement: Herbicide resistance, Glyphosate resistance, Pest resistance: insect resistance-Bae/7/us *thuringiensis* approach. Disease-Resistant plants-Resistance to Fungi, Bacteria and Viral infection. Stress-tolerant plants: resistance to water deficit. Crops with improved yield and Quality- Delayed softening, Delayed ripening, Rice with increased vitamin A content-Golden Rice. Manipulation of photosynthetic carbon metabolism. Alteration of starch quantity,Introduction to Genomics and Proteomics.

Unit IV

Molecular Pharming: Biofarming and the environment, Pharmaceutical crops and the danger to our food supply. Advantages and disadvantages of using plants as bioreactors. Medical Pharming: Pharmaceuticals, Plantibodies, f.dible Vaccines, Edible interferons. Non-medical Pharming: Industrial enzymes, Bioplastics and Biotechnology. Organic farming: Environmental benefits of organic agriculture. Organic cotton, Organic milk. Uses of Vermicompost, Neem Pesticide, Seaweed Liquid fertilizer and Panchakavya in agriculture.

Unit V

Intellectual Property rights (IPR) and Protection (IPP): Biosafety, Biosafety guidelines and regulation. Protection of intellectual properly. Copyright, Trademark, patent, Patenting of

biological material, Plant breeders and Farmer's rights, Some case studies on plant patents: Patenting of basmati rice in USA, Revocation of turmeric patent. Revocation of Neem patent. Significance of patents in India.

Practicals:

1.Study of cultured cells - Datura, Daucas. Nicotiana

2.Induction of Callus

3 Shoot initiation from Datura callus

4.Root initiation from in vitro formed shoots o f Datura.

5.Demonstration of technique of anther culture.

6.Isolation of N2 fixing Rhizobium, Azntubacter.Azospirillum and Phosphate solubilizing bacteria from soil

7.Demonstration of PCR techniques - RAPD analysis in plants.

8.Demonstration of Agrobactehum mediated DNA transfer

9.Vermicomposting

10.Effect of Vermicompost, Neem pesticide and Panchakavya on plants.

11.Effect of seaweed-liquid fertilizer on seed germination.

Text Books:

1.Nirmala.C.B., G. Rajalakshmi, Chandra Karthick. 2009. Plant Biotechnology. MJP Publishers, Chennai.

2.Chawla,H.S. 2008. Introduction to Plant Biotechnology. Oxford & IBH publishing Co. Pvt. Ltd. New Delhi.

3.Adrian Slater, Nigel Scott & Mark Fowler. 2004. Plant Biotechnology - The genetic manipulation of plants. Oxford University Press. London.

4.Ramawat, K.G. 2000. Plant Biotechnology. S. Chand & Co., New Delhi.

BLUE PRINT OF QUESTION PAPER FOR M.Sc. PLANT SCIENCE

(Effective from the academic year 2010-11)

Time - 3 hrs. Max. Marks - 75

Section - A

Answer all the questions. Each answer should not exceed 50 words.

Two questions from each unit (10 x 2 = 20 marks)

1. Unit I
2. Unit I
3. Unit II
4. Unit II
5. Unit III
6. Unit III
7. Unit IV
8. Unit IV
9. UnitV
10. Unit V

Section — B

Answer all the questions. Each answer should not exceed 200 words.

Two questions from each unit (5 x 5 = 25 marks)

11 a) Unit I or

11b) Unit I

12a) Unit II

or

12b) Unit II

13a) Unit III

or

13b) Unit 111

14a) Unit IV

or

14b) Unit IV

15a) Unit V

or

15 b) UnitV

Section - C

Answer any three questions. Eiaeh answer should not exceed 600 words.

One question from each unit (10 x 3 = 30 marks)

16.Unit I

17.Unit II

18.Unit III

19.Unit IV

20.Unit V

BLUE PRINT OF PRACTICAL QUESTION **PAPER FOR M.Sc. PLANT SCIENCE**

(Effective from the academic year 2010-11)

PRACTICAL PAPER -1 (Covering Theory Papers 1,11 & III)

Time -4 Hrs. Max. Marks - 75

1 .Make a suitable micropreparations of A,B.C & D.Draw labeled sketches and identify them giving reasons.Leave the slide for valuation.
(Slide-2 marks,ldentification-l mark,Sketch-l mark,Notes-l mark) **4x5=20** Marks.
2. Make a suitable micropreparation(T.S/L.S) of specimen E. Identify giving reasons. Draw labeled sketches. Leave the slide for valuation.
(Slide-2 marks,Identification-l mark,Sketch-1 mark,Notes-l mark) **1x5=05** Marks.
3.Make a T.S of anther of the given specimen F.. Identify the stages giving reasons. Draw labeled sketches. Leave the slide for valuation.
(Slide-2 marks,Identification-1 mark.Sketch-1 mark,Notes-l mark) **1x5=05** Marks.
4.1dentify,draw and write notes on G.H,I & .1.
(Identification-! mark,Sketch-l mark,Notes-l mark) **4x3=12** Marks.
5. Identify,draw and write notes on K,L,M.N,0 & P.
(Identification-1 mark,Sketch-2 marks,Notes-2 marks) **5x6=30** Marks.
6.Comment on Q.

(Identification-1 mark,Notes-2 marks) 1x3=03 Marks.

KEY

A	ALGAE	SECTION	
B	FUNGI	SECTION	
C	PTERIDOPHYTE	SECTION	
D	GYMNOSPERMS	SECTION	
E	ANATOMY	SECTION	
F	EMBRYOLOGY	SECTION	
G	ALGAE	SLIDE/SECTION	
H	FUNGI	SLIDE/SECTION	
I	LICHENS	SLIDE/SECTION	
J	BRYOPHYTES	SLIDE/SECTION	
K	PTERIDOPHYTE	SLIDE/SECTION	
L	GYMNOSPERMS	SLIDE/SECTION	
M	PALEOBOTANY	SLIDE/SECTION	
N	ANATOMY	SLIDE/SECTION	
O	EMBRYOLOGY	SLIDE/SECTION	
P	LAB TECHNIQUES	APPARATUS	
Q	BRYOPHYTES	MACRO SPECIMEN	

BLUE PRINT OF PRACTICAL QUESTION PAPER FOR M.Sc. PLANT SCIENCE

(Effective from the academic year 2010-11)

PRACTICAL PAPER – II (Covering Theory Papers IV,V & VI)

Time – 4 Hrs. Max. Marks – 75

1. Describe the given specimens A & B in technical terms and assign them to their respective families giving reasons. Draw flower. L.S, & Floral diagram. Write Floral formula.
(identification – 1, Technical description -2, Flower L.S – 1, Floral diagram – 1, Floral formula – 1, Rason - 1) **2x7 = 14 Marks**
2. Using the given plant specimens A,B,C,D & E prepare a taxonomic key for identification. **1x5 = 05 Marks**

3. Determine frequency, abundance and density of the given vegetation in F by using quadrate methods. Estimate Importance Value Index.

(Frequency -2, abundance – 2, density – 2, IV-2) **1x8 = 08 Marks**

4. Performs simple test for tannin/alkaloid/oil/starch/protein in G

(Procedure 4, setup 2, result 1) **1x7 = 07 Marks**

5. Solve the given problem H **1x10 = 10 Marks**

6. Tabulate and graphically represent the given scientific data in I using MS-Excel

1x10 = 10 Marks

7. Identify, draw and write notes on J,K and L

(Identification – 1, Diagram – 2, notes -2) **3x5 = 15 Marks**

8. Submission of herbarium sheets = **06 Marks**

KEY

A	TAXONOMY	SPECIMEN	
B	TAXONOMY	SPECIMEN	
C	TAXONOMY	SPECIMEN	
D	TAXONOMY	SPECIMEN	
E	TAXONOMY	SPECIMEN	
F	ECOLOGY	PROBLEM	
G	RESOURCES	TEST	
H	BIO-STATISTICS	PROBLEM	
I	COMP. APPLICATION	PROBLEM	
J	ECOLOGY	SLIDE/SPECIMEN	
K	RESOURCES	SLIDE/SPECIMEN	
L	COMP. APPLICATION	EXHIBIT	

BLUE PRINT OF PRACTICAL QUESTION PAPER FOR M.Sc. PLANT SCIENCE

(Effective from the academic year 2010-11)

PRACTICAL PAPER - III (Covering Theory Papers VII.VIII & IX)

Time -4 Hrs. Max. Marks – 75

1. Set up the experiment A. Write the procedure, tabulate and infer the results (Set up -3, Procedure - 3, Results 2, inference -1,Sketch/graph-1).

1x10=10 Marks

2. Set up the experiment B. Write the procedure, tabulate and infer the results (Set up -4, Procedure - 4 Results - 3, inference -2,Sketch/graph-2).

1x15=15 Marks

3. Prepare squash/smear of the material C. Identify with reason any two stages. (Slide -3, Notes-2).

1x5=05 Marks

4.Solve the given problem D **1x10=10 Marks**

5.Stain the given bacterial specimen E. Write the procedure identify and draw submit the slide for valuation.
(Slide - 3, Procedure - 4, Identification -1, diagram -2).

1x10=10 Marks

6. Identify, draw and write notes on F. Q, H, I and J
(Identification -1, diagram-2, notes-2) **5x5= 25 Marks**

KEY

A	BIOCHEMISTRY	EXPERIMENT	
B	PHYSIOLOGY	EXPERIMENT	
C	CELL BIOLOGY	EXPERIMENT	
D	GENETICS	PEOBLEM	
E	MICRO BIOLOGY	EXPERIMENT	
F	CELL BIOLOGY	SLIDE/SPECIMEN	
G	GENETICS	SLIDE/SPECIMEN	
H	MICRO BIOLOGY	SLIDE/SPECIMEN	
I	PATHOLOGY	SLIDE/SPECIMEN	
J	PATHOLOGY	SLIDE/SPECIMEN	

EXHIBIT

BLUE PRINT OF **PRACTICAL QUESTION PAPER FOR M.Sc. PLANT SCIENCE**

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PRACTICAL PAPER - IV (Covering Theory Papers X & XI)

Time -4 Hrs. Max. Marks – 75

1.Isolate DNA/RNA from the given material A using spectrophotometric method. (Set up-5,Procedure-6,Results-3,I)iagram-2,Calculation-4) **1x20=20 Marks**.

2.Demonstrate the technique of an! her culture/Inoculate an explant B in the medium. (Set up-10,Procedure-6,Results-2,Diagram-2) **1x20=20 Marks.**

3.Solve the given problem C & 1). **2x5=10 Marks.**

4.1dentify and writr critical notes on **E,F.G,H,I,J,K & L** **8x5=40 Marks**. (Identification-l,Notes-2_5Diagram-2)

KEY

A	MOL.BIOLOGY	EXPERIMENT	
B	BIOTECHNOLOGY	EXPERIMENT	
C	MOL.BIOLOGY	PROBLEM	
D	BIOTECHNOLOGY	PROBLEM	
E	MOL.BIOLOGY	EXHIBIT	
F	MOL.BIOLOGY	EXHIBIT	
G	MOL.BIOLOGY	EXHIBIT	
H	MOL.BIOLOGY	EXHIBIT	
I	BIOTECHNOLOGY	EXHIBIT	
J	BIOTECHNOLOGY	EXHIBIT	
K 4	BIOTECHNOLOGY	EXHIBIT	
L	BIOTECHNOLOGY	EXHIBIT	