PONDICHERRY UNIVERSITY
(A CENTRAL UNIVERSITY)

B.Sc. Information Technology
(Choice Based Credit System)

Regulations & Syllabus

2017-18 onwards

Pondicherry University
Bachelor of Information Technology (B.Sc. IT)
REGULATIONS
(Effective from the academic year 2017-2018)

1. Aim of the Course

The B.Sc. (Information Technology) course aims to impart the students with fundamental and hands on knowledge of computers, information technology and communication and information technology management.

2. Eligibility of Admission

Candidates for admission to B.Sc. (IT) shall be required to have passed 10 + 2 system of Examination or equivalent with Mathematics / Business Mathematics / Computer Science/ Computer Applications as one of the subjects of study.

3. Lateral Entry Admission

Candidates who have passed Diploma in Computer Science / Information Technology/ Computer Technology / Computer Application in I Class (10+3 years of study) are eligible to apply for the lateral entry to the 2nd year of the course subject to availability of seats, but limited to 10% of the sanctioned intake.

4. Duration of the course

The course shall be of three years' duration spread over six consecutive semesters. The maximum duration to acquire prescribed number of credits in order to complete the Programme of Study shall be twelve consecutive semesters (six years).

5. Medium

The medium of instruction shall be English.

6. **Course Structure**

Category	Course Name	Number Of Papers	Credits Per Paper	Total Credits
MIL	Modern Indian Languages	2	3	6
ENG	English	2	3	6
AECC	Ability Enhancement Compulsory Course	2	2	4
SEC	Skill Enhancement Course	4	2	8
GE	Generic Elective Course	2	3	6
DSC	Discipline Specific Core Course	Theory- 12 Practical – 9 Project -1	Theory- 3 Practical – 2 6	12x3=36 9 x 2 =18 1 x 6 = 6 Total = **60**
DSE	Discipline Specific Elective Course	6	4	6 x 4 =24
OE	Open Elective Course	2	3	2 x 3 =6
			Total	**120**

MIL, ENG, AECC

The crediting of MIL, ENG and AECC courses is as per Pondicherry University UG CBCS regulations.

DSC and DSE

At least 60% (72 credits) of the total minimum credit requirement must be earned by the student from DSC and DSE courses as follows in order to obtain the degree - 60 credits from Discipline Specific Core and 12 credits from Discipline Specific Elective courses.

SEC

Out of the 4 Skill Enhancement Courses, two courses viz. – i) Online Course / In-Plant Training (2 weeks) / One month Internship / mini project is mandatory. The Online Course to be studied, the organization to be chosen for In-Plant Training or One month internship is to be validated or approved by a panel of members comprising of the Department Faculty, before a student pursues the same.

For the remaining 2 SEC courses, any of the 2 credit Skill Enhancement Courses specified in the curriculum (B.Sc. IT) could be credited or substituted with Skill Enhancement Courses in the curriculum of other UG computer science courses or Skill Enhancement Courses of other UG Non-Computer Science Disciplines of study that constitute to skill development or an assortment of these without any overlap of courses.

GE

Any 2 of the 3 credit Generic Elective Courses specified in the curriculum (BCA) could be credited to constitute the 6 credits or substituted with Generic Elective courses in the curriculum of other UG Computer Science Disciplines of study or UG Courses of Non-Computer Science Disciplines of study that add proficiency to the students - with the advice of the Faculty Advisor, or an assortment of these without any overlap of courses.

DSE

The six 4 credit papers to be credited under DSE can be credited from Discipline Specific Elective specialization stream courses as follows:

I. Three of the 4 credit courses should be credited from one specialization stream courses or across the different specialization stream courses specified in the curriculum.

II. The remaining three of the 4 credit courses may be credited from
   a. Another specialization stream courses of the curriculum or across the different specialization stream courses specified in the curriculum without any overlap of courses credited in I above.

   or

b. Another specialization stream courses or across the different specialization stream courses in the curriculum of other UG Computer Science Disciplines of study without any overlap of courses credited in I above.

or

c. An assortment of the above options in II a and IIb.

OE

Any 2 of the 3 credit Open Elective Courses specified in the curriculum (B.Sc. IT) could be credited to constitute the 6 credits or substituted with Open elective courses in the curriculum of other UG Computer Science disciplines of study or substituted with UG Courses of Non-Computer Science Disciplines of study that add proficiency to the students - with the advice of the Faculty Advisor or an assortment of these without any overlap of courses.

7. Faculty to Students Ratio

The Faculty to Student Ratio in all the practical / laboratory classes shall be maintained at 1:25.

8. Pattern of Examination

I. The End-Semester examination and internal assessments for MIL, ENG, AECC, DSC, GE and OE courses are as per Pondicherry University UG CBCS regulations.

II. All SEC courses (except Online Course / In-Plant Training (2 weeks) / One month Internship) to be treated as a practical / laboratory course and the End-Semester examination to be conducted as per Pondicherry University UG CBCS regulations.

III. The internal assessments for all practical / laboratory courses (for DSC, SEC courses) shall be as follows – 15 marks from two internal practical / laboratory assessment tests and 5 marks based on practical / laboratory course based mini application development.

IV. The internal assessment for DSE courses shall be conducted as follows - 12 marks from two internal assessment tests and 8 marks based only on two internal practical / laboratory assessment tests.

V. The marks for attendance (5 marks) applies to all courses and the awarding of attendance marks is as per Pondicherry University UG CBCS regulations.

VI. The Project work is to be evaluated as follows:

    i. The internal assessment (25 marks) is awarded as follows:

        a. 10 marks is awarded based on two internal project reviews conducted in periodic intervals by a panel comprising of members of the Department during the tenure of the project.

        b. The student's project guide awards 10 marks for the project work and 5 marks for attendance (attendance marks as specified in the Pondicherry University UG CBCS regulations).

    ii. The End Semester Examination assessment (75 marks) is evaluated under two aspects viz – i)Project Work – (50 marks) ii)Project Report and Viva-Voce (25 marks)

Passing Minimum

Passing Eligibility and classification for the award of the Degree is as per Pondicherry University UG CBCS regulations.

Lateral Entry

The Lateral Entry students have to complete 102 credits from the DSC, DSE, GE, SE, OE courses as per curriculum (IIIrd to VIth semesters). In addition, they should complete the two AECC courses (4 credits) for the award of the degree. One MIL (3 credits) and one ENG (3 credit) courses also need to be completed, if it is not studied in the last three years of the course eligible for lateral entry admission.

Other aspects of CBCS not covered in this document by default conforms to the Pondicherry University UG CBCS regulations.

PONDICHERRY UNIVERSITY

B.Sc.-Information Technology

PROPOSED STRUCTURE OF THE COURSE UNDER CBCS 2017-2018

FIRST SEMESTER

COURSE	SUBJECT CODE	Paper	CREDITS		HOURS		
			Theory	Prac.	L	T	P
MIL	LTAM/LHIN/LTEL LMAL111	Language-I	3	-	4	1	0
ENG	ENGL112	English-I	3	-	4	1	0
DSC-1	CSIT113	Introduction to Problem Solving using C	3	-	4	1	0
DSC-2	CSIT114	Digital Electronics	3	-	4	1	0
AECC-1	PADM115	Public Administration	2	-	2	0	0
DSC-1(lab)	CSIT116	Programming in C lab	-	2	0	0	4
DSC-2 (lab)	CSIT117	Digital lab		2	0	0	4
		TOTAL	**18**		**30**		

SECOND SEMESTER

COURSE	SUBJECT CODE	Paper	CREDITS		HOURS		
			Theory	Prac.	L	T	P
MI4L	LTAM/LHIN/LTEL LMAL121	Language-II	3	-	4	1	0
ENG	ENGL122	English-II	3	-	4	1	0
DSC - 3	CSIT123	PYTHON Programming	3	-	3	0	0
DSC - 4	CSIT124	Data Structures and Algorithms	3	-	3	0	0
GE – 1 (1 out of 2)	CSIT125	Discrete Mathematics	3	-	4	0	0
	CSIT126	Probability and Statistics					
AECC-2	ENVS127	EVS	2	-	2	0	0
DSC-3 (lab)	CSIT128	PYTHON Programming lab	-	2	0	0	4
DSC-4(lab)	CSIT129	Data Structures and Algorithms lab	-	2	0	0	4
		TOTAL	**21**		**30**		

THIRD SEMESTER

COURSE	SUBJECT CODE	Paper	CREDITS		HOURS		
			Theory	Prac.	L	T	P
DSC – 5	CSIT231	Object Oriented Programming Using JAVA	3	-	3	1	0
DSC – 6	CSIT232	Information theory and Coding	3	-	3	1	0
DSC – 7	CSIT233	Computer Networks	3	-	3	1	0
DSC – 8	CSIT234	Software Engineering	3	-	3	0	0
GE-**2** (1 out of 2)	CSIT235	Operation Research	3	-	3	0	0
	CSIT236	Numerical Methods					
DSC-5(lab)	CSIT237	Object Oriented Programming Using JAVA lab	-	2	0	0	4
DSC-8(lab)	CSIT238	Software Engineering lab	-	2	0	0	4
SEC-I	CSIT201	**SEC-1** Soft Skills	-	2		1	3
		TOTAL	**21**		**30**		

FOURTH SEMESTER

COURSE	SUBJECT CODE	Paper	CREDITS		HOURS		
			Theory	Prac.	L	T	P
DSC – 9	CSIT241	Database Management System	3	-	3	0	0
DSC – 10	CSIT242	Digital Signals Processing	3	-	3	1	0
DSE – 1 DSE – 2 (2 out of 5 stream s)	CSIT243	Object Oriented System Design	3	1	3	1	2
	CSIT244	Distributed Computing	-	-	0	0	0
	CSIT245	Wireless Communication Technologies	-	-	0	0	0
	CSIT246	Fundamentals of Multimedia	3	1	3	1	2
	CSIT247	IT Infrastructure Management	-	-	0	0	0
OE-2 (1 out of 2)	CSIT248	E-Commerce	3	-	3		0
	CSIT249	IT Enabled Services	-	-	0	0	0
DSC-9 (lab)	CSIT250	DBMS lab	-	2	0	0	4
SEC (1 out of 2)	CSIT301	**SEC-II** Office Automation tools		2	0	1	3
	CSIT302	**SEC-II** Linux and Shell Programming					
		TOTAL	**21**		**30**		

FIFTH SEMESTER

COURSE	SUBJECT CODE	Paper	CREDITS		HOURS		
			Theory	Prac.	L	T	P
DSC – 11	CSIT351	Operating System	3	-	3	0	0
DSE – 3 DSE – 4 **(2 out of 5)**	CSIT352	Service Oriented Architecture	3	1	3	1	2
	CSIT353	Cloud Computing					
	CSIT354	Introduction to Mobile Communication	3	1	3	1	2
	CSIT355	Multimedia Applications					
	CSIT356	IT Project Management					
OE-2 **(1 out of 2)**	CSIT357	Total Quality Management	3	-	3	0	0
	CSIT358	Artificial Intelligence					
DSC-11 (lab)	CSIT359	Operating System lab	-	2	0	0	4
SEC (1 out of 2)	CSIT401	**SEC-III** PHP Programming					
	CSIT402	**SEC-III** Android Programming					
Compulsory	CSIT403	**SEC-IV** Online Course / In-Plant Training (2 weeks) / One month Internship / mini project	-	2	0	1	3
		TOTAL	**20**		**30**		

SIXTH SEMESTER

COURSE	SUBJECT CODE	Paper	CREDITS		HOURS		
			Theory	Prac.	L	T	P
DSC – 12	CSIT361	Web Technology	3	-	3	0	0
DSC – 13	CSIT362	PROJECT	-	6	0	1	10
DSE - 5 DSE – 6 **(2 out of 5)**	CSIT363	Software Testing	3	1	3	1	2
	CSIT364	Services Computing					
	CSIT365	Internet of Things					
	CSIT366	Audio and Visual Technology	3	1	3	1	2
	CSIT367	Information Security Management					
DSC-12 (lab)	CSIT368	Web Technology lab	-	2	0	0	4
		TOTAL	**19**		**30**		

B.Sc – INFORMATION TECHNOLOGY [CBCS PATTERN]

COURSE STRUCTURE

From the Academic Year 2017 - 2018

Title	No. of papers	No. of credits	Total Credits	Theory / practical
MIL	2	3	6	Theory
English	2	3	6	Theory
Discipline Specific Core (DSC) - Core papers - Theory	12	3	36	Theory
DSC – Core papers (LAB)	9	2	18	Practical
DSC - Project work	1	6	6	
Discipline Specific Elective (DSE) – Specialization Papers	6	3+1	24	Theory
Generic Elective (GE) - Mathematics	2	3	6	Theory
Open Elective (OE)	2	3	6	Theory
Ability Enhancement Compulsory Core (AECC) (Environmental Studies & Public Administration)	2	2	4	Theory
Skill Enhancement Core (SEC)	4	2	8	Practical
		Total Credits	**120**	

	DISCIPLINE SPECIFIC CORES (DSC)	Semester
1	**Introduction to Problem Solving using C**	**I**
2	**Digital Electronics**	**I**
3	**PYTHON Programming**	**II**
4	**Data Structures and Algorithms**	**II**
5	**Object Oriented Programming using JAVA**	**III**
6	**Information Coding & Theory**	**III**
7	**Computer Networks**	**III**
8	**Software Engineering**	**III**
9	**Database Management Systems**	**IV**
10	**Digital Signals Processing**	**IV**
11	**Operating Systems**	**V**
12	**Web Technology**	**VI**
13	**PROJECT**	**VI**
	DISCIPLINE SPECIFIC ELECTIVES (DSE) **(Specialization Stream - I)** **Software Engineering**	
1	**Object Oriented System Design**	
2	**Service Oriented Architecture**	
3	**Software Testing**	
	DISCIPLINE SPECIFIC ELECTIVES (DSE) **(Specialization Stream - II)** **Advanced Computing**	
1	**Distributed Computing**	
2	**Cloud Computing**	
3	**Services Computing**	

	DISCIPLINE SPECIFIC ELECTIVES (DSE) **(Specialization Stream - III)** **Wireless Communication**	
1	**Wireless Communication Technologies**	
2	**Introduction to mobile Communication**	
3	**Internet of Things**	
	DISCIPLINE SPECIFIC ELECTIVES (DSE) **(Specialization Stream - IV)** **Multimedia**	
1	**Fundamentals of Multimedia**	
2	**Multimedia Applications**	
3	**Audio & Visual Technology**	
	DISCIPLINE SPECIFIC ELECTIVES (DSE) **(Specialization Stream - V)** **IT Management**	
1	**IT Infrastructure Management**	
2	**IT Project Management**	
3	**Information Security Management**	
	OPEN ELECTIVES	
1	**E-Commerce**	**IV**
2	**IT Enabled Services**	**IV**
3	**Total Quality Management**	**V**
4	**Artificial Intelligence**	**V**
	SKILL ENHANCEMENT COURSES	
1	**Soft Skills (SEC–I)**	**III**

2	**Office Automation (SEC-II)**	**IV**
3	**Linux and Shell Programming (SEC-II)**	**IV**
4	**Programming with PHP (SEC-III)**	**V**
5	**Android Programming (SEC-III)**	**V**
8	**** Online Course / In-Plant Training (2 weeks) / One month Internship / mini project (SEC-IV)**	**V**
	GENERIC ELECTIVES	
1	**Discrete Mathematics**	**II**
2	**Probability and Statistics**	**II**
3	**Operation Research**	**III**
4	**Numerical Methods**	**III**
	COURSES OFFERED TO NON-COMPUTER SCIENCE STUDENTS	
1	**Fundamentals of Information Technology**	
2	**Fundamentals of 'C' Language**	
3	**Web Designing**	
4	**Basics of Computers and Office Automation**	

NOTE:

** -- compulsory course

No.	SUBJECT CODE	SUBJECT	PRACTICAL	CREDITS	Total Credits
		I SEM			
1	LTAM/LHIN/ LMAL/ /LTEL111	MIL - I		3	
2	ENGL112	English – 1		3	
3	CSIT113	DSC – I Introduction to Problem Solving using C		3	
4	CSIT114	DSC – II Digital Electronics		3	
5	PADM115	AECC – I Public Administration		2	
6	CSIT116	Programming in C lab	LAB	2	
7	CSIT117	Digital lab	LAB	2	Total=18
		II SEM			
1	LTAM/LHIN/ LMAL/ /LTEL121	MIL - II		3	
2	ENGL122	English - 2		3	
3	CSIT123	DSC – III PYTHON Programming		3	
4	CSIT124	DSC – IV Data Structures and Algorithms		3	
5	CSIT125	GE- I Discrete Mathematics			
	CSIT126	GE- I Probability and Statistics		3	
6	ENVS127	AECC – II EVS		2	
7	CSIT128	PYTHON lab	LAB	2	
8	CSIT129	Data Structures and Algorithm lab	LAB	2	Total=21

		III SEM			
1	**CSIT231**	**DSC – V** Object Oriented Programming Using JAVA		3	
2	**CSIT232**	**DSC – VI** Information theory and Coding		3	
3	**CSIT233**	**DSC – VII** Computer Networks		3	
4	**CSIT234**	**DSC – VIII** Software Engineering		3	
5	**CSIT235**	**GE- II** Operation Research		3	
6	**CSIT236**	**GE –II** Numerical Methods			
7	**CSIT237**	**Object Oriented Programming Using JAVA lab**	LAB	2	
8	**CSIT238**	**Software Engineering lab**	LAB	2	
9	**CSIT201**	**SEC – I[compulsory]** Soft Skills	LAB	2	Total=21
		IV SEM			
1	**CSIT241**	**DSC – IX** Database Management System		3	
2	**CSIT242**	**DSC – X** Digital Signals Processing		3	
3		**DSE – I & II** **Specialization paper – I & II**		3+1	
	CSIT243	Object Oriented System Design			
	CSIT244	Distributed Computing			
	CSIT245	Wireless Communication Technology		3+1	
	CSIT246	Fundamentals of Multimedia			
	CSIT247	IT Infrastructure Management			

4	**CSIT248**	**OE - I** E-Commerce		3	
5	**CSIT249**	**OE – I** IT Enabled Services			
6	**CSIT250**	**DBMS lab**	LAB	2	
7	**CSIT301**	**SEC – II** Office Automation tools	LAB	2 (1 out of 2)	Total=21
8	**CSIT302**	**SEC- II** Linux and Shell Programming	LAB		

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V SEM

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1	**CSIT351**	**DSC – X** Operating System		3	
2	**CSIT352** **CSIT353** **CSIT354** **CSIT355** **CSIT356**	**DSE – III & IV** **Specialization paper– III & IV** Service Oriented Architecture Cloud Computing Introduction to Mobile Communication Multimedia Applications IT Project Management		3+1 3+1	
3	**CSIT357**	**OE – II** Total Quality Management		3	
4	**CSIT358**	**OE – II** Artificial Intelligence			
5	**CSIT359**	**Operating System lab**	LAB	2	
6	**CSIT401**	**SEC – III** PHP Programming	LAB	2 (1 out of 2)	
7	**CSIT402**	**SEC – III** Android Programming	LAB		
9	**CSIT403**	**SEC – IV [<u>COMPULSORY</u>]** Online Course / In-Plant Training (2 weeks) / One month	LAB	2	Total=20

		Internship / mini project			
		VI SEM			
1	**CSIT361**	**DSC – XII** Web Technology		3	
2	**CSIT362**	**DSC – XIII** Project work		6	
3		**DSE – V&VI** **Specialization paper – V& VI**			
	CSIT363	Software Testing		3+1	
	CSIT364	Services Computing			
	CSIT365	Internet of Things			
	CSIT366	Audio and Visual Technology			
	CSIT367	Information Security Management		3+1	Total=19
4	**CSIT368**	**Web Technology lab**	LAB	2	

TOTAL CREDITS: 120

Bachelor of Science (INFORMATION TECHNOLOGY*)*

under *CHOICE-BASED CREDIT SYSTEM(CBCS)*

(Effective from the academic year 2017- 2018)

Paper Code: CSIT113

INTRODUCTION TO PROBLEM SOLVING USING C

L	T	P
4	1	0

Prerequisite: - Basic knowledge of Mathematics and Computers
Objectives:
- 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. Tromey, "How to solve it by computer", Prentice Hall, 1982.
3. Paul Deital & Harvey Deital, "C How to Program", 7th edition, Pearson Education, 2013.

Paper Code: CSIT116

L	T	P
0	0	4

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

Paper Code: CSIT114

L	T	P
4	1	0

DIGITAL ELECTRONICS

Prerequisite: Basic knowledge about computers
Objectives:
•   To introduce the fundamentals of digital system design.
•   To lay strong foundation to the combinational and sequential logic.
•   To educate from basic concepts to advanced system design.

MODULE – I
Number systems & Conversions – Arithmetic of number systems – binary codes – BCD – The excess – 3code – the gray code – ASCII – EBCDIC

MODULE – II
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 – III
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 – IV
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 – serial-in serial-out shift register - serial-in parallel-out shift register - parallel-in-serial-out(PISO) shift register - parallel-in-parallel-out shift register – bidirectional shift register – counters – classification of counters – designing a counter

MODULE – V
Combinatorial logic circuits – designing procedure – code converters – multiplexers – multiplexer tree – demultiplexers/decoders – half & full adder – half & full subtractor – encoders – BCD adder – D/A & A/D conversions - D/A converter with binary-weighted registers – D/A converter with R & 2R resisters – A/D converter

TEXT BOOK:
1. S.S. Bhatti & Ragul Malhotra, "A Textbook of Digital Electronics", I.K. International publishing, New Delhi, 2013
2. Morris Mano M., "Digital Logic and Computer Design", Pearson Education, 1/e, 2010.

Paper Code: CSIT117

DIGITAL LAB

L	T	P
0	0	4

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

Paper Code: CSIT123

L	T	P
3	0	3

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

Paper Code: CSIT128

L	T	P
0	0	4

PYTHON PROGRAMMING 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: $1 - 2/2! + 3/3! - \text{ - - - - } n/n!$
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>=0.
9. A population of 1000 bacteria is introduced into a nutrient medium. The population p grows as follows:

$$P(t) = (15000(1+t))/(15+ e)$$

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)

Paper Code: CSIT124

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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 Horowiz, 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.

Paper Code: CSIT129

DATA STRUCTURES & ALGORITHMS LAB

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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.

Paper Code: CSIT231

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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.

Paper Code: CSIT237

OBJECT ORIENTED PROGRAMMING USING JAVA LAB

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LIST OF EXERCISES

1. Program to illustrate various date 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

Paper Code: CSIT232

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INFORMATION THEORY AND CODING

Prerequisite: Knowledge of Probability

Objectives
- Students will learn about Information Theory, Entropy and Probability.
- To understand Source Coding, Channel Coding, Error Detection and Correction, Error Control Coding and various types of codes

MODULE I:
Introduction to Probability, Sample space and events, The axioms of probability Elementary theorems –Conditional Probability and Independence, Baye's theorem. Random variables, discrete probability distribution, discrete functions for random and discrete random variables, continuous random variables.

MODULE II
Uncertainty and Information, Shannon Entropy, Joint and conditional Entropies Mutual Information, Uniquely decipherable and Instantaneous codes, Noiseless coding problem. Source coding Theorem, Block coding, construction of Optimal codes, Huffman's & Shannon – Fano methods.

MODULE III
Discrete memory less channel, channel capacity BSC and other channels.

MODULE IV
Information measure for continuous ensembles capacity of AWGN channel. Error control coding. The channel coding Theorem, Application to BSC, Source Coding with fidelity criteria. Types of codes, error and error control strategies, Linear block codes, syndrome and error detection, Minimum distance, Error detecting and correcting capabilities of a block code, Syndrome decoding, Hamming codes.

MODULE V
Cyclic codes, Generator and parity – check matrices, encoding, syndrome computation and error detection and decoding.

Text Books:
1. Murray Spiegel, John Schiller, R. Alu Srinivasan, Debasree Goswami, "Probability and Statistics" (Schaum?s Outline Series).
2. J.H. van Lint, "Introduction to coding theory", Springer.
3. R. Ash, "Information Theory", Dover Science Publications.
4. Cover and Thomas , "Element of Information Theory", John Wiley & Sons.
5. Simon Haykin, "Communication Systems", Wiley Student

REFERENCE BOOKS
1. F.J. MacWilliams and N.J.A. Slone, The theory of error correcting codes,North Holland, 1977.
2. R.E. Balahut, Theory and practice of error control codes, Addison Wesley, 1983.
3. Thomas M. Cover, Joy A. Thomas, "Elements of Information Theory", Wiley Publishers.
4. Ranjan Bose," Information Theory Coding, Cryptography", TMH Publication.

Paper Code: CSIT233

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COMPUTER NETWORKS

Prerequisite: Basic knowledge of computers
Objectives:
1. Given an environment, after analyzing the channel characteristics, appropriate channel access mechanism and data link protocols are chosen to design a network.
2. Given an environment, analyzing the network structure and limitations, appropriate routing protocol is chosen to obtain better throughput.
3. 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 BOOK
Andrew S. Tanenbaum, "Computer Networks", Prentice Hall India, 5th edition, 2010

Paper Code: CSIT234

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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.

Paper Code: CSIT238

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SOFTWARE ENGINEERING LAB

LIST OF EXERCISES

1. Studying various phases of Water-Fall Model.
2. Prepare SRS for Banking or Online book store domain problem
3. Using COCOMO model estimate effort for Banking or on line book store domain problem.
4. Calculate effort using FP oriented estimation model
5. Analyze the Risk related to the project and prepare RMMM plan.
6. Develop Time-line chart and project table using PERT or CPM project scheduling methods.
7. Draw E-R diagram, DFD, CFD and STD for the project.
8. Design of the test cases.
9. Prepare FTR. Version control and change control for software configuration item

Paper Code: CSIT241

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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.

Paper Code: CSIT250

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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.

Paper Code: CSIT242

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DIGITAL SIGNALS PROCESSING

Prerequisite: Basic knowledge of computers and signals
Objectives:

- To learn the concepts of frequencies and sampling.
- To understand the needs of filtering methods.
- To understand the different types of signals.

MODULE-1
Basic elements of DSP – concepts of frequency in Analog and Digital Signals – sampling theorem – Discrete – time signals, systems – Analysis of discrete time LTI systems – Z transform – Convolution (linear and circular) – Correlation.

MODULE-II
Introduction to DFT – Properties of DFT – Filtering methods based on DFT – FFT Algorithms Decimation – in – time Algorithms, Decimation – in – frequency Algorithms – Use of FFT in Linear Filtering – DCT.

MODULE-III
Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (HPF, BPF, BRF) filter design using frequency translation

MODULE-IV
Structures of FIR – Linear phase FIR filter – Filter design using windowing techniques, Frequency sampling techniques – Finite word length effects in digital Filters

MODULE-V
Multi-rate signal processing – Speech compression – Adaptive filter – Musical sound processing – Image enhancement.

TEXT BOOKS:
1. John G. Proakis & Dimitris G.Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", Fourth edition, Pearson education / Prentice Hall, 2007.
2. Emmanuel C..Ifeachor, & Barrie.W.Jervis, "Digital Signal Processing", Second edition, Pearson Education / Prentice Hall, 2002.

REFERENCES:
1. Alan V.Oppenheim, Ronald W. Schafer & Hohn. R.Back, "Discrete Time Signal Processing", Pearson Education, 2nd edition, 2005.
2. Andreas Antoniou, "Digital Signal Processing", Tata McGraw Hill, 2001

Paper Code: CSIT351

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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.

Paper Code: CSIT359

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OPERATING SYSTEM LAB

LIST OF EXERCISES

1. Memory allocation - Mono-programming
2. Memory allocation - Multi-programming
3. Job Scheduling – Mono - programming
4. Job Scheduling – Multi - programming
5. Process Scheduling – Round Robin
6. Process Scheduling - FIFO
7. Process Scheduling - SJF
8. Process Synchronization
9. General File Management

Paper Code: CSIT361

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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.

Paper Code: CSIT368

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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.

Paper Code: CSIT362

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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 VI) 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.

DISCIPLE SPECIFIC ELECTIVE (DSE) PAPERS

SPECIALIZATION STREAM -I [SOFTWARE ENGINEERING]

Paper Code: CSIT243

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OBJECT ORIENTED SYSTEM DESIGN

Prerequisite: Knowledge of object oriented programming
Objectives:
- Understand software modeling and Architectural Concepts
- Understand and apply UML notations in designing software
- Gain knowledge about Static and Dynamic modeling

MODULE - I
Introduction - overview - Object basics - Object state and properties, Behavior, Methods, Messages- Object Oriented system development life cycle - Benefits of OO Methodology. - Overview of Prominent OO Methodologies - Rumbaugh OMT-. The Booch methodology- Jacobson's OOSE methodologies- Unified Process

MODULE - II
Introduction to UML - Use case diagram - Requirement Capture with Use case- Building blocks of Use Case diagram - Relationships between use cases - extend, include, generalize - Activity diagram - Elements of Activity Diagram - Object - Control and Object flow, Transition - Guidelines for Creating Activity Diagrams- Activity Diagram - Action Decomposition - Partition - Swim Lane - Static structural view - Relationships among classes- Dependency relationships among classes, notations - Package & interface notation - Object diagram notations and modelling - relations among objects.

MODULE - III
Class Modeling and Design Approaches - Three approaches for identifying classes - using Noun phrases, Abstraction, Use Case Diagram - Comparison of approaches- Using combination of approaches. - Flexibility guidelines for class diagram: Cohesion, Coupling, Forms of coupling - class Generalization, class specialization versus aggregation -Behavioral - State diagram - State Diagram states - Interaction diagrams- Sequence diagram - Sequence diagram notations - Activations in sequence diagram- Collaboration diagram - Collaboration diagram notations

MODULE - IV
Approaches for developing dynamic systems- Top-down approach for dynamic systems- Bottom-up approach for dynamic systems- Flexibility Guidelines for Behavioral Design - Architectural view- Logical architecture - Hardware architecture - deployment diagram notations, nodes, object migration between node - Process architecture - process and threads notations in UML, object synchronization, invocation schemes for threads - Implementation architecture - component diagram notations and examples.

MODULE - V
Reuse - Libraries, Frame works components and Patterns- Reuse of classes- Reuse of components- Reuse of frameworks, black box framework, white box frame- Reuse of patterns - Architectural pattern and Design pattern.

Text Books

1. Ali Bahrami, "Object Oriented Systems Development using the unified modeling language", 1st edition, TMH, 2008.

2. Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", 2nd edition, Pearson Education, 2007.

Paper Code: CSIT352

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SERVICE ORIENTED ARCHICTECHTURE

Prerequisite: Knowledge of Object oriented system design.
Objectives
1. Understand the concepts of Service Oriented Architecture along with the evolution of SOA.
2. Be aware of the key issues facing many organizations, especially dealing with integration among systems and providing architectural abstractions to them.
3. Integrate SOA technologies with Web Services paradigms.
4. Know related technologies and implementation basics of SOA.

MODULE - I   Fundamental SOA- Common Misperceptions about SOA- Common tangible benefits of SOA- Common pitfalls of adopting SOA. The Evolution of SOA:-from XML to Web services to SOA, Comparing SOA with N-tier architecture, The continuing evolution of SOA, The roots of SOA.

MODULE - II   Web Services and Primitive SOA: The Web services framework- Services, Service descriptions, messaging with SOAP. Web Services and Contemporary SOA: Message exchange patterns- Service activity coordination - Atomic transactions- Business activities-Orchestration-Choreography.

MODULE - III Service Orientation And Security - Web Services and Contemporary SOA: Addressing- Reliable messaging- Correlation- Policies Metadata exchange- Security-Notification and eventing - SOA and Service-Orientation: Principles of Service-Orientation-Service-orientation. Anatomy of a service-oriented architecture- Common principle of service-orientation-Service Layers –Service orientation.

MODULE - IV Building SOA - Delivery Strategies- SOA delivery lifecycle phases. Service-Oriented Analysis: Introduction to service-oriented analysis- Benefits of a business-centric SOA Deriving business services- ServiceOriented Analysis: Service modeling, Service modeling guidelines- Classifying service model logicContrasting service modeling approaches.

MODULE - V Service-Oriented Design - Introduction to service-oriented design- WSDL-related XML Schema language basics- WSDL language basics- SOAP language basics- Service interface, design tools. SOA Composition Guidelines: Steps to composing SOA Considerations for choosing service layers and SOA standards, positioning of cores and SOA extensions.

Text Books
1. Thomas Erl ,” Service-Oriented Architecture: Concepts, Technology & Design”, Pearson Education Pte Ltd 2008
2. Michael Rosen, Boris Lublin sky, Kevin T. Smith, Marc J. Balcer, “Applied SOA: Service Oriented Architecture and Design Strategies”, Wiley, 2010.

Reference Books

1. Thomas Erl,”SOA Principles of Service Design”Pearson Exclusives 2007.

2. Tomas Erl and Grady Booch,”SOA Design Patterns”Prentice Hall 2008.111.

3. David S.Linthicum,”Cloud Computing and SOA Convergence in Your Enterprise”,Pearson Addison-Wesley Information Technology Series.

4. Shankar Kambhampaty, “Service Oriented Architecture – for enterprise and cloud applications”,Wiley Second Edition.

5. Douglas K. Barry, “Web Services, Service-Oriented Architectures, and Cloud Computing”, Elsevier, 2003. 6

6. James Bean, “SOA and Web Services Interface Design: Principles, Techniques and Standards”, Elsevier, 2010

Paper Code: CSIT363

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SOFTWARE TESTING

Prerequisite: Knowledge of Software Engineering.
Objectives

- To make practitioners/students to understand the state-of-practice in testing industry by learning various types of software testing**.**

MODULE - I
Principles of testing – Software development life cycle models – phases of software project – life cycle models - Types of Testing – white box testing – static testing – structural testing – challenges in white box testing – black box testing – how to do black box testing

MODULE - II
Integration Testing – integration testing as a type of testing – integration testing as phase of testing – scenario testing – defect bash – System & Acceptance Testing - reason for conducting system testing – functional testing and non –functional testing - acceptance testing – summary of testing phases

MODULE - III
Performance testing – factors governing performance testing – methodology for performance testing – tools for performance testing – process for performance testing – challenges

Text Book:
Srinivasan Desikan & Goplaswamy Ramesh, "Software Testing: Principles & Practices", Dorling Kindersley (India) Pvt. Ltd, 2013.

Software Testing Lab:

Implement the below mentioned exercises using any Testing Tool

1. Test Principles and Concepts
2. Test Management
3. Build the Test Environment
4. Test Planning Process
5. Test Design
6. Performing Tests
7. Defect Streaming and Correction
8. Acceptance Testing
9. Status of Testing
10. Test Reporting

Paper Code: CSIT244

DISTRIBUTED COMPUTING

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Prerequisite: Knowledge of Database and 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. Case study: Java RMI - 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- Distributed File Systems – Introduction - File service architecture – Andrew File system.

MODULE V

Introduction - Clocks, events and process states - Synchronizing physical clocks - Logical time and logical clocks - Global states –Coordination and Agreement – Introduction - Distributed mutual exclusion – Elections – Transactions and Concurrency Control– Transactions -Nested transactions – Locks - Optimistic concurrency control - Timestamp ordering -Distributed deadlocks – Replication – Case study - Coda

Text Book

  George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems Concepts and Design",AddisonWesley.

Paper Code: CSIT353

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CLOUD COMPUTING

Prerequisite: Knowledge of Parallel and Distributing computing.
Objectives
- To impart the principles and paradigm of Cloud Computing
- To understand the Service Model with reference to Cloud Computing
- To comprehend the Cloud Computing architecture and implementation
- To realize the role of Virtualization Technologies
- To have knowledge on Cloud Computing management and security

MODULE – I
Computing Paradigms - Cloud Computing Fundamentals - Motivation for Cloud Computing - Defining Cloud Computing - Principles of Cloud computing - Cloud Ecosystem - Requirements for Cloud Services - Cloud Application - Benefits and Drawbacks - Cloud Computing Architecture and Management Cloud Architecture - Anatomy of the Cloud- Network Connectivity in Cloud Computing - Applications on the Cloud- Managing the Cloud - Migrating Application to Cloud

MODULE – II
Cloud Deployment Models – Introduction - Private Cloud - Public Cloud- CommModuley Cloud - Hybrid Cloud- Cloud Service Models- Infrastructure as a Service- Platform as a Service- Software as a Service

MODULE – III
Technological Drivers for Cloud Computing - SOA and Cloud – Virtualization- Multicore Technology - Memory and Storage Technologies - Networking Technologies - Web 2.0 - Web 3.0 - Software Process Models for Cloud- Programming Models - Operating System - Application Environment

MODULE – IV
Virtualization - Approaches to Virtualization- Hypervisors - From Virtualization to Cloud Computing- Programming Models for Cloud Computing

MODULE – V
Software Development in Cloud Introduction - Different Perspectives on SaaS Development - New Challenges - Cloud-Aware Software Development Using PaaS Technology

Text Book:
K. Chandrasekaran, "Essentials of Cloud Computing", CRC Press, Taylor & Francis Group

Paper Code: CSIT364

L	T	P
3	1	2

SERVICES COMPUTING

Prerequisite: Knowledge of Computing and Web services.
Objectives
- To understand the advantages of using XML technology family
- To analyze the problems associated with tightly coupled distributed software architecture
- To use Web services as building block in distributed application development
- To design e-business solutions using SOA and XML based web services

MODULE – I
Web services basics – Introduction - The concept of software as a service - A more complete definition of Web services - A more complete definition of Web services - Characteristics of Web services - Service interface and implementation - The service-oriented architecture - Operations in the SOA - The Web services technology stack - Quality of service(QoS) - Web services interoperability

MODULE – II
Enabling infrastructure - Distributed computing infrastructure- Distributed computing and Internet protocols - The client–server model - Characteristics of inter process communication - Synchronous forms of middleware - Asynchronous forms of middleware - Request/reply messaging - Message-oriented middleware

MODULE – III
Brief overview of XML - XML document structure - URIs and XML namespaces - XML schemas reuse - Document navigation and transformation

MODULE – IV
Core functionality and standards - SOAP: Simple Object Access Protocol - Inter-application communication and wire protocols - SOAP as a messaging protocol - Structure of a SOAP message - The SOAP communication model - Error handling in SOAP - SOAP over HTTP - Advantages and disadvantages of SOAP

MODULE – V
Describing Web services - Why is a service description needed? - WSDL: Web Services Description Language - Using WSDL to generate client stubs - Non-functional descriptions in WSDL - Registering and discovering Web services - Registering and discovering Web services Service registries - Service discovery - UDDI: Universal Description, Discovery, and Integration

Text Book:
Michael P. Papazoglou," Web Services: Principles and Technology", Pearson Education,2008

Paper Code: CSIT245

WIRELESS COMMUNICATION TECHNOLOGIES

L	T	P
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Prerequisite: Knowledge of Data communication and Networks.
Objectives
- To know about the various frequency Spectrum and Signals for wireless communication
- To Know the concept of Infrared, Cordless and WLL
- To understand the concepts wireless communication technologies such as Wireless LAN, WiMAX, Bluetooth and Wi-Fi

MODULE –I
Introduction to Protocols and the TCP/IP Suite - The Need for a Protocol Architecture, The TCP/IP Protocol Architecture, The OSI Model, Inter-networking. Wireless Communication Technology- Antennas and Propagation- Antennas, Propagation Modes, Line-of-Sight Transmission, Fading in the Mobile Environment.

MODULE –II
Signal Encoding Techniques- Signal Encoding Criteria, Digital Data- Analog Signals, Analog Data-Analog Signals, Analog Data-Digital Signals, The Concept of Spread Spectrum- Frequency Hopping Spread Spectrum , Direct Sequence Spread Spectrum, Code Division Multiple Access, Generation of Spreading Sequences.

MODULE –III
Wireless Networking - Satellite Communications- Satellite Parameters and Configurations, Capacity Allocation-Frequency Division, Capacity Allocation-Time Division Cellular Wireless Networks- Principles of Cellular Networks, First-Generation Analog, Second-Generation - TDMA, CDMA, Third-Generation Systems

MODULE –IV
Cordless Systems and Wireless Local Loop- Cordless Systems, Wireless Local Loop - Wireless LANs- Wireless LAN Technology – Overview, Infrared LANs, Spread Spectrum LANs, Narrowband Microwave LANs.

MODULE –V
IEEE 802.11 Wireless LAN Standard- IEEE 802 Protocol Architecture, IEEE 802.11 Architecture and Services, IEEE 802.11 Medium Access Control. Introduction to Wi-Fi and Bluetooth Technologies (Only Overview).

TEXT BOOKS
1. William Stallings, "Wireless Communications and Networks" 2nd edition, Pearson Prentice Hall, 2005. (Chapters 4, 5, 6, 7, 9, 10,11, 13, 14, 15.1)

REFERENCES
1. Steve Rackley, "Wireless Communication Technology", Elsevier, 2007
2. C. Siva Ram Murthy and B.S.Manoj, "Adhoc WirelessNetworks-Architechture and Protocols", Pearson Prentice Hall, 2004

Paper Code: CSIT354

L	T	P
3	1	2

INTRODUCTION TO MOBILE COMMUNICATION

Prerequisite: Knowledge of Data communication and Wireless Networks.
Objectives
- To understand the concepts of Telecommunication Systems such as GSM, DECT, TETRA, UMTS and UTRAN.
- To understand the Mobile Network Layer and Transport Layer.

MODULE I
Introduction – Applications, A short history of wireless communication, A market for mobile communications, Telecommunications systems – GSM- Mobile services, System architecture, Radio interface, protocols, Localization and calling, Handover, Security, New data services, Introduction to DECT, TETRA, UMTS and IMT-2000 & UTRAN.

MODULE II
Satellite systems – History, Applications, Basics, GEO, LEO, MEO, Routing, Localization, Handover, Examples.

MODULE III
Broadcast systems – Overview, Cyclical repetition of data, Digital audio broadcasting, Multi-media object transfer protocol, Digital video broadcasting, DVB data broadcasting, DVB for high-speed internet access, Convergence of broadcasting and mobile communications

MODULE IV
Mobile communications - Radio layer Baseband layer Link manager protocol L2CAP Security SDP Mobile network layer - Mobile IP, Goals, assumptions and requirements, Entities and terminology, IP packet delivery, Agent discovery, Registration, Tunneling and encapsulation, Optimizations, Reverse tunneling, IPv6, IP micro-mobility support.

MODULE V
Mobile Transport layer - Traditional TCP- Congestion control, Slow start, Fast retransmit/fast recovery, Implications of mobility, Classical TCP improvements - Indirect TCP , Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission/time-out freezing, Selective retransmission, Transaction-oriented TCP, TCP over 2.5/3G wireless networks, Performance enhancing proxies

TEXT BOOK
1. Jochen H. Schiller, "Mobile Communications", 2nd edition, Addison Wesley, 2003
   (Chapter 1, 4, 5, 6, 8.1, 9)

Paper Code: CSIT365

INTERNET OF THINGS

L	T	P
3	1	2

Prerequisite: Knowledge of Wireless and Mobile communication.
Objectives
- Understand IoT Market perspective.
- Data and Knowledge Management and use of Devices in IoT Technology.
- Understand State of the Art – IoT Architecture.
- Real World IoT Design Constraints, Industrial Automation and Commercial Building Automation in IoT.

MODULE- I
M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics.

MODULE- II
M2M to IoT – A Market Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. **M2M to IoT-An Architectural Overview**– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

MODULE- III
M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management

MODULE- IV
IoT Architecture-State of the Art – Introduction, State of the art, **Architecture Reference Model-** Introduction, Reference Model and architecture, IoT reference Model

MODULE- V
IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. **Real-World Design Constraints-** Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control. **Industrial Automation-** Service-oriented architecture-based device integration, SOCRADES: realizing the enterprise integrated Web of Things, IMC-AESOP: from the Web of Things to the Cloud of Things, **Commercial Building Automation-** Introduction, Case study: phase one-commercial building automation today, Case study: phase two- commercial building automation in the future.

Textbook:
Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.

Reference Books:
1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1stEdition, VPT, 2014.
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013

DISCIPLE SPECIFIC ELECTIVE (DSE) PAPERS

SPECIALIZATION STREAM -IV [MULTIMEDIA]

Paper Code: CSIT246

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3	1	2

FUNDAMENTALS OF MULTIMEDIA

Prerequisite: Basic knowledge of Computers and Multimedia elements.
Objectives
1. To understand Multimedia hard ware and software
2. To understand Multimedia system architecture
3. To understand various compression techniques
4. To understand various file formats
5. To understand storage media

MODULE I – Multimedia System Design: An Introduction Multimedia Elements, Multimedia Applications, Multimedia System Architecture, Evolving Technologies for Multimedia Systems, Multimedia Databases

MODULE II –Compression and Decompression Techniques Types of Compression, Binary Image Compression Schemes, Color, gray scale, still-video image compression, Discrete Cosine Transform, Video Image compression, MPEG Coding methodology, Audio Compression, Data and File format standards- RTF, TIFF,RIFF, MIDI, JPEG, AVI, JPEG, TWAIN Architecture.

MODULE III – MULTIMEDIA INPUT AND OUTPUT TECHNOLOGIES Key Technology Issues, Pen Input, Video and Image Display Systems, Print Output Technologies, Image Scanners, Digital Voice and Audio, Video Images and Animation, Full Motion Video. 18

MODULE IV– STORAGE AND RETRIEVAL TECHNOLOGIES Magnetic Media Technology, RAID-Level-0 To 5, Optical Media, WORM optical drives, Hierarchical Storage Management, Cache Management for storage systems.

MODULE V– MULTIMEDIA APPLICATION DESIGN Types of Multimedia systems - Virtual Reality Design - Components of Multimedia system - Distributed Application Design Issues - Multimedia Authoring and User Interface - Hypermedia Messaging - Distributed Multimedia Systems

REFERENCES
1. Andleigh PK and Thakrar K, "Multimedia Systems", Addison Wesley Longman, 1999.
2. Fred Halsall, "Multimedia Communications", Addison Wesley, 2000.
3. Ralf Steinmetz, Klara Nahrstedt, "Multimedia, computing, communications and applications", Prentice Hall, 1995.
4. Tay Vaughan, "Multimedia making It work", TMH 5th Edition 2001.
5. Weixel, Fulton, Barksdale.Morse, "Multimedia Basics", Easwar Press 2004.

Paper Code: CSIT355

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MULTIMEDIA APPLICATIONS

Prerequisite: Knowledge of Multimedia elements and Multimedia tools.
Objectives:

- formulate a working definition of interactive multimedia
- Getting basic idea about multimedia components and development process
- Acquiring knowledge about latest multimedia tools & hardware's
- And also getting knowledge of internal concept and research oriented ideas

MODULE-I: Multimedia IO Technologies: LED/LCD screen- Touch Screen Technologies- Digital Camera- CCD array- Red Dragon Cinema camera- 70MM film roll- Image scanner and Types- Sound Mixer Board- Vocal Microphone- Condenser Microphone- Laser printer- 3D printer- Speaker & Subwoofer- Barco 2X Projector- Auro 3D sound Amblifier- UFO/ Cube Technology

MODULE-II:Multimedia Data Compression: Lossy Compression- Introduction- Lossless Compression - algorithm- Runlength Encoding- Variable length coding- Arithmetic Coding- Quantization- Transform Coding- wavelet based coding- wavelet packets**- Image Compression Standards :**JPEG Standards- Bi-level Image compression-**Video Compression standards :** MPEG 1, MPEG 2.

MODULE-III:Multimedia Communication and Retrieval : Basic of Computer and Multimedia Networks- Multiplexing Technologies- LAN & WAN- Access Networks- Quality of Multimedia data transmission- Audio and Video Streaming- Multimedia over IP- Multimedia over ATM.

MODULE-IV: Multimedia Application Design: Multimedia Application classes- types of Multimedia systems- **Virtual reality :**VRML Language- VR Reality- VR modeling- VR design Consideration – Virtual Environment display and Orientation Tracking- visually coupled systems requirements- VR software Systems.

MODULE – V:Delivering Medium: CD ROM Disc- Interface cards- data tracking- Data transfer rate- CR- R, CD- RW, - CD replication process- Pre Mastering- Testing- Mastering- Packaging- Color book standards- Digital Versatile disc (DVD) - Blue Ray.

Text Books:
1. MULTIMEDIA MAGIC- S. GOKUL, BPU PUBLICATIONS- 2nd Edition
2. Ze-Nian Li and Mark S. Drew, Fundamentals of Multimedia, Pearson Prentice Hall- 2004.
3. Tay Vaughan, Multimedia Making it with , 5th Edition, Tata McGraw Hill, 2001

Reference Books:
1. Prabhat K. Andleigh, Kiran Thakrar, Multimedia Systems Design, PHI 2002.
2. Multimedia: An Introduction, Villamil & Molina, PHI.
3. Sound & Video, Lozano. Multimedia, PHI.
4. Multimedia: Production. Planning and Delivery, Villamil & Molina, PHI
5. Multimedia on the Pc, Sinclair, BPB.

Paper Code: CSIT366

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AUDIO AND VISUAL TECHNOLOGY

Prerequisite: Basic knowledge of Multimedia and Multimedia Tools.
Objectives:
- formulate a working definition of interactive multimedia
- Getting basic idea about multimedia components and development process
- Acquiring knowledge about latest multimedia tools & hardware's

MODULE-I-Multimedia Component Color: Color Science– Light and Spectra- Human vision- Spectral sensitivity of Eyes- gamma Correction- XYZ to RGB Transmission- White point Correction- more color Co-ordinate Scheme- Munsell color naming System- Color models in Images- color models in video- YIQ Color model- YcbCr Color Model.

MODULE-II: Multimedia Component Audio : Digitalization of Sound- Audio filtering- Signal to Noise ratio- **Audio sampling parameters:** Sampling Rate- sample size- Mono Stereo audio channel- Surround sound channel- digital audio recording pitfalls- **Audio recording & Editing Technique :** introduction- digital audio recording technique- recording options- Professional multitrack Recording- Sound Equalization- Re-Recording and Mastering- MIDI- MIDI channel assignment- quantization and transmission of Audio- Red book standard.

MODULE-III: Multimedia Component Video: Digital Video Production system- Video Shooting Platform- Video capture process- Digital Video post-production- post-production Concepts- Quarter screen and full screen video- cinemascope picture- video broadcasting standards – HDTV/UDTV- High definition video and its resolution- 4K Video (Ultra Definition and its resolution).

MODULE-IV: Multimedia Component Animation: Classification I: Cel animation- Object animation -**Classification II:** Two-dimensional animation- Three-dimensional animations- **Classification III** : Animation for movies- Animation for television shows- Animations for multimedia applications and games- Animations for the Internet- **Classification – IV:** Animation by programming -Morphing- Understanding two-dimensional animation planes- Understanding three-dimensional worlds- Animation tools- Two-dimensional animation software- Three dimensional animation software

MODULE-V: Multimedia Component Graphics & Images: Digital Imaging- Graphics in multimedia projects- Graphics for interface design- Graphics for contents- Types of graphic imagery- Photographic images- Clip arts- 3D graphical image- Types of graphics storage- Raster graphics- Vector graphics

Text Book(s):
- MULTIMEDIA MAGIC- S. GOKUL, BPB PUBLICATIONS- 2nd Edition
- Ze-Nian Li and Mark S. Drew, Fundamentals of Multimedia, Pearson Prentice Hall- 2004.
- Prabhat K. Andleigh, Kiran Thakrar, Multimedia Systems Design, PHI 2002.

Reference Book(s):
1. Tay Vaughan, Multimedia Making it with , 5th Edition, Tata McGraw Hill, 2001
2. Multimedia: An Introduction, Villamil & Molina, PHI.
3. Sound & Video, Lozano. Multimedia, PHI.
4. Multimedia: Production. Planning and Delivery, Villamil & Molina, PHI
5. Multimedia on the Pc, Sinclair, BPB.

Paper Code: CSIT247

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IT INFRASTRUCTURE MANAGEMENT

Prerequisite: Knowledge of Information System.
Objectives

- To understand the IT infrastructure
- To learn current computing environment
- To learn how to manage the Information Systems

MODULE 1 : IT Infrastructure: Overview
Definitions, Infrastructure management activities, Evolutions of Systems since 1960s (Mainframes-to-Midrange-to-PCs-to-Client-server computing-to-New age systems) and their Management, growth of internet, current business demands and IT systems issues, complexity of today's computing environment, Total cost of complexity issues, Value of Systems management for business.

MODULE II : IT Infrastructure Management
Factors to consider in designing IT organizations and IT infrastructure, Determining customer's Requirements, Identifying System Components to manage, Exist Processes, Data, applications, Tools and their integration, Patterns for IT systems management, Introduction to the design process for information systems, Models, Information Technology Infrastructure Library (ITIL).

MODULE III: Current computing environment
Complexity of current computing, multiple technologies, multiple vendors, multiple users, e-Waste disposal, Toal cost of ownership.

MODULE IV : : IT system Management
Common tasks in IT system management, approaches for organization Management, Models in IT system design, IT management systems context diagram, patterns for IT system Management

MODULE V: Establishing business value of information system
Information system costs and benefits, Capital budgeting for information system, Real Options pricing models, Limitation of financial models.

TEXT BOOK :
 Gupta, It Infrastructure & Its Management- Tata McGraw-Hill Education, 2010

Paper Code: CSIT356

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IT PROJECT MANAGEMENT

Prerequisite: Knowledge of IT Infrastructure Management.
Objectives
1. To understand the Nature of IT projects
2. To design Project plans and write Project proposals.
3. To understand the Project Development Life Cycle.

MODULE –I
The Nature of Information Technology Projects – Conceptualizing the IT Project - Developing the Project Charter and Baseline Project Plan

MODULE –II
The Human Side of Project Management - Defining and Managing Project Scope

MODULE –III
The Work Breakdown Structure and Project Estimation - The Project Schedule and Budget - Managing Project Risk

MODULE –IV
Project Communication, Tracking and Reporting– IT Project Quality Management

MODULE –V
Managing Organizational Change, Resistance and Conflict – Project Implementation, Closure and Evaluation.

TEXT BOOK
1. Jack T.Marchewka, "Information Technology and Project Management", John Wiley & sons P.Ltd,2003.

Paper Code: CSIT367

L	T	P
3	1	2

INFORMATION SECURITY MANAGEMENT

Prerequisite: Knowledge of Mathematics, Information System.
Objectives:
- To learn about Infromation security
- To learn Authentication and Authorization
- To learn how to deal with Infromation Security Challenges
- Develop a basic understanding of cryptography, how it has evolved and some key encryption techniques used today.

MODULE- I:
Introduction: Security Definition, Why Security, Security and its need, Current Trends and Statistics, Basic Terminology, The CIA of Security the Relation: Security functionality and Ease of Use Triangle.

MODULE- II:
User identity and Access Management: Authentication, Account Authorization, Validation, Access, Control and Privilege management. Hashing and Cryptography- Encryption and Decryption

MODULE- III:
System Security, Desktop &Server Security, Firewalls, Password cracking Techniques, Key-logger, viruses and worms, Malwares & Spywares, Windows Registry

MODULE- IV:
Internet Security: LAN Security, Email Security, Hacking attacks, preventive measures.

MODULE- V:
Vulnerability Assessment, Penetration Testing, Cyber Laws

Text Book:
1. Information Systems Security: Security Management, Metrics, Frameworks And Best Practices-Nina
    Godbole,ISC2Press,2010

Reference Book:
1. Information Security Management Handbook,Volume 4-MickiKrause,ISC2Press,2007

Paper Code: CSIT248

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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.

Paper Code: CSIT249

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IT ENABLED SERVICES

Prerequisite: Knowledge Information Technology
Objective:
- To understand importance of IT enabled services.
- To encourage the use of Information Technology so as to enable students to improve their skills, knowledge and job prospects and enable them to obtain employment in sunrise industries.
- To develop the ability to integrate various resources for optimization in the industry as well as for strategic utilization of IT enabled services and functions.

MODULE - I Business Strategy: Challenges and OpportMODULEies For IT - Business Strategy: Challenges and OpportMODULEies in the Globalized, Interconnected, Convergent World, Establish Principles before Practice, IT Strategy, Application Strategy, Technology Strategy for IT, IT Management Strategy, Developing IT Strategy for Competitive Advantage, Stages of IT Strategy Development and Implementation, Challenges of IT and Business Strategy Alignment, Inhibitors of Business and IT Strategy Alignment, Three-D Framework for Business and IT Strategy Alignment.

MODULE – II Strategic IT Planning - Business Implications for IT Strategic and Planning, Strategic IT Planning Motivations, SITP Process: Prevalent Planning Approaches, Difficulties in Developing and Executing SITP, Best Practices for Achieving Good SITP, SITP Approaches- Prevalent Researches.

MODULE - III Enterprise IT Architecture - Defining EITA, Contents of a Typical Enterprise IT Architecture, Standard for Enterprise IT Architecture, Technology Management strategy Framework, Prevalent Technology Reference Architectures Framework and Standards, Program Management, Benefits of PMO, Desired Qualities of a Program Office Manager, Maturity of PMO, Implementation of PMO Strategy, Measuring PMO Performance, Success Factors for PMO, Project Scope Management, PMO Dashboard and Reporting.

MODULE - IV IT Service Management Strategy - Information Technology Infrastructure Library (ITIL), ITIL Overview, ITIL Service Support Processes, Incident Management, Problem Management, Service Delivery, Service Level Management, Financial Management, Capacity Management, IT Service Continuity Management (ITSCM), Availability Management, Imperatives for Outsourcing, IT Management Layers, Variants of Outsourcing, Business Process Outsourcing, In sourcing.

MODULE – V IT Enabled Web Services - Overview of basic features of PHP: arrays, functions and state management, working with PHP forms, More advanced PHP, OOP's concept in PHP, Portable database supported with different, exception handling, concepts of UDDI, WSDL, SOAP - Current Trends in ITES - Current Employment in the IT and ITES industry: Newly emerging area and requirement of IT enabled service sector.

Text Books:
1. Sanjiva Shankar Dubey, " IT strategy and Management", PHI.
2. K.Venkatesh, " Marketing of Information Technology",TMH.
3. Steve Suehring, Timconverse, Joyoe Park , "PHP 6 and MySQL Bible", Willey.

Reference Books:

1. Shiro Uesugi, "IT Enabled Services", Springer; 2013 edition, 2013.
2. Sanjiva Shankar Dubey, "IT Services Business Management: Concepts, Processes and Practices", PHI, 2012.
3. Nikhil Treebhoohu, "Promoting IT Enabled Services", Addison-Wesley, 2013.

Paper Code: CSIT357

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TOTAL QUALITY MANAGEMENT

Prerequisite: Knowledge of E-Commerce
Objectives:
- To learn how to understand the customer's perception and to satisfy the customer
- To understand process capability and Reliability concepts
- To learn the different quality functions and how to develop them

MODULE I
Quality – vision, mission and policy statements. Customer Focus – customer perception of quality, Translating needs into requirements, customer retention. Dimensions of product and service quality. Cost of quality.

MODULE II
Overview of the contributions of Deming, Juran Crosby, Masaaki Imai, Feigenbaum, Ishikawa, Taguchi techniques – introduction, loss function, parameter and tolerance design, signal to noise ratio. Concepts of Quality circle, Japanese 5S principles and 8D methodology.

MODULE III
Meaning and significance of statistical process control (SPC) – construction of control charts for variables and attributed. Process capability – meaning, significance and measurement – Six sigma - concepts of process capability. Reliability concepts – definitions, reliability in series and parallel, and product life characteristics curve.Total productive maintenance (TMP), Terotechnology. Business process Improvement (BPI) – principles, applications, reengineering process, benefits and limitations.

MODULE IV
Quality functions development (QFD) – Benefits, Voice of customer, information organization, House of quality (HOQ), building a HOQ, QFD process. Failure mode effect analysis (FMEA) – requirements of reliability, failure rate, FMEA stages, design, process and documentation. Seven Tools (old & new). Bench marking and POKA YOKE.

MODULE V
Introduction to IS/ISO 9004:2000 – quality management systems – guidelines for performance improvements. Quality Audits. TQM culture, Leadership – quality council, employee involvement, motivation, empowerment, recognition and reward - TQM framework, benefits, awareness and obstacles.

TEXT BOOKS
1. Dale H.Besterfield, Carol Besterfield – Michna, Glen H. Besterfield, Mary Besterfield – Sacre, Hermant – Urdhwareshe, RashmiUrdhwareshe, Total Quality Management, Revised Third edition, Pearson Education, 2011
2. Shridhara Bhat K, Total Quality Management – Text and Cases, Himalaya Publishing House, First Edition 2002.

REFERENCES
1. Douglas C. Montgomory, Introduction to Statistical Quality Control, Wiley Student Edition, 4 th Edition, Wiley India Pvt Limited, 2008.
2. James R. Evans and William M. Lindsay, The Management and Control of Quality, Sixth Edition, Thomson, 2005.

OPEN ELECTIVE –IV

Paper Code: CSIT358

ARTIFICIAL INTELLIGENCE

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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.

MODULE - I
Introduction to Al & 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.
1. Stuart Russel, Peter Norvig "AI – A Modern Approach", 2nd edition, Pearson Education, 2007.
2. Ivan Bratka, "PROLOG Programming for Artificial Intelligence", Addison Wesley, 1986.

Paper Code: CSIT201

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SOFT SKILLS

Prerequisite: Basic knowledge of English language
Objectives:
- To enable learners to develop their communicative competence.
- To facilitate learners to improve their soft skills.
- To equip learners with employability skills to enhance their prospect of Placements.

MODULE - I

Nature of technical communication: Stages of communication – Channels of communication – Nature of technical communication – Importance and need for technical communication – Technical communication skills - The Listening process: Types of listening – Listening with a purpose – Barriers to listening – The speech process – Conversion and oral skills – Body language.

MODULE - II

Job interviews: Pre – interview preparation techniques – Interview questions – Answering strategies – Frequently asked interview questions – Projecting a positive image – Alternative interview formats - Group Discussion: Nature of group discussion – Characteristics of successful group discussions – Selection group discussion – Group discussion strategies – Techniques for individual contribution – Group interaction strategies.

MODULE - III

Presentation Skills: Planning the presentation – Preparing the presentation – Organizing your presentation – Rehearsing the presentation – Improving delivery

Text Book:
M. Ashraf Rizvi , "Effective Technical Communication", Tata McGraw – Hill Education, 2005

SOFT SKILLS LAB – EXERCISES
1. ORAL PRESENTATION
- TV violence.
- Is the Fast-Food Industry Accountable Legally for poor health?
- Intelligence depends more on the environment than genetic factors.
- Environment vs. technology Impact of technology on learning
- Learning does not eradicate ignorance
- How WiFi improved your life?

2. GROUP DISCUSSION
- NGOs - Do they serve peoples' interests or are they pressure groups?
- Role of women in development.
- Kids today are not what they used to be.
- Repeated elections - Should taxpayers pay for it?
- In India, the whole is less than the parts - Do we lack in team spirit?
- "Dot.com" companies - Is there room for everyone?
- Artificial Intelligence - Will man be ever replaced by machines?

3.INTERVIEW SKILLS

- How to make a good impression
- Basic Interview Questions
- Behavioural Interview Questions

Paper Code: CSIT301

L	T	P
0	1	3

OFFICE AUTOMATION TOOLS

Prerequisite: Knowledge of computers
Objectives:
- To understand how to use office automation software packages in day to day activities

MODULE – I
Word processing - Introduction - Introduction to MS Word - Working with MS Word - Creating a New Document-Different Page Views and layouts - Working with Styles, Text Attributes; Paragraph and Page Formatting - Text Editing using various features   - Advanced Features of MS-Word – Inserting – Page Numbers, Pictures, Files, Auto texts, Symbols - Working with Columns, Tabs & Indents - Creation & Working with Tables -Margins & Space management in Document - Mail Merge- MS PowerPoint - Creating a New Presentation-Working with Presentation; Using Wizards- Slides & it's different views; Inserting, Deleting and Copying of Slides -   Adding Graphics

MODULE – II
MS Excel - Introduction and area of use -Working with MS Excel - concepts of Workbook & Worksheets - Working with Data & Ranges - Different Views of Worksheets - Column Freezing, Labels, Hiding, Splitting etc.;-Using different features with Data and Text - Use of Formulas, Calculations & Functions-Cell Formatting including Borders & Shading; Working with Different Chart Types - Printing of Workbook & Worksheets with various options.

MODULE – III
MS Access: DBMS Concept; Creating database, table, fields & its properties; Data types; Adding primary key into table; Relationship; Adding/Editing data; sorting; indexing; designing queries; using forms; Report generation.

Text Books:
1. Dinesh Maidasani , Straight to the Point – MS Office 2010, Laxmi Publications, 2010.
2. Sherry Kinkoph Gunter, Master Visually Microsoft Office 2010, WILEY, 2010.

LIST OF LAB EXERCISES:

1. To create a personal letter using MS-WORD
2. To create company letter head using MS-WORD
3. To create a memo using MS-WORD
4. To create a greeting card using MS-WORD
5. To create a cover page of a project report.
6. To create letter using mail merge.
7. To create a slide show regarding our college and department.
8. To create a spreadsheet for mark statement of students.
9. To create various graphs with respect to students' academic details.

Paper Code: CSIT302

L	T	P
0	1	3

LINUX AND SHELL PROGRAMMING

OBJECTIVE:
- It aims to introduce about open source operating system as we can use Linux as Server OS or as standalone OS on our PC, Shell scripting & IPC etc.

MODULE - I
UNIX UTILITIES: Introduction to UNIX file system; vi editor; file handling utilities; security by file permissions; process utilities; disk utilities; networking commands; cp; mv; In; rm; unlink; mkdir; rmdir; du; df; mount; unmount; find; ps; who; w; finger; arp; ftp; telnet; rlogin; text processing utilities and backup utilities; detailed commands to be covered are cat; tail; head; sort; nl; uniq; gerep; egrep; fgrep; cut; paste; join; tee; pg; comm.; cmp; diff; tr; awk; tar; cpio.

MODULE - II
PROBLEM SOVING APPROACHES IN UNIX: Using single commands; using compound commands; shell scripts; C programs; building own command library of programs; working with the Bourneshell : what is a shell; shell responsibilities; pipes and input redirection; output redirection; shell script examples.

MODULE – III
UNIX FILES: UNIX file structure; directories; files and devices; system calls; library functions; usage of open; creat; read write; close; Ileek; stat; fstat; octl; umask; dup; dup2; the standard I/O (fopen; fclose; fflush; fseek; fgetc; getc; getchar; fputc; putc; putchar; fgets; gets); formatted I/O; strem errors; streams and file descriptors; file and directory maintenance (chmod; chown; unlink; link; symlink; mkdir; rmdir; chdir; getcwd).

TEXT BOOKS:
W. R. Stevens, "Unix Network Programming", Pearson/PHI.

REFERENCE BOOKS:
Sumitabha Dass,"Unix Concepts and Application", 3rd Edition, Tata McGraw Hill.

LINUX – SHELL PROGRAMMING

1. Check whether the given number is prime or not.
2. Find the biggest of given two numbers
3. Write a program to check the given number is odd or even
4. Write a program to generate Fibonacci Series
5. Write a program to prepare a Payroll with Basic Pay, DA, Allowances, PF and Gross Pay.
6. Using Case Statement, write a program to check the files ending with vowels.
7. Write a single program to sort the names and numbers in alphabetical, ascending and Descending order.

Paper Code: CSIT401

L	T	P
0	1	3

PHP PROGRAMMING

Prerequisite: Knowledge of programming
Objectives:
- To learn the fundamentals of PHP language
- To learn how to use PHP language to create websites

MODULE – I
Introduction to PHP – brief history – installing PHP – Language basics – Lexical structure – data types – variables – expressions and Operators – flow-control statements – including code – embedding PHP in web pages

MODULE – II
Functions – Strings – Arrays - Multidimensional Arrays- Extracting Multiple Values - Slicing an Array - Checking Whether an Element Exists - Traversing Arrays – Sorting - Objects – Terminology - Creating an Object - Accessing Properties and Methods - Declaring a Class – Introspection

MODULE – III
Web Techniques - HTTP Basics - Server Information - Processing Forms - Setting Response Headers - Maintaining State - Databases - Using PHP to Access a Database - Relational Databases and SQL MySQLi Object Interface – SQLite

Text Book:
Kevin Tatroe, Peter MacIntyre, and Rasmus Lerdorf, "Programming PHP", O'Reilly, 3rd edition, 2013.

PHP Lab – List of Exercises

1. Create a PHP page using functions for comparing three integers and print the Largest number.
2. Write a function to calculate the factorial of a number (non-negative integer). The function accept the number as an argument.
3. WAP to check whether the given number is prime or not.
4. Create a PHP page which accepts string from user. After submission that page displays the reverse of provided string.
5. Write a PHP function that checks if a string is all lower case.
6. Write a PHP script that checks whether a passed string is palindrome or not? (A palindrome is word, phrase, or sequence that reads the same backward as forward, e.g., madam or nurses run)
7. WAP to sort an array.
8. Write a PHP script that removes the whitespaces from a string.

   Sample string : 'The   quick " " brown fox'

   Expected Output : Thequick""brownfox
9. Write a PHP script that finds out the sum of first n odd numbers.
10. Create a login page having user name and password. On clicking submit, a welcome message should be displayed if the user is already registered (i.e.name is present in the database) otherwise error message should be displayed.

Paper Code: CSIT402

ANDROID PROGRAMMING

L	T	P
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Prerequisite: Basic Knowledge of programming
Objectives:

- To study about the android architecture and the tools for developing android applications.
- To create an android application
- To learn about the user interfaces used in android applications
- To learn about how to handle and share android data

MODULE - I
Introduction - Android - Android Versions - Features of Android - Architecture of Android - Obtaining the Required Tools - Android SDK - Installing the Android SDK Tools - Configuring the Android SDK Manager – Eclipse - Android Development Tools (ADT) - Creating Android Virtual Devices (AVDs) - Types of Android Application - Anatomy of an Android Application - Activities

MODULE – II
Linking Activities Using Intents – Resolving Intent Filter Collision - Returning Results from an Intent - Passing Data Using an Intent Object - Adding Fragments Dynamically - Life Cycle of a Fragment - Interactions between Fragments

MODULE – III
Understanding the Intent Object - Using Intent Filters – Adding Categories - Displaying Notifications - Android User Interface - Understanding the Components of a Screen - Adapting to Display Orientation - Managing Changes to Screen Orientation - Utilizing the Action Bar - Creating the User Interface Programmatically - Listening for UI Notifications - Designing Your User Interface with Views - Using Basic Views - Using Picker Views - Using List Views to Display Long Lists

Text Books:
1. Wei - Meng Lee, "Beginning Android Application Development", 2nd edition, John Wiley, 2012.
2. Reto Meier, "Android 6 for Programmers: An App-driven Approach", 3rd edition, Pearson Education, 2016.
3. Deital & Deital, "Android for Programmers: An App-Driven Approach", 1st edition, Pearson Education, 2012.

ANDROID PROGRAMMING LAB - LIST OF EXERCISES
1. Develop an application that uses GUI components, Font and Colours
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of database.
6. Develop an application that makes use of RSS Feed.
7. Implement an application that implements Multi-threading
8. Develop a native application that uses GPS location information.
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert upon receiving a message.

Paper Code: CSCS403

L	T	P
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ONLINE COURSE /
IN-PLANT TRAINING (2 WEEKS) /
ONE MONTH INTERNSHIP /
MINI PROJECT

GENERAL ELECTIVE –I

Paper Code: CSIT125

DISCRETE MATHEMATICS

L	T	P
3	0	0

MODULE –I
Matrices – definition – special types of matrices – operations – symmetric matrices – skew symmetric matrices – Hermitian and skew Hermitian matrices – Inverse – Orthogonal matrices – Solutions of Simultaneous equations – Rank of a matrix – Eigen values and eigenvectors – Cayley Hamilton Theorem.

MODULE –II
Mathematical Logic – Connectives – Statement Forms – Paranthesis – Truth Table – Tautology and Contradiction/Logical Implications and equivalences – Disjunctive and Conjunctive normal forms.

MODULE –III
Sets – Relation – functions – Poset – Hasse Diagram – Lattice and its Properties – Boolean Algebra – Properties – Karnaugh Map (Two, Three and Four Variables Only).

MODULE –IV
Graph Theory: Introduction – application of graphs – Finite and Infinite Graphs – Incidence and Degree – Isolated Vertex, Pendant Vertex and Null Graph. Paths and Circuits – Connected Graph, Disconnected Graphs and components – Euler Graphs – Operations on Graphs – Hamiltonian Paths and Circuits

MODULE –V
Trees and Fundamentals Circuits: Trees – Some properties of Trees – Pendant Vertices in a Tree – Distance and Centers in a Tree – Rooted and Binary Trees – On Counting Trees – Spanning Trees – Fundamental Circuits

Text Books

1. Manicavachagom Pillay and others ,"Algebra",11th Revised edition. Vol II.,S.V. Publications, (Unit – 1)
2. Narsingh Deo, "Graph Theory with applications to Engineering and Computer Science", PHI, 1997. (Unit –4, 5)

Trembly & Manohar, "Discrete Mathematics for Computer Science", TMH, 1997 (Units – 2, 3).

Paper Code: CSIT126

PROBABILITY & STATISTICS

L	T	P
3	0	0

MODULE - I
Basic Probability - Random Experiments - Sample Spaces Events - The Concept of Probability - The Axioms of Probability - Some Important Theorems on Probability - Assignment of Probabilities -Conditional Probability -Theorems on Conditional Probability -- Independent Events -Bayes'Theorem or Rule Combinatorial Analysis - Fundamental Principle of Counting - Tree Diagrams -Permutations

MODULE – II
Random Variables and Probability Distributions - Random Variables - Discrete Probability Distributions -Distribution Functions for Random Variables - Distribution Functions for Discrete Random Variables - Continuous Random Variables – Graphical Interpretations Joint Distributions Independent Random Variables - Change of Variables - Probability Distributions of Functions of Random Variables – Convolutions – Conditional Distributions Applications to Geometric Probability

MODULE – III
Mathematical Expectation - Definition of Mathematical Expectation - Functions of Random Variables - Theorems on Expectation - Variance & Standard Deviation - Theorems on Variance - Standardized Random Variables - Special Probability Distributions - Binomial Distribution - Normal Distribution - Poisson Distribution

MODULE – IV
STATISTICS - Sampling Theory - Population and Sample - Statistical Inference- Sampling With and Without Replacement Random Samples - Random Numbers - Population Parameters - Sample Statistics -Sampling Distributions - Sample Mean - Sampling Distribution of Means - Sampling Distribution of Proportions - Sampling Distribution of Differences and Sums - Sample Variance - Sampling Distribution of Variances - Computation of Mean, Variance, and Moments for Grouped Data

MODULE – V
Curve Fitting, Regression, Correlation - Curve Fitting – Regression - The Method of Least Squares The Least-Squares Line -The Least-Squares Line in Terms of Sample Variances and Covariance - The Least-Squares Parabola - Multiple Regression Standard Error of Estimate The Linear Correlation Coefficient Generalized Correlation Coefficient Rank Correlation

Text books:
1. Murray R. Spiegel, John J. Schiller & R. Alu Srinivasan, "Probability and Statistics", Schaum outlines,
    McGraw Hill, 3rd edition, 2009.
2. S. P. Gupta, Statistical Methods, S. Chand and Sons.
3. S. C Gupta and V. K. Kapoor, "Fundamentals of Mathematical Statistics", 11th edition, S. Chand and Sons.

Paper Code: CSIT235

OPERATION RESEARCH

L	T	P
3	0	0

Module –I
Introduction to Operations Research - Principal components of decision problems - phases of OR study.

Module –II
Linear Programming - graphical solution - simplex method including artificial variable technique - duality.

Module –III
Transportation and assignment models - Sequencing

Module –IV
Game theory - optimal solution of two-person zero-sum games - mixed strategies - graphical solution of (2 X n) and (m X 2) games - solution of (m X n) games by linear programming.

Module – V
PERT and CPM - network diagrams - determination of the floats and critical path - probability considerations in project scheduling.

Text Books

1. Treatment as in Hamdy A.Taha "Operations Research - An introduction (III edition)", chapters 1, 2, 3 (omit 3.4), 4 (omit 4.4, 4.5), 5 (omit 5.4), 11 (omit all sections except 11.4 only), 12 (omit 12.3, 12.5).
2. R.L. Ackoff and M.W.Sasieni "Fundamentals of O.R.". (For Sequencing)

Paper Code: CSIT236

NUMERICAL METHODS

L	T	P
3	0	0

MODULE 1 : Algebraic Equation :
Bisection Method, Newton – Raphson Method, Regula Falsi Method.

MODULE 2 : Simultaneous Algebraic Equation: Gauss Elimination Method, Gauss-Jordan Method, Factorization Method, Jacobi's Iteration Method, Gauss- seidal Iteration Method.

MODULE 3 : Matrix Inversion & Eigen Value : Gauss Jordan Method, Factorization Method , Eigen values and Eigen Vectors .

MODULE 4 : Interpolation: Newton's backward and forward Interpolation Formula, Lagrange's Interpolation Formula.

MODULE 5 : Numerical Differentiation & Integration: Trapezoidal Rule, Simpson's one- third rule Simpson's three- eight rule.

Text Books:
1 Numerical Methods in Engineering & Science By Dr. B.S.Grewal, Khanna Publishers, Seventh edition, 2005.
2 Introductory methods of numerical Analysis By S.S.Sastry, Phi Learning publication, Edition Fourth , 2009

<div align="center">**Non-Major Elective Course**</div>

Paper Code: CSIT171

FUNDAMENTALS OF INFORMATION TECHNOLOGY

L	T	P
3	1	0

Objective:
- To acquire the basic knowledge about computers

Module - I
Introduction to Computers - Generation of Computers - Classification of Digital Computer - Anatomy of Digital Computer.

Module - II
CPU and Memory - Secondary Story Devices - Input Devices - Output Devices.

Module - III
Introduction to Computer Software - Programming Language – Operating Systems - Introduction to Database Management System.

Module - IV
Computer Networks - WWW and Internet - Email - Web Design

Module - V
Computers at Home, Education, Entertainment, Science, Medicine and Engineering - Introduction to Computer Security - Computer Viruses, Bombs, Worms.

Text Book:
1. Fundamentals of Information Technology, Alexis Leon and Mathews Leon,
   Vikas Publishing House Pvt. Ltd., 2009.
2. Faithe Wempen, Computing Fundamentals: Introduction to Computers, WILEY, 2014.

Paper Code: CSIT172

FUNDAMENTALS OF 'C' LANGUAGE

L	T	P
3	1	0

Prerequisite: Knowledge of computers
Objective:
- To learn how to solve common types of computing problems.
- To learn about data types and control structures of C
- To learn how to map problems to programming features of C.
- To learn how to write good portable C programs.

MODULE- I
Introduction to Programming - How to develop a program, Algorithms, Flow-charts, Types of Programming Languages, Compiler and Linker, Testing and Debugging a program, Documentation. Constants, Variables & Data Types - Character set, C Tokens, Identifiers and Keywords, Constants, Variables, Data types - Operators & Expressions - Managing Input & output operations

MODULE - II
Decision Making – Branching & Looping - Arrays - One dimensional array: Array Manipulation, Different operations on one dimensional arrays, two dimensional array, operations on two dimensional arrays, multi-dimensional array, dynamic arrays - Handling of Character Strings.

MODULE - III
Functions - Top down approach of problem solving, standard library functions, passing values between functions, scope rules of functions, calling convention, return type of functions, call by value and call by reference, recursive functions - Storage Classes - Scope and extent, Storage Classes in a single source file: auto, extern and static, register,

MODULE – IV
Structures and Unions - Defining a structure, Declaring Structure variables, accessing structure members, structure initialization, copying and comparing structure variables, operation on individual members, arrays of structures, arrays within structures, structures and functions, union, size of structure, bit fields.

MODULE - V
File Processing - Defining and Opening a file, closing a file, input/output operations on files, error handling during I/O operations, random access to files, Command Line Arguments.

Text Books:
1. E. Balagurusamy, "Programming with ANSI-C", Fourth Edition, Tata McGraw Hill, 2008,
2. Hanly J R & Koffman E.B, "Problem Solving and Programming design in C", Pearson Education, 2009.

Paper Code: CSIT173

WEB DESIGNING

L	T	P
3	1	0

Prerequisite: Knowledge of computers and internet
Objectives:
- To acquire the fundamental knowledge about internet & WWW
- To learn how to develop static and dynamic web pages / websites for any organization.
- To learn how to develop animated web pages

MODULE - I
Internet and the World Wide Web **-** Internet - Introduction to internet and its applications, E-mail, telnet, FTP, e-commerce, video conferencing, e-business. Internet service providers, domain name server, internet address, World Wide Web (WWW) - World Wide Web and its evolution, uniform resource locator (URL), browsers – internet explorer, Netscape navigator, opera, Firefox, chrome, Mozilla. search engine, web saver – apache, IIS, proxy server, HTTP protocol

MODULE – II
HTML5 **–** Introduction - formatting text by using tags, using lists and backgrounds, Creating hyperlinks and anchors - Style sheets, CSS formatting text using style sheets, formatting paragraphs using style sheets.

MODULE – III
Page layout and navigation **-** Creating navigational aids: planning site organization, creating text based navigation bar, creating graphics based navigation bar, creating graphical navigation bar, creating image map, redirecting to another URL, creating division based layouts.

MODULE – IV
Tables, Forms and Media **-** Creating tables: creating simple table, specifying the size of the table, specifying the width of the column, merging table cells, using tables for
page layout, formatting tables: applying table borders, applying background and foreground fills, changing cell padding, spacing and alignment

MODU|LE – V
Creating user forms: creating basic form, using check boxes and option buttons, creating lists, additional input types in HTML5, Incorporating sound and video: audio and video in HTML5, HTML multimedia basics, embedding video clips, incorporating audio on web page.

Text Books:
Faithe Wempen, "HTML5 Step by Step", Microsoft Press, 2011.

Paper Code: CSITS174

L	T	P
3	1	0

BASICS OF COMPUTERS & OFFICE AUTOMATION

Prerequisite: -- Nil
Objectives:
- To understand how to use software packages in day to day activities

MODULE – I
DOS: Internal & External commands; Wildcard Character; file name; Creating/Editing file; batch file - MS Windows: Windows Basic - Introduction to Windows- Using My Computer; Using Windows Explorer -   Printing- Introduction to Accessories and Control Panel

MODULE – II
Word processing - Introduction - Introduction to MS Word - Working with MS Word - Creating a New Document-Different Page Views and layouts - Working with Styles, Text Attributes; Paragraph and Page Formatting - Text Editing using various features   - Advanced Features of MS-Word – bookmarks - Spell Check and Thesaurus; Find & Replace; Headers & Footers ; Inserting – Page Numbers, Pictures, Files, Auto texts, Symbols -Working with Columns, Tabs & Indents;- Creation & Working with Tables -Margins & Space management in Document - Mail Merge.

MODULE – III
MS Excel - Introduction and area of use -Working with MS Excel - concepts of Workbook & Worksheets - Working with Data & Ranges - Different Views of Worksheets - Column Freezing, Labels, Hiding, Splitting etc.;-Using different features with Data and Text - Use of Formulas, Calculations & Functions-Cell Formatting including Borders & Shading; Working with Different Chart Types - Printing of Workbook & Worksheets with various options.

MODULE -IV
MS PowerPoint - Introduction & area of use- Working with MS PowerPoint- Creating a New Presentation-Working with Presentation; Using Wizards- Slides & it's different views; Inserting, Deleting and Copying of Slides - Working with Notes, Handouts, Columns & Lists- Adding Graphics, Sounds and Movies to a Slide-Working with PowerPoint Objects; Designing & Presentation of a Slide Show

MODULE – V:
MS Access: DBMS Concept; Creating database, table, fields & its properties; Data types; Adding primary key into table; Relationship; Adding/Editing data; sorting; indexing; designing queries; using forms; Report generation.

Text Books:
1. Rob Tidrow, Master Visually Windows 7, John Wiley, 2010.
2. Dinesh Maidasani , Straight to the Point – MS Office 2010, Laxmi Publications, 2010.
3. Sherry Kinkoph Gunter, Master Visually Microsoft Office 2010, WILEY, 2010.
4. Faithe Wempen, Computing Fundamentals: Introduction to Computers, WILEY, 2014.