

**M. C. A.**  
**(COMPUTER APPLICATIONS)**  
**SYLLABUS - 2014**

**SCHOOLS OF EXCELLENCE**  
**with**  
**CHOICE BASED CREDIT SYSTEM (CBCS)**



**SCHOOL OF COMPUTING SCIENCES**  
**St. JOSEPH'S COLLEGE (Autonomous)**

Accredited at 'A' Grade (3<sup>rd</sup> Cycle) by NAAC  
College with Potential for Excellence by UGC  
**TIRUCHIRAPPALLI - 620 002, INDIA**

## SCHOOLS OF EXCELLENCE WITH CHOICE BASED CREDIT SYSTEM (CBCS)

### POST GRADUATE COURSES

St. Joseph's College (Autonomous), a pioneer in higher education in India, strives to work towards the academic excellence. In this regard, it has initiated the implementation of five "Schools of Excellence" from this academic year 2014 – 15, to standup to the challenges of the 21<sup>st</sup> century.

Each School integrates related disciplines under one roof. The school system allows the enhanced academic mobility and enriched employability of the students. At the same time this system preserves the identity, autonomy and uniqueness of every department and reinforces their efforts to be student centric in curriculum designing and skill imparting. These five schools will work concertedly to achieve and accomplish the following objectives.

- Optimal utilization of resources both human and material for the academic flexibility leading to excellence.
- Students experience or enjoy their choice of courses and credits for their horizontal mobility.
- The existing curricular structure as specified by TANSCH and other higher educational institutions facilitate the Credit-Transfer Across the Disciplines (CTAD) - a uniqueness of the choice based credit system.
- Human excellence in specialized areas
- Thrust in internship and / or projects as a lead towards research and
- The **multi-discipline** nature of the newly evolved structure (School System) caters to the needs of stake-holders, especially the employers.

### What is Credit system?

Weightage to a course is given in relation to the hours assigned for the course. Generally one hour per week has one credit. For viability and conformity to the guidelines credits are awarded irrespective of the teaching hours. The following Table shows the correlation between credits and hours. However, there could be some flexibility because of practical, field visits, tutorials and nature of project work.

For PG courses a student must earn a minimum of 110 credits. The total number of courses offered by a department is given above. However within their working hours few departments / School can offer extra credit courses.

## SUMMARY OF HOURS AND CREDITS PG COURSES - COMPUTER APPLICATIONS (MCA)

Part	Semester	Specification	No. of Courses	Hours	Credits	Total Credits
1	I-IV	<b>Core Courses</b> Theory Practical	23	80	59	<b>121</b>
			11	32	20	
	II	<b>Self Paced Learning</b>	1	-	2	
	III	<b>Common Core</b>	3	12	10	
	IV	<b>Comprehensive Examination</b>	1	2	2	
IV	<b>Dissertation &amp; Viva Voce</b>	1	30	28		
2	III-IV	<b>Core Electives</b>	3	12	12	12
3	I-III	<b>IDC (WS)</b> <b>IDC (Common)</b> <b>IDC (BS)</b>	1	4	4	<b>12</b>
			1	4	4	
			1	4	4	
4	I-IV	<b>Additional Core Courses</b>	-	-	-	(9)
5	IV	SHEPHERD & Gender Studies	1	-	5	<b>5</b>
		<b>TOTAL</b>		<b>180</b>		<b>150</b>

IDC – Inter Departmental Courses

BS – Between School

WS – Within School

**Total Hours : 180**

**Total Credits : 150**

However, there could be some flexibility because of practicals, field visits, tutorials and nature of project work. For PG courses a student must earn a minimum of 110 credits. The total number of courses offered by a department is given above. However within their working hours few departments / School can offer extra credit courses.

### Course Pattern

The Post Graduate degree course consists of five vital components. They are cores courses, core electives, additional core courses, IDC's and SHEPHERD. Additional Core courses are purely optional on the part of the student. SHEPHERD, the extension components are mandatory.

### CORE COURSE

A core course is the course offered by the parent department related to the major subjects, components like theories, practicals, self paced learning, common core, comprehensive examinations, dissertations & viva – voce, field visits, library record form part of the core courses.

### CORE ELECTIVE

The core elective course is also offered by the parent department. The objective is to provide choice and flexibility within the School. There are three core electives. It is offered in different semester according to the choice of the school.

### ADDITIONAL CORE COURSES (If any)

In order to facilitate the students gaining extra credit, the additional core courses are given. The students are encouraged to avail this option of enriching with the extra credits.

### INTERDEPARTMENTAL COURSES (IDC)

IDC is an interdepartmental course offered by a department / School for the students belonging to other departments / school. The objective is to provide mobility and flexibility outside the parent department / School. This is introduced to make every course multi-disciplinary in nature. It is to be chosen from a list of courses offered by various departments.

There are three IDC's. Among three, one is the Soft-Skill course offered by the JASS in the II Semester for the students of all the Departments. The other one is offered "With-in the school" (WS) and the third one is offered "Between the school" (BS). The IDC's are of application oriented and inter disciplinary in nature.

### Subject Code Fixation

The following code system (9 characters) is adopted for Post Graduate courses:

14	PXX	X	X	XX
↓	↓	↓	↓	↓
Year of Revision	PG Code of the Dept	Semester of the Part	Specification of Part	Running number in the part
14	PCA	1	1	01

### For Example :

IMCA, first semester Programming in C and UNIX  
The code of the paper is 14PCA1101.  
Thus, the subject code is fixed for other subjects.

### Specification of the Part

1. Core Courses: (Theory, Practical, Self paced Learning, Common Core, Comprehensive Examination, Dissertation and Viva-voce)
2. Core Electives
3. Additional Core Courses (if any)
4. Inter Departmental Courses (WS, Soft Skill & BS)
5. SHEPHERD & Gender Studies

### EXAMINATION

#### Continuous Internal Assessment (CIA):

PG - Distribution of CIA Marks	
Passing Minimum: 50 Marks	
Library Referencing	5
3 Components	35
Mid-Semester Test	30
End-Semester Test	30
<b>CIA</b>	<b>100</b>

### MID-SEM & END – SEM TEST

Centralised – Conducted by the office of COE

1. Mid-Sem Test & End-Sem Test: (2 Hours each); will have Objective + Descriptive elements; with the existing question pattern PART-A; PART-B; and PART-C
2. CIA Component III for UG & PG will be of 15 marks and compulsorily objective multiple choice question type.
3. The CIA Component III must be conducted by the department / faculty concerned at a suitable computer centres.
4. The 10 marks of PART-A of Mid-Sem and End-Sem Tests will comprise only: OBJECTIVE MULTIPLE CHOICE QUESTIONS; TRUE / FALSE; and FILL-IN BLANKS.
5. The number of hours for the 5 marks allotted for Library Referencing/ work would be 30 hours per semester. The marks scored out of 5 will be given to all the courses (Courses) of the Semester.

## SEMESTER EXAMINATION

Testing with Objective and Descriptive questions

### Part-A: 30 Marks

#### Objective MCQs only

Answers are to be marked on OMR score-sheet. The OMR score-sheets will be supplied along with the Main Answer Book. 40 minutes after the start of the examination the OMR score-sheets will be collected

### Part-B + C = 70 Marks

#### Descriptive

**Part-B:** 5 x 5 = 25 marks; inbuilt choice;

**Part-C:** 3 x 15 = 45 marks; 3 out of 5 questions, open choice.

*The Accounts Paper of Commerce will have*

**Part-A:** Objective = 25

**Part-B:** 25 x 3 = 75 marks.

**Duration of Examination must be rational;** proportional to teaching hours  
90 minute-examination / 50 Marks for courses of 2/3 hours/week (all Part IV UG Courses) 3-hours examination for courses of 4-6 hours/week.

## EVALUATION

### Percentage Marks, Grades & Grade Points

#### UG (Passing minimum 40 Marks)

Qualitative Assessment	Grade Points	Grade	Mark Range (%)
Exemplary	10	S	90 & above
Outstanding	9	A+	85-89.99
Excellent	8	A	80-84.99
Very Good	7	B	70-79.99
Good	6	C	60-69.99
Pass (PG)	5	D	50-59.99
RA (PG)	0	RA	< 50

### CGPA - Calculation

Grade Point Average for a semester is calculated as indicated here under:

$$\frac{\text{Sum total of weighted Grade Points}}{\text{Sum of Credits}}$$

Weighted Grade Points is *Grade point x Course Credits*. The final CGPA will only include: Core, Core Electives & IDCs.

A Pass in SHEPHERD will continue to be mandatory although the marks will not count for the calculation of the CGPA.

POSTGRADUATE		
CLASS	Mark Range (%)	
	ARTS	SCIENCES
Distinction	75 & above, first attempt	80 & above, first attempt
First	60 - 74.99	60 - 79.99
Second	50 - 59.99	50 - 59.99

### Declaration of Result:

Mr./Ms. \_\_\_\_\_ has successfully completed the Post Graduate in \_\_\_\_\_ programme. The candidate's Cumulative Grade Point Average (CGPA) is \_\_\_\_\_ and the class secured \_\_\_\_\_ by completing the minimum of 110 credits.

The candidate has also acquired \_\_\_\_\_ (if any) additional credits from courses offered by the parent department.

**Computer Applications (MCA)  
Course Pattern - 2014 Set**

Sem	Code	Course	Hrs	Crs	
I	14PCA1101	Programming in C and UNIX	4	3	
	14PCA1102	Mathematical Foundations	4	3	
	14PCA1103	Organizational Behaviour	4	3	
	14PCA1104	Web User Interface Design	4	3	
	14PCA1105	Digital Computer Fundamentals	4	3	
	14PCA1106	Software Lab -I(C and LINUX)	3	2	
	14PCA1107	Software Lab – II (Web User Interface Design)	3	2	
	14PCA1108	Self-paced Learning(Fundamentals of IT)	--	2	
	14PCA1109	ICT*	2	2	
		Web Learning	2	-	
		<b>Total for Semester I</b>	<b>30</b>	<b>23</b>	
II	14PCA2110	Object Oriented Concepts and C++	4	3	
	14PCA2111	Software Engineering	4	3	
	14PCA2112	Operating Systems	4	3	
	14PCA2113	Probability and Statistics	4	3	
	14PCA2114	Software Lab – III (C++)	3	2	
	14PCA2115	Software Lab – IV (Multimedia)	3	2	
	14PSS2401	IDC: Soft Skills	4	4	
	14PCA2401	IDC(WS) - LAMP	4	4	
		<b>Total for Semester II</b>	<b>30</b>	<b>24</b>	
III	14SCS3101	Programming in JAVA	4	3	
	14SCS3102	Data Base Systems	4	4	
	14SCS3103	Design and Analysis of Algorithms	4	3	
	14PCA3104	Software Lab – V(JAVA)	3	2	
	14PCA3105	Software Lab – VI(RDBMS)	3	2	
	14PCA3201 A	(WS) Computer Organization and Architecture	OR	4	4
	14PCA3201 B	Data mining			
	14PCA3402	IDC (BS): Web design	4	4	
		Domain Study**	2	--	
		Skill Based Course: Quantitative Aptitude*	2	--	
		<b>Total for Semester III</b>	<b>30</b>	<b>22</b>	

IV	14PCA4116	Programming Smart Devices	4	3	
	14PCA4117	Accounting and Financial Management	4	3	
	14PCA4118	Graph and Automata Theory	4	3	
	14PCA4119	Computer Networks and Security	4	3	
	14PCA4120	Software Lab – VII (XML & Android programming)	3	2	
	14PCA4121	Software Lab – VIII(PHP & MYSQL)	3	2	
	14PCA4202 A	(WS): Linux Administration	OR	4	4
	14PCA4202 B	Pervasive computing	OR	(4)	(4)
	14PCA4202 C	Information Storage and Management		(4)	(4)
	14PCA4122	Domain Study**		2	2
	14PCA4123	Skill Based Course: Quantitative Aptitude*		2	2
	<b>Total for Semester IV</b>		<b>30</b>	<b>24</b>	
V	14PCA5124	Distributed Technologies	4	3	
	14PCA5125	Programming with Win32 API and MFC	4	3	
	14PCA5126	UML and MIS	4	3	
	14PCA5127	Operations Research	4	3	
	14PCA5128	Software Lab – IX(Distributed Programming)	3	2	
	14PCA5129	Software Lab – X (VC++)	3	2	
	14PCA5203 A	(WS) : Principles of Compiler Design	OR	4	4
	14PCA5203 B	Cloud Computing	OR		
	14PCA5203 C	Cyber Crimes and Cyber Laws			
	14PCA5130	Comprehensive Examination		2	2
	14PCA5131	Mini-project**		--	3
14PCA5132	Managerial skills		2	2	
	<b>Total for Semester V</b>		<b>30</b>	<b>27</b>	
VI	14PCA6133	Project Dissertation & Viva Voce	30	25	
		<b>Total for Semester VI</b>	<b>30</b>	<b>25</b>	
I-IV	14PCW6501	SHEPHERD and Gender Studies		5	
	<b>Total for all Semesters</b>		<b>180</b>	<b>150</b>	

WS –within School      BS – between Schools  
 \* - Fully Internal (Students continuously evaluated)  
 \*\* - Report to be submitted and VIVA to be conducted by the Internal examiners at the end of the year

**Extra Credits for fast learners**

Activity	Number of credits
Paper presentation International conference	2
Paper presentation National conference	1
Govt. funded projects	2
Development of marketable products	2
Completion of the Professional Certifications (OCJP, CCNA, MCSE, ZCE, etc.) from reputed organizations	2

**Sem. I**  
**14PCA1101**

**Hours/Week: 4**  
**Credits: 3**

### **PROGRAMMING IN 'C' AND 'UNIX'**

#### **Objectives**

- \* To develop programming skills using C language, to learn to use the specialties of 'C' language for programming and to develop good understanding of the structure of UNIX operating system.

#### **Unit - I**

Structure of Unix - UNIX file system - Types of users, files and permission - Structure of Password file - Directories and Path name - basic directory Commands - standard I/O files - redirecting standard I/O files - Pipelines and filters - Process status - Protecting, Terminating, Setting priority and Killing a process. (12)

#### **Unit - II**

Data Types - Variables - Operators - Control structures - Looping structures - Arrays - Strings. (12)

#### **Unit - III**

Functions - Built-in-functions - Types of functions - Scope of Variables - Call by value and call by reference. (12)

#### **Unit - IV**

Pointers-Pointer and Arrays-Array of Pointers-Pointer as Function arguments-Functions returning pointers-Pointer to Functions-Pointer and structures. (12)

#### **Unit-V**

Structure - Union- Files - Sequential Files - Random Access Files - Command Line Arguments. (12)

#### **Books for Study**

Unit-I

1. Rebecca Thomas, Jean Yates, "A User Guide to the UNIX System", Osborne McGraw-Hill, USA, Second Edition, 1985.

Unit II, III, IV, V

2. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, New Delhi, Fourth Edition, 2007.

#### **Books for Reference**

1. Byron S. Gottfried, "Programming with C", Schaum's Outline Series, Tata McGraw Hill Edition, New Delhi, 1991.
2. Brian W. Kernighan, Dennis M. Ritchie, "The C Programming Language", Prentice Hall of India Pvt. Ltd., New Delhi, 1989.
3. T. Jeyapooan, "A First Course in Programming with C", Vikas Publishing House Pvt. Ltd., First Edition, 2002.

**Sem. I**  
**14PCA1102**

**Hours/Week: 4**  
**Credits: 3**

### **MATHEMATICAL FOUNDATIONS**

#### **Objectives**

- \* To impart basic features of Logic, Set Theory and ideas of Lattices and Boolean algebra, and to introduce Numerical Mathematics.

#### **Unit - I**

Mathematical Logic: Statements and Notation - Connectives - Statement Formulas and Truth Tables - Tautologies - Equivalence of Formulas - Duality Law. Tautological implications - Theory of inference - validity using truth tables-Rules of Inference. (12)

#### **Unit -II**

Basic concepts of Set Theory : Inclusion and Equality of sets - Power set - Operations on Sets - Venn Diagrams - Cartesian Products. Relations and Ordering - Binary & Equivalence relations - Partial Ordering. Functions - Composition of functions, inverse functions, Binary & n-ary operations. (12)

#### **Unit - III**

Lattices as Partially ordered sets - Hasse diagrams - Properties of Lattices - Distributive & Modular inequalities - Special lattices - Complete, Bounded, Complemented & Distributive lattices. Properties of Boolean Algebra. (12)

#### **Unit - IV**

Solution of polynomial equations: Birge-Vieta and Root squaring methods. System of linear algebraic equations: Gauss - elimination, Gauss - Jordan, Triangularization, Jacobi, Gauss-Seidal iterative methods. (12)

### Unit - V

Interpolation: Lagrange's and Newton's interpolation -interpolating polynomials using finite difference. Numerical integration: Trapezoidal, Simpson's rules and Romberg integration. (12)

Note: Stress on solving Numerical Problems in Units IV and V

#### Books for Study

Units I, II, III

1. J.P.Tremblay & R.Manohar, "Discrete Mathematical Structures with Applications to Computer Science", McGraw-Hill International Edition, 2008.

Units IV, V

2. M.K.Jain, S.R.K.Iyengar & R.K. Jain, "Numerical Methods for Scientific and Engineering Computation", Wiley Eastern Limited, New Delhi, 2003.

#### Books for Reference

1. Bernard Kolman & Robert C. Busyby, "Discrete Mathematical Structures for Computer Science", Prentice Hall of India, New Delhi, 1987.
2. S.S. Sastry, "Introductory Methods of Numerical Analysis", Prentice-Hall of India, New Delhi, 2005.

**Sem. I**  
**14PCA1103**

**Hours/Week: 4**  
**Credits: 3**

## ORGANISATIONAL BEHAVIOUR

### Objectives

- \* To enable the students to understand the basic concepts of organizational Structure and its behavior.

### Unit -I

NATURE OF ORGANIZATION - features - types - goals. NATURE OF ORGANIZATIONAL BEHAVIOR - Nature of OB - Role of OB - Foundations of OB. (12)

### Unit -II

NATURE OF HUMAN BEHAVIOR: Nature and causes of individual differences - models of man.

PERCEPTION: Concept - process - perceptual selectivity and distortion - Developing perceptual skills

LEARNING AND BEHAVIOR MODIFICATION: Concept - components - reinforcement principles - OB Mod.

PERSONALITY: Theories - Determinants - Personality and behavior. (12)

### Unit -III

Attitudes: Concept - Theories - Formation factors - measurements - Attitude change - MOTIVATION: Definition - Motivation & Behavior - Theories - approaches - incentives - STRESS: Concept & features - Causes & effects - Coping strategies. (12)

### Unit -IV

INTERPERSONAL BEHAVIOR - Transactional analysis - Ego states - life scripts - life positions - transactions - stroking - Psychological games - Benefits of TA - GROUP DYNAMICS: Concepts & features of group - types of groups - group behavior - group decision making - committee - task group - inter group behavior - LEADERSHIP: Definitions - types - importance - theories - styles. (12)

### Unit -V

ORGANIZATION THEORY - Classical organizational theory - neoclassical organizational theory - DESIGNING OF ORGANIZATIONAL STRUCTURE: need - planning and process - Departmentation - span of management - delegation of authorities - centralization & decentralization - FORMS OF ORGANIZATIONAL STRUCTURES: line and staff - functional - divisional - project - matrix - free form - ORGANIZATIONAL CHANGE & DEVELOPMENT: reasons - resistance to change - organizational development - OD interventions. (12)

#### Books for Study

1. Prasad LM, "Organisational Behavior", Sultan Chand and Sons, 2007.

#### Books for Reference

1. SS Khanka, "Organisational Behavior", S. Chand Ltd., 2006.
2. K. Aswathappa, "Organisational Behavior", Himalaya Publishing house, 2007.

**Sem. I**  
**14PCA1104**

**Hours/Week: 4**  
**Credits: 3**

### **WEB USER INTERFACE DESIGN**

#### **Objectives**

- \* To know the UI Design principles, the features of HTML and Scripting Language JavaScript and to design web pages.

#### **Unit-I**

Web Medium: Core web technologies - web browsers - Markup Languages - Style sheet technologies - images - sound - video - programming technologies - client side, server side - network and related protocols - Introduction to static, dynamic and active web pages. (12)

#### **Unit-II**

HTML : Introduction to HTML - Lists - Adding graphics to HTML documents. (12)

#### **Unit-III**

HTML: Tables - Linking documents - Frames - Form and its elements. (12)

#### **Unit-IV**

JavaScript: Introduction to JavaScript - JavaScript in web pages - writing JavaScript with - HTML - Basic programming techniques - operators and expressions - conditional checking - loops - functions - user defined functions - dialog boxes. (12)

#### **Unit-V**

JavaScript: JavaScript DOM: JSSS DOM - understanding objects in HTML - browser objects - web page object hierarchy - handling events - The form object - built-in objects - user defined objects - cookies - setting a cookie. (12)

#### **Books for Study**

##### **Unit - I**

1. Thomas A Powell, "Web Design - The Complete Reference", Tata McGraw-Hill, Second Edition, 2003

##### **Unit- II,III,IV,V**

2. Ivan N. Bayross, "Web enabled Commercial Application Development using HTML, JavaScript, DHTML and PHP", 4th Revised Edition, BPB Publications, New Delhi, 2010.

#### **Books for Reference**

1. Thomas A Powell, "The Complete Reference - HTML", Osborne-McGraw-Hill, Third Edition, 2000.
2. Gary B. Shelly, H. Albert Napier, Ollie N. Rivers, "Web Design: Introductory Concepts and Techniques", Cengage Learning, 2008.

**Sem. I**  
**14PCA1105**

**Hours/Week: 4**  
**Credits: 3**

### **DIGITAL COMPUTER FUNDAMENTALS**

#### **Objectives**

- \* To give fundamental principles of digital electronics, semiconductor memories, A/D and D/A converters.

#### **Unit - I**

Number Systems and Logic Circuits: Number systems - Decimal, Binary, Octal, Hexadecimal - conversion from one to another - Characters and codes - ASCII code, Excess-3 code, gray code - binary addition, subtraction, multiplication and division - unsigned binary numbers - signed magnitude numbers - complements in number systems - Truth tables, AND, OR, NOT, NOR & NAND gates, EX-OR gates - parity generators and checkers. (12)

#### **Unit - II**

Boolean Algebra and Digital Circuits : Boolean laws and theorems - De Morgan's theorems - Duality theorem - simplification of sum of product and product of sum expressions - Karnaugh map and simplifications - Simple arithmetic circuits - Half and Full adders - Binary adder/subtractor - BCD adder - Data processing circuits - Multiplexers - Demultiplexers - Encoders and Decoders. (12)

#### **Unit -III**

Sequential Logic Design: Flip-flops - RS, JK, D & T Flip flops - Master/Slave Flip flop - Shift Registers - Counters - Asynchronous and Synchronous Counters. (12)

#### **Unit - IV**

D/A And A/D Conversion : D/A converter - D/A accuracy and resolution - A/D Converter - simultaneous conversion - counter method - continuous conversion - A/D techniques - Dual Slope conversion - A/D accuracy and Resolution. (12)



### Unit - V

Memory Elements : RAM - Linear Select memory organization - decoders - Dimensions of memory access - connecting memory chips to a computer bus - static RAM - Dynamic RAM - ROM - Magnetic Disk memories - Magnetic tape - Magnetic Bubble memories - Computer word structures - Storage Hierarchy - Virtual memory - Cache memory. (12)

### Books for Study

Units I, II, III, IV

1. Donald P. Leach and Albert Paul Malvino, "Digital Principles and Application", Fifth Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2003.

### Unit V

2. Thomas C. Bartee, "Computer Architecture and Logic Design", McGraw Hill International Edition, New Delhi, 1991.

### Books for Reference

1. Thomas C. Bartee, "Digital Computer Fundamentals", McGraw-Hill International Edition, New Delhi, 1985.
2. Morris Mano and Michael D Ciletti, "Digital Design", 4th Edition, Pearson publications, 2008.

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**Sem. I**  
**14PCA1106**

**Hours/Week: 3**  
**Credits: 2**

### Software Lab-I: 'C' AND 'UNIX'

1. Usage of Unix Commands
2. Simple problems using Operators
3. Control structures (if-else, switch-case)
4. Looping structures (for, while, do-while)
5. Sorting and Searching using one dimensional array
6. Matrix operations.
7. Recursion - Factorial, GCD, Adding two numbers
8. Structure, nested structure, structure array
9. File Handling (Text file, Sequential and Random)
10. String Manipulation Using pointers
11. Pointers and Structures.

**Sem. I**  
**14PCA1107**

**Hours/Week: 3**  
**Credits: 2**

### Software Lab-II

### HTML and DHTML

1. Designing and formatting the contents of a webpage using basic tags
2. Creating a webpage for displaying the Time-table for current semester with 'Table' tags
3. Designing a webpage using Frame tag
4. Designing an application form for opening a SB account using 'form' tag
5. Creating a webpage using audio and video tags

### JavaScript

5. Data validation using JavaScript
6. Writing a simple JavaScript with Conditional and Branching constructs
7. Adding interactivity to a web page (Events)
8. Working with Dialog boxes
9. Adding Scripts to Forms
10. Designing a simple calculator.

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**Sem. I**  
**14PCA1108**

**Credits: 2**

### Self Paced Learning: FUNDAMENTALS OF IT

### Objectives

\* To impart the knowledge about various facets of Information Technology.

### Unit - I

Information Technology - Meaning - Need - Components Role of IT - IT in manufacturing, IT in mobile computing, IT in public sector, IT in defense, IT in media, IT in publication, IT and internet. Emerging trends in IT - E Commerce, IT and supply chain management, IT and SIS, Electronic Data Interchange (EDI).

### Unit - II

Emerging Trends of Information Technology: Mobile Communication, Bluetooth, Global Positioning System (GPS), Infrared Communication, Smart

Card, Blue Laser Disc, Nano Technology, DNA Computing, Quantum Computer, Holographic Memory.

### Unit - III

Internet: Introduction, Relays, Repeaters, Bridges, Routers, Gateways. Internetworking: How networks differ, concatenated virtual circuits, connectionless internetworking, tunneling, internetwork Routing, fragmentation, Firewalls, internet architecture.

### Unit - IV

Multimedia: Definition - Building blocks of multimedia - Multimedia System - Applications - Virtual Reality. Internet Tools: Introduction - Web Browser - Electronic Mail - Search Engines - Instant Messaging.

### Unit - V

Computer in Business: Computers in Office Automation - Computers in Transaction Processing - Computers as Information Tools for Management Control - Computers in Engineering - Business on the Internet. Software Packages: Introduction to Word Processing - Microsoft Word - Desktop Publishing - Database Management Systems- Electronic Spreadsheets.

### Books for Study

Unit I, II, III, IV

1. ITLEducation Solution Ltd, "Introduction to Information Technology", Dorling, Kindersley (India) Pvt. Ltd, New Delhi.

Unit V: CH 10 and CH 13

2. Leon, "Introduction to computers", Vikas Publishing House Pvt. Ltd., NewDelhi, 2006.

### Books for Reference

1. Efraim Turban et al, "Introduction to Information Technology", Wiley India Pvt. Ltd., New Delhi.
2. Srinivasa Vallaban SV, (2005), Computers in Business, Sultan Chand and Sons, New Delhi.

**Sem. I**  
**14PCA1109**

**Hours/Week: 2**  
**Credits: 2**

## **INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)**

### Objectives

- \* To enable the students to have a basic knowledge of information communication technology and its applications.

### Unit I

Fundamentals: Fundamentals of Information and Communication Technology (ICT) - Importance of ICT - Applications of ICT. (6)

### Unit II

Internet groups: Creations and access of news groups - Community Networks - Social forum - Blogs. (6)

### Unit III

Internet Applications and Services: Online payments (EB, Phone) - Online reservation (Train, Bus, Air-Tickets) - Online bank transaction (Net Banking). (6)

### Unit IV

Internet Applications and Services: Online Applications (PAN, Passport) - Online tests - Social Networking websites - Blog management. (6)

### Unit V

Categories of web sites: Government websites - Public sector websites - Education institution websites - Scientific & Research websites. (6)

### Books for Study

1. K.L. James, "The Internet: a User's Guide", PHI Learning Pvt. Ltd., 2010.

### Web References

1. [www.india.gov.in](http://www.india.gov.in)
2. [www.irctc.co.in/](http://www.irctc.co.in/)
3. [www.onlinesbi.com](http://www.onlinesbi.com)
4. <https://tin.tin.nsdl.com/pan/>
5. [www.passportindia.gov.in/AppOnlineProject/welcomeLink](http://www.passportindia.gov.in/AppOnlineProject/welcomeLink)
6. [www.blogger.com](http://www.blogger.com)

**Sem. II**  
**14PCA2110**

**Hours/Week: 4**  
**Credits: 3**

### **OBJECT ORIENTED CONCEPTS AND 'C++'**

#### **Objectives**

\* To provide a sound understanding of the fundamental concepts of the object technology and to learn the realistic applications of object oriented software systems using C++.

#### **Unit - I**

Principles of Object Oriented Programming: Software Crisis - software evolution - procedure oriented programming - object oriented programming paradigm - basic concepts and benefits of OOP - object oriented language - applications of OOP - structure of C++ - applications of C++ - operators and manipulators in C++ - type cast operator. (12)

#### **Unit - II**

Functions in C++ : Function prototyping - call by reference - return by reference - inline functions - default, const arguments - function overloading - Classes and Objects: member functions - nesting of member functions - private member functions - memory allocations for objects - static data members - static member functions - arrays of objects - objects as function arguments - friendly functions - pointers to members. (12)

#### **Unit - III**

Constructors: Parameterized constructors - multiple constructors - constructor with default parameters - copy and dynamic constructors - destructors - operator overloading - overloading unary and binary operators - overloading binary operators using friend functions. (12)

#### **Unit - IV**

Inheritance: Defining derived classes - single inheritance - making a private member inheritable - multilevel inheritance - multiple inheritance - hybrid inheritance - virtual method - pure virtual method - virtual base classes - abstract classes - constructors in derived classes - member classes: nesting of classes. (12)

#### **Unit - V**

Streams formatted and unformatted I/O: Defined manipulators - File I/O - reading and writing - various functions - Exception handling: try - throw - catch statements - re-throwing - Templates: Generic classes and functions. (12)

#### **Books for Study**

1. E. Balagurusamy, "Object Oriented Programming with C++", Tata McGraw Hill, New Delhi, 4th edition, 2008

#### **Books for Reference**

1. Robert Lafore, "Object Oriented programming in Microsoft C++", Galgotia Publications, New Delhi, 2000
2. Bjarne Stroustrup, "The C++ Programming Language", Addison-Wesley, 1999.
3. Herbert Schildt, "C++: The complete reference", Tata McGraw Hill, New Delhi, Second edition, 1998.

**Sem. II**  
**14PCA2111**

**Hours/Week: 4**  
**Credits: 3**

### **SOFTWARE ENGINEERING**

#### **Objectives**

\* To introduce the basic concepts of Software Engineering and the various phases in Software Development.

#### **Unit - I**

**(12)**

Introduction to Software Engineering: The Evolving Role of Software - Software - The changing nature of software - Software Myths. A Generic View of Process: A Layered Technology - Process Models: The Waterfall Model - Evolutionary Process Models. System Engineering: Computer-Based Systems - The System Engineering Hierarchy.

#### **Unit - II**

**(12)**

Requirements Engineering: Requirements Engineering Tasks - Initiating the Requirement Engineering Process - Eliciting Requirements - Building the Analysis Model - Requirements Analysis - Data Modeling Concepts - Flow Oriented Modeling - Class based Modeling - Creating a Behavioral Model.

#### **Unit - III**

**(12)**

Design Engineering: Design Process and Design Quality - Design Concepts - The Design Model. Creating an Architectural Design: Software Architecture - Data Design - Architectural Design - Mapping Data Flow into Software Architecture. Modeling component level design: Designing class based components - Performing User Interface Design: The Golden Rules - User Interface Analysis and Design - Interface Analysis - Interface Design Steps - Design Evaluation.

**Unit - IV (12)**

Testing Strategies: A Strategic Approach to Software Testing - Test Strategies for Conventional Software and Object Oriented Software - Validation Testing - System Testing - The art of Debugging. Testing Tactics: Software Testing Fundamentals -White Box Testing - Basis Path Testing - Control Structure Testing - Black Box Testing - Object Oriented Testing Methods.

**Unit - V (12)**

Project Management: The Management Spectrum - The People - The Product - The Process - The Project. Estimation: The Project Planning Process - Resources - Software Project Estimation - Decomposition Techniques - Empirical Estimation Models. Project Scheduling: Project scheduling - Scheduling. Quality Management: Quality Concepts - Software Quality Assurance - Formal Technical Reviews.

**Books for Study**

1. Roger S Pressman, "Software Engineering", McGraw Hill, International 6th Edn, New York, 2006.

**Book for Reference**

1. Richard Fairley, "Software Engineering Concepts", McGraw Hill International Edn., 1996.

**Sem. II  
14PCA2112**

**Hours/Week: 4  
Credits: 3**

**OPERATING SYSTEMS**

**Objectives**

\* To present fundamental aspects of various managements in an operating system.

**Unit - I (12)**

Introduction: Simple batch system - multiprogrammed batch systems - time sharing - personal computer, parallel, distributed and real time systems. Computer-system Structures: Computer-system operation - I/O structure - storage structure - storage hierarchy - hardware protection - general system architecture. Operating system structures: system components - operating system services - system calls - system programs - system structures - virtual machines - system design and implementation - system generation.

**Unit - II (12)**

Process Management: Processes: process concept - process scheduling - operation on processes - cooperating processes - threads - interprocess communication. CPU scheduling: basic concepts - scheduling algorithms - multiple-processor scheduling - real time scheduling - algorithm evaluation. Process Synchronization: background - critical-selection problem - synchronization hardware - semaphores - classical problems of synchronization - critical regions - monitors - synchronization in Solaris - atomic transactions. Deadlocks: system model - deadlock characterization - methods for handling deadlocks - deadlock prevention - deadlock avoidance - deadlock detection - recovery from deadlock - combined approach to deadlock handling.

**Unit - III (12)**

Storage Management: Memory Management: background - logical versus physical address space - swapping - contiguous allocation - paging - segmentation - segmentation with paging. Virtual memory: Background - demand paging - performance of demand paging - page replacement - page-replacement algorithms - allocation of frames - thrashing - demand segmentation.

**Unit -IV (12)**

File - system interface: file concept - access methods - directory structure - protection - consistency semantics. File-system implementation: file-system structure - allocation methods - free-space management - directory implementation - efficiency and performance - recovery. I/O systems: i/o hardware - application i/o interface - kernel i/o subsystem - transforming I/O requests to hardware operations - performance. Secondary storage structure: Disk structure - disk scheduling - disk management - swap-space management - disk reliability - stable storage implementation.

**Unit - V (12)**

Protection: goals of protection - domain of protection - Access matrix - Implementation of access matrix - capability-based systems - Language-based protection. Security: problem - authentication - one-time passwords - program threats - system threats - Encryption - computer-security classifications.

**Books for Study**

1. Abraham Silberschatz and Peter Baer Galvin, "Operating System Concepts", 4th edition, Addison Wesley Longman Inc., California, 1998.

### Books for Reference

1. Harvey M. Deitel, "An introduction to Operating System", Addison Wesley Publishing Company, California, 1984.
2. Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall of India Private Ltd, New Delhi, 1997.

**Sem. II**  
**14PCA2113**

**Hours/Week: 4**  
**Credits: 3**

### PROBABILITY AND STATISTICS

#### Objectives

- \* To give a detailed knowledge on probability and distribution theory and to give a brief introduction to the theory of hypothesis testing and applied statistics.

#### Unit - I (12)

Sample space: Events - Probability - Probability axioms - addition and multiplication law of probabilities - conditional probability - Independent events - Baye's theorem.

#### Unit - II (12)

Random Variables: distribution functions (discrete and continuous) - Joint probability distribution - Marginal and conditional distribution. Mathematical expectations - Moment Generating Functions. Chebyshev's inequality.

#### Unit - III (12)

Discrete distributions: Binomial and Poisson -Continuous distributions: Uniform, Exponential and Normal. Correlation and Regression.

#### Unit - IV (12)

Testing of hypothesis: Tests based on normal population. Applications of chi -square, Student's-T, F- distributions - Chi-square Test - goodness of fit - Test based on mean, means, variance, correlation and regression coefficients.

#### Unit - V (12)

Analysis of Variance (one way and two way classifications). Design of Experiments - Principles of Design of Experiments - Completely Randomized Design - Randomized Block Design and Latin Square Design.

Note: Stress is given on the working of problems.

### Books for Study

Units I, II, III, IV

1. S.C.Gupta and V.K.Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 11th edition, 2002.

Unit V

2. S.C. Gupta and V.K. Kapoor, "Fundamentals of Applied Statistics", Sultan Chand & Sons, New Delhi, 4th edition, 2007.

### Books for Reference

1. Erwin Kryszig, "Introductory Mathematical Statistics", John Wiley & sons, New York, 1990.
2. J.S. Milton and J.C. Arnold, "Probability and Statistics in Engineering and Computer Science", McGraw Hill, New York, 1986.

**Sem. II**  
**14PCA2114**

**Hours/Week: 3**  
**Credits: 2**

### Software Lab-III: 'C++'

#### Classes and Objects

1. Problems Using classes
2. Constructors
3. Static Polymorphism: Operator overloading & function overloading
4. Inheritance.
5. Function Overriding
6. Dynamic Polymorphism: Virtual functions.
7. Pure virtual functions and abstract classes
8. Formatted I/O and File operation with Command Line Arguments
9. Templates
10. Exception Handling
11. Stack and its application
12. Queue and its application.

**Sem. II**  
**14PCA2115**

**Hours/Week: 3**  
**Credits: 2**

**Software Lab-IV: MULTIMEDIA**

**PhotoShop**

1. Develop an image using selection and allied operations
2. Develop an image using Effects and apply Filters
3. Develop an image with the help of patterns, images.
4. Develop an image and do the following image slicing, rollover, animations
5. Designing a Student ID card
6. Designing an Invitation
7. Designing a Flexible Banners
8. Designing a Web banner
9. Designing a Web Page layout using slice tool

**Flash**

10. Develop an image with the help of basic shapes.
11. Animate an image using motion, shape tweening, and actions.

**Dreamweaver**

12. Create a simple web page contain five images with animation.
13. Develop a class timetable using tables in Dreamweaver.
14. Develop a College student application form using Dreamweaver.
15. Design a web blog of personal details using Dreamweaver.

**Sem. II**  
**14PSS2401**

**Hours/Week: 4**  
**Credits: 4**

**IDC-1:**  
**SOFT SKILLS**

**Objectives**

- \* Introducing learners to the relevant soft skills at the territory level in order to make them gain competitive advantage both professionally and personally.

**Module 1: Basics of communication and Effective communication**

Basics of communication: Definition of communication, Process of Communication, Barriers of Communication, Non-verbal Communication. Effective communication: Johari Window, The Art of Listening, Kinesthetic, Production of Speech, Organization of Speech, Modes of delivery, Conversation Techniques, Dialogue, Good manners and Etiquettes.

**Module II: Resume writing and Interview skills**

Resume Writing: What is Resume? Types of Resume? Chronological, Functional and Mixed Resume, Steps in preparation of Resume. Interview Skills: Common interview questions, Attitude, Body Language, The mock interviews, Phone interviews, Behavioral interviews.

**Module III: Group discussion and team building**

Group Discussion: Group Discussion Basics, GD Topics for Practice, Points for GD Topics, Case-Based and Article based Group Discussions, Points for Case Studies, and Notes on Current Issues for GDS. Team Building: Team Vs Group - synergy, Stages of Team Formation, the Dabbawala. Leadership - Styles, Work ethics. Personal Effectiveness: Personal Effectiveness: Self Discovery, Self Esteem, and Goal setting. Conflict and Stress Management.

**Module IV: Numerical Ability**

Average, Percentage, Profit and Loss, Simple Interest, Compound Interest, Time and Work, Pipes and Cisterns, Time and Distance, Problems on Trains, Boats and Streams Calendar, Ratios and Proportions.

**Module V: Test of reasoning**

Verbal Reasoning: Series Completion, Analogy, Data Sufficiency, Assertion and Reasoning, Logical Deduction. Non-Verbal Reasoning: Series, Classification

**References**

1. Aggarwal, R.S. 2010 Quantitative Aptitude, S.Chand & Sons
2. Aggarwal, R.S. 2010. A Modern Approach to Verbal and Non Verbal Reasoning. S.Chand
3. Covey, Stephen. 2004. 7 Habits of Highly effective people, Free Press.
4. Egan, Gerard. 1994. The Skilled Helper (5th Ed). Pacific Grove, Brooks / Cole.
5. Khera, Shiv 2003. You Can Win. Macmillan Books , Revised Edition
6. Murphy, Raymond. 1998. Essential English Grammar. 2nd ed., Cambridge Univ. Press.
7. Prasad, L. M. 2000. Organizational Behaviour, S.Chand
8. Sankaran, K., & Kumar, M. 2010 Group Discussion and Public Speaking. M.I. Pub, Agra, Adams Media.
9. Schuller, Robert. (2010). Positive Attitudes. Jaico Books.
10. Trishna's (2006). How to do well in GDs & Interviews, Trishna Knowledge Systems.
11. Yate, Martin. (2005). Hiring the Best: A Manager's Guide to Effective Interviewing and Recruiting.

**Sem. II**  
**14PCA2401**

**Hours/Week: 4**  
**Credits: 4**

**IDC-1 (WS):**  
**LAMP**

**Objectives**

\* The objective of the paper is to enable the students to install and configure as well as to handle the components of the LAMP (Linux, Apache, MySQL, and PHP) infrastructure in an efficient way.

**Unit - I (12)**

Linux: Introduction - Download and Install - Decisions, Decisions - Linux Partition Sizes - Accounts - Security - Basic UNIX: Shell - Owner, Groups, Permissions, Ownership - Processes - PATH and Environment - Commands-Basic File System Essentials - Useful Programs.

**Unit - II (12)**

Apache Web server: Starting and Stopping and Restarting Apache-Configuration - Securing Apache - Create the Web Site-Apache Log Files.

**Unit - III (12)**

My SQL: Commands - Database Independent Interface - Tables - Loading and Dumping Database.

**Unit - IV (12)**

PHP: Embedding PHP into HTML -Configuration - Language Syntax: Variables - Data Types - Web variables - Operators - Flow Control Constructs - Writing PHP Papers.

**Unit - V (12)**

Built in PHP function - Important Functions - Array Functions - String Functions - Other Functions - PHP and MySQL: MySQL Functions.

**Books for Study**

1. James Lee and Brent Lee "Open Source Development with LAMP - Using Linux , Apache, My SQL ,Perl and PHP", Pearson Education , 2009.

**Books for Reference**

1. JsonGerner, Elizabeth Naramore , Morgan Owens and Matt Warden , "Professional LAMP - Using Linux , Apache, My SQL and PHP5Web development", Wiley Publisher, 2006.

**Sem. III**  
**14SCS3101**

**Hours/Week: 4**  
**Credits: 3**

**PROGRAMMING IN JAVA**

**Objectives**

\* To understand the power of Java language and advanced concepts of Java.

**Unit I: (12)**

Fundamental Programming Structures in Java: Data Types - Variables - Operators - Strings - Control flow - Arrays. Objects and Classes: Introduction to Object-Oriented Programming - Predefined Classes - Defining Your Own Classes - Static Fields and Methods - Methods Parameters - Object Constructions - Packages.

**Unit II: (12)**

Inheritance: Classes, Superclasses and Subclasses - Object: The Cosmic Superclass - Generic Array List - Object Wrappers and Autoboxing, Interfaces and Inner Classes: Interfaces - Object Cloning - Interfaces and Callbacks - Inner Classes. Event Handling: Basic of Event Handling - AWT Event Hierarchy - Semantic and Low Level Events in the AWT - Low Level Event Types - Actions - Multicasting.

**Unit III: (12)**

User Interfaces Components with Swing: The Model-View-Controller Design Pattern - Layout Management - Text Input - Choice Components - Menus - Sophisticated Layout Management - Dialog Boxes. Deploying Applets and Applications: Applet Basics - Applet HTML Tags and Attributes. Exception and Debugging: Dealing with Errors - Catching Exceptions. Streams and Files: Streams - Complete Stream Zoo - Use of Streams - File Management.

**Unit IV: (12)**

Multithreading: Threads - Thread Properties - Interrupting Threads - Thread Priorities - Synchronization. Networking: Connecting to a Server - Implementing Server - Sending E-Mail - URL Connections.

**Unit V: (12)**

Database Connectivity: JDBC - Structured Query Language - Installing JDBC - Basic JDBC Programming Concepts - Populating a Database - Executing Queries. Java Beans: Need for Beans - Bean-Writing Process - JDK and the BeanBox - Building an Image Viewer Application via Beans - Naming Patterns for Beans Properties and events - Bean Property Types.

### Books for Study

Unit: I, II, III

1. Cay S. Horstmann and Gary Cornell, Core Java2 Volume I - Fundamentals, Pearson Education in South Asia, Seventh Edition, 2007.

Unit: IV, V

2. Cay S. Horstmann and Gary Cornell, Core Java2 Volume II - Advanced Features, Pearson Education Asia Pte. Ltd, 2000.

### Books for Reference

1. Herbert Schildt, Java 2: Complete Reference, Tata McGraw Hill, Fifth Edition, 2009.
2. Deitel & Deitel, Java How to Program, PHI, Eighth Edition.
3. Kogent Learning solution, Java 6 Programming Black Book, Dreamtech Press, 2007.

**Sem. III**  
**14SCS3102**

**Hours/Week: 4**  
**Credits: 3**

## DATABASE SYSTEMS

### Objectives

- \* To give the detailed knowledge about the Different Approaches to the Database System giving emphasis to Relational Approach and Concurrency Management.

### Unit - I (12)

Introduction to DBS: Basic Concepts and Definitions - Data Dictionary - Database System - DBA - Database Languages - Database System Architecture: Schemas, Sub-schemas and Instances - Three-level Architecture - Data Independence - Mappings -Data Models - Types - ER Model - Specialization and Generalization - Relational Algebra and Calculus: Structure - Relational Algebra - Relational Calculus.

### Unit - II (12)

Relational Query Languages: Introduction - Codd's Rules - Information System Based Language - Structured Query Language (SQL) - Embedded SQL.

### Unit - III (12)

Normalization: Introduction to Database Design - Functional Dependency and Decomposition - Normalization - Normal Forms - BCNF - Multi-valued and Join Dependencies.

### Unit - IV (12)

PL/SQL: A Programming Language: History - Fundamentals -Data types - Operators. Control Structures: Control Structures - Nested Blocks - SQL in PL/SQL - Data Manipulation - Transaction Control statements. PL/SQL Cursors and Exceptions - Named Blocks: Procedures - Functions - Packages -Triggers.

### Unit - V (12)

Transaction Processing and Concurrency Control - Database Recovery System - Database Security - Parallel Database Systems: Introduction to Parallel databases - Architecture - Key Elements of Parallel Database Processing -Distributed Databases - Architecture - Distributed Database design.

### Books for Study

Unit I, II, III and V

1. S K Singh, "Database Systems Concepts, Design and Applications", Pearson Education, 2006.

Unit IV

2. Nilesh Shah, "Database Systems using ORACLE", Prentice Hall of India, 2005.

### Books for Reference

1. Abraham Silberschatz, "Database Systems", McGraw Hill International, 1997.
2. CJ Date, "An Introduction to Database Systems", 6th Edn, Addison Wesley Publishing Company, New York, 1995.

**Sem. III**  
**14SCS3103**

**Hours/Week: 4**  
**Credits: 3**

## DESIGN AND ANALYSIS OF ALGORITHMS

### Objectives

- To impart the students the knowledge of design and analysis of algorithms this is the core of computer science.
- To give importance to find the complexity (order) of algorithms.

### Unit I: (12)

Introduction- Algorithm - Algorithm specification: Pseudocode Conventions, Recursive algorithms - Performance analysis: Space Complexity, Time Complexity, Asymptotic Notation, Practical Complexities.



**Unit II:** (12)  
Linear data structures: Concepts of non-primitive data structures - Storage structure for arrays - Stacks - Operations on stacks - Queues - Priority queues.

**Unit III:** (12)  
Linked linear lists - Operations on linked linear lists - Circularly linked lists - Doubly linked linear lists - Non-linear data structure: Trees - Binary trees - Operations on binary trees - Storage representation and manipulations of binary trees.

**Unit IV:** (12)  
Divide and conquer - General method - Binary search - Finding the maximum and minimum in a set of items - Merge sort - Quick sort - Selection sort. Basic Traversal and Search Techniques for graphs: Breadth First Search - Depth First Search.

**Unit V:** (12)  
Backtracking - The 8-Queens problem - Algebraic problems - The general method - Evaluation and interpolation - Horner's rule - Lagrange interpolation - Newtonian interpolation.

#### **Books for Study**

Unit I,IV,V

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Fundamentals of Computer algorithms", Galgotia Publications Pvt. Ltd., 2004.

Unit II,III

2. Jean-Paul Tremblay and Paul G.Sorenson, "An introduction to data structures with applications", Second Edition, Tata McGraw Hill Publishing Company Limited, New Delhi, 1995.

#### **Books for Reference**

1. A.V. Aho, J.E.Hopcroft, J.D. Ullman, "The Design and Analysis of Computer Algorithms", Addison-Wesley Publ. Comp., 1974.
2. Seymour E.Goodman, S.T. Hedetniemi, "Introduction to the design and analysis of algorithms", McGraw Hill International Edition, 2002

**Sem. III**  
**14PCA3104**

**Hours/Week: 3**  
**Credits: 2**

#### **Software Lab-V: JAVA**

1. Classes & Objects
2. Packages & Interfaces
3. Inheritance
4. Exception Handling
5. Multithreading
6. Applet
7. Swing
8. Event Handling Mechanisms
9. Streams and Files
10. Networking
11. JDBC
12. Java Beans

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**Sem. III**  
**14PCA3105**

**Hours/Week: 3**  
**Credits: 2**

#### **Software Lab-VI: RDBMS**

##### **SQL**

1. Simple queries using DDL, DML, and DCL
2. SQL functions
3. SET operations
4. View and Snapshots
5. Nested queries

##### **PL/SQL**

6. PL/SQL Block
7. Cursors
8. Database triggers
9. Subprograms and packages.

##### **FORMS AND REPORTS**

10. Designing oracle forms with menus, buttons and LOVs
11. Master-Detail form design.
12. Developing oracle reports (Tabular, Master/detail, Matrix and Mailing label)

**Sem. III**  
**14PCA3201A**

**Hours/Week: 4**  
**Credits: 4**

**Core Elective (WS):**

**COMPUTER ORGANISATION AND ARCHITECTURE**

**Objectives**

\* To give basic knowledge on various building blocks of a typical digital computer and advanced microprocessors.

**Unit - I (12)**

Basic Computer Organisation and Design: Instruction codes - Computer registers - Computer Instructions - Timing and Control - Instruction cycle - Memory reference instructions - Input/output & Interrupt - Design of Basic Computer - Design of Accumulator Logic. Microprogrammed control: Control memory - Address sequencing - Micro program example - Design of control unit.

**Unit - II (12)**

CPU: General register organisation - Stack organisation - Instruction formats - Addressing modes - data transfer and manipulation - Program Control - RISC. Pipeline & Vector Processing: Parallel processing - Pipelining - Arithmetic pipeline - Instruction pipeline - RISC pipeline - Vector processing - Array processors.

**Unit -III (12)**

Computer Arithmetic: Addition, Subtraction, Multiplication and Division algorithms - Floating point arithmetic operations - Decimal arithmetic unit - Decimal arithmetic operations.

**Unit IV (12)**

Intel 8086-Introduction-8086 Architecture-8086 Addressing Modes of 8086 - 80186/80188 Architecture - Introduction to the 80286 Microprocessor - Introduction to the 80386 Microprocessor - Special 80386 Registers.

**Unit V (12)**

Introduction to the Pentium Microprocessor - Introduction to the Pentium Pro Microprocessor - Special Pentium Pro Features - Introduction to the Pentium II Microprocessor - The Pentium III - The Pentium 4 and Core2. (12)

**Books for Study**

Units I, II, III

1. M.Morris Mano, "Computer System Architecture", Third Edition, Prentice Hall of India, New Delhi, 2003.

Units IV, V Note : Stress on architecture only

2. Barry B.Brey, "The Intel Microprocessors 8086/8088,80186/80188,80286,80386,80486, Pentium, And Pentium Pro Processor, Fourth Edition, Prentice-Hall of India Pvt.Ltd, New Delhi. 1999.

**Books for Reference**

1. M. Rafiquzzaman "Microprocessors Theory and Applications" Revised Edition, PHI Learning Pvt.Ltd, New Delhi, 2012.

**Sem. III**  
**14PCA3201B**

**Hours/Week: 4**  
**Credits: 4**

**Core Elective (WS):**  
**DATA MINING**

**Objectives**

\* To understand the basic concepts, tasks, methods and techniques in data mining.

**Unit-I (12)**

Introduction: Data Mining - Data Mining Functionalities - Classification of Data Mining Systems - Data Mining Task Primitives - Integration of a Data Mining System with a Database or Data Warehouse System - Major Issues in Data Mining.

**Unit-II (12)**

Data Preprocessing: Descriptive Data Summarization - Data Cleaning - Data Integration and Transformation - Data Reduction - Data Discretization and Concept Hierarchy Generation.

**Unit-III (12)**

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and a Road Map - Efficient and Scalable Frequent Itemset Mining Methods - Mining Various Kinds of Association Rules - From Association Mining to Correlation Analysis.

**Unit-IV (12)**

Classification and Prediction: Issues Regarding Classification and Prediction - Classification by Decision Tree Induction - Bayesian Classification - Rule-Based Classification - Classification by Backpropagation - Support Vector Machines.

**Unit - V** (12)

Cluster Analysis: Cluster Analysis - Types of Data in Cluster Analysis - A Categorization of Major Clustering Methods - Partitioning Methods - Hierarchical Methods - Density-Based Methods - Grid-Based Methods - Model-Based Clustering Methods.

**Book for Study**

1. Han. J, Kamber. M, "Data Mining: Concepts and Techniques", Morgan Kaufmann Publishers, 2nd Edition, 2006.

**Books for Reference**

1. Michael J.A. Berry, Gordon S. Linoff, "Data Mining Techniques", John Wiley & Sons, 1997.
2. David J. Hand, Heikki Mannila, Padhraic Smyth, "Principles of Data Mining", Massachusetts Institute of Technology, 2001.

**Sem. III**  
**14PCA3402**

**Hours/Week: 4**  
**Credits: 4**

**IDC (BS):**  
**WEB DESIGN**

**Objectives**

- \* To enable the students to have a basic knowledge about the Internet and its principles.

**Unit I** (12)

Networking Concepts: what is INTERNET? - History - Applications - Users - Protocols - Host Machines and Host Names - Internet Architecture and Packet Switching - Who is in charge? - Client Server Model - Band width and Asynchronous Communication. Connection : Dial-up Access - Direct and Dedicated Connections - shell or TCT/ IP accounts - Domains and Addresses - Domain name system - IP addresses.

**Unit II** (12)

Facilities: E-Mail - WWW - FTP - TELNET - HTTP - USENET - Search Engines.

**Unit III** (12)

HTML: Tags - Document Layout - Comments - Headings - Paragraphs - Breaks - Texts - Lists - Special Characters - Links - Images - Form - Tables - Frames.

**Unit IV** (12)

VB Script: Language structure - Control Structure - Procedures and Functions - Error handling.

**Unit V** (12)

VB Script: Input & Output - Data Validation - Integration with Forms - ActiveX Control & Scripting.

**Books FOR STDUY**

Unit I,II

1. Wendy G.Lehnert, "Internet 101 - a beginners guide to the internet and the world wide web", addition wesley, 1999.

Unit III

2. CIS terms school of computing - Jaipur, "INTERNET - An Introduction", Tata McGraw Hill publishing company limited, New Delhi - 1999.

Unit IV, V

3. Christopher J.Goddard, Mark White, "Mastering VBScript", Galgotia publications, New Delhi, 1998.

**Book for Reference**

1. Chuck Musciano & Bill Kennedy, "HTML - The Definitive Guide", Shroff Publishers & Distributors Pvt. Ltd., Calcutta - 1999.

**Sem. IV** **Hours/Week: 4**  
**14PCA4116** **Credits: 3**

### **PROGRAMMING SMART DEVICES**

#### **Objectives**

\* To provide concepts to enable the students for creating applications for smart devices using Android.

#### **Unit I** **(12)**

Introduction to Android: History of Android - Versions of Android - Android Architecture - Application Architecture - Components - Intents - Manifest - Application Package - Activities - Services - Broadcast Receivers - Content Providers - Installing the Android SDK - Installing an Android Platform - Creating an Android Virtual Device - Starting the AVD - Introducing UC - Creating UC - Installing and Running UC - Preparing UC for Publishing - Migrating to Eclipse - Developing UC with Eclipse.

#### **Unit II** **(12)**

User Interface: Customizing the Window - Creating and Displaying Views - Monitoring Click Actions - Resolution Independent Assets - Locking Activity Orientation - Dynamic Orientation Locking - Manually Handling Rotation - Creating Pop-up Menu Actions - Customizing Options Menu - Customizing Back Button - Emulating the Home Button - Monitoring TextView Changes - Scrolling TextView Ticker - Animating a View - Creating - Drawables as Backgrounds - Creating Custom State Drawables - Applying - Masks to Image - Creating Dialogs that Persist - Implementing Situation - Specific Layouts - Customizing Keyboard Actions - Dismissing Soft Keyboard - Customizing AdapterView Empty View - Customizing ListView Rows - Making ListView Section Headers - Creating Compound Controls.

#### **Unit III** **(12)**

Interacting with Device Hardware and Media - Interacting Device Location - Mapping Locations - Annotating Maps - Capturing Images and Videos - Making a Custom Camera Overlay - Recording Audio - Adding Speech Recognition - Playing Back Audio/Video - Creating a Tit Monitor - Monitoring Compass Orientation.

#### **Unit IV** **(12)**

Persisting Data : Marking a Preference Screen - Persisting Simple Data - Reading and Writing Files - Using Files as Resources - Managing a Database - Querying a Database - Backing Up Data - Sharing your Database - Sharing your other Data.

#### **Unit V** **(12)**

Interacting with the Systems: Notifying from the Background - Creating Timed and Periodic Tasks - Scheduling a Periodic Task - Creating Sticky Operations - Running Persistent Background Operations - Launching Other Applications - Launching System Application - other Applications - Interacting with Contacts - Picking Device Media - Saving to the MediaStore. Working with Libraries : Creating Java Library JARs - Using Java Library JARs - Creating Android Library Projects - Using Android Library Projects - Charting - Practical Push Messaging. (12)

#### **Book for Study**

1. Dave Smith and Jeff Friesen, "Android Recipes: A Problem - Solution Approach", Rakmo Press (P) Ltd, New Delhi, 2011.

#### **Web Reference**

1. Android Developer's Guides - available at <http://developer.android.com/>

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**Sem. IV** **Hours/Week: 4**  
**14PCA4117** **Credits: 3**

### **ACCOUNTING AND FINANCIAL MANAGEMENT**

#### **Objectives**

\* To present the whole range of bookkeeping and accountancy and to give comprehensive coverage to management accounts.

#### **Unit I** **(12)**

Accounting: Principles - concepts - conventions - journals-ledger-trial balance.

#### **Unit II** **(12)**

Trading account-profit and loss account- balance sheet-adjustments- error correction.

#### **Unit-III** **(12)**

Depreciation: Meaning-need-methods of charging depreciation (straight line method, diminishing balance method). Tally: General frame work-accounting applications.

#### **Unit IV** **(12)**

Marginal costing-break even analysis. - Standard costing-Analysis of variance.

**Unit V** (12)

Budgeting: Characteristics- advantages-classification-preparation of budgets.

Capital budgeting: Meaning-methods of capital investment decision-making.

**Books for Study**

1. R. Ramachandran and R. Srinivasan, "Management Accounting: Theory, Problems and Solutions", Sriram Publications, 2010.
2. T.S Grewal, "Double entry book keeping", Sultan Chand sons, New Delhi, 1986.
3. S.N. Maheswari, "Management accounting", Sultan Chand sons, New Delhi, 1986.

**Books for Reference**

1. M.C.Shukla, T.S. Grewal, "Advanced accounting", S.Chand and Company Pvt., Ltd., Ram Nagar, New Delhi, 1988.
2. Man Mohan and G.N. Goyal, "Principles of management accounting", Sahitya bhawan, Agra, 1986.

**Sem. IV**  
**14PCA4118**

**Hours/Week: 4**  
**Credits: 3**

**GRAPH AND AUTOMATA THEORY**

**Objectives**

\* To introduce the important features of Graph theory and the computer representation of graph, principles of formal languages and their relation to automata.

**Unit - I** (12)

Graph Introduction: Paths and Circuits - isomorphism, Connected & Disconnected Graphs, Euler graphs - Operations on Graphs - Hamiltonian Paths & Circuits.

**Unit - II** (12)

Trees and Fundamental Circuits: Properties of Trees, Rooted and Binary Trees, Spanning trees. Matrix representation of Graphs -Incidence Matrix, Adjacency Matrix, Circuit Matrix - Fundamental Circuit Matrix.

**Unit - III** (12)

Directed Graphs: Some types of digraphs, trees with directed edges. Graph Theoretic Algorithms - Computer representation of a Graph. Algorithms for connectedness & components, spanning tree, shortest path.

**Unit - IV** (12)

Finite State Systems: Basic definitions - Non-Deterministic Finite Automata - Finite Automata with epsilon moves-Regular Expressions, Applications of Finite Automata.

**Unit - V** (12)

Motivation and Introduction: Context- Free Grammars - Derivation Trees - Chomsky Normal Form - Greibach Normal Form - The Pumping Lemma for CFL's.

**Note:**

Stress can be given to problem solving instead of proof of theorems in Units IV and V.

**Books for Study**

Units I, II, III

1. Narsing Deo, "Graph Theory with applications to Engineering and Computer Science", Prentice-Hall of India Limited, New Delhi, 2013.

Units IV, V

2. John E.Hopcroft & Jeffery D.Ullman, "Introduction To Automata Theory, Languages and Computation", Narosa Publishing House, New Delhi, 2002.

**Books for Reference**

1. John E.Hopcroft & Jeffery D.Ullman, "Formal Languages and Their Relation to Automata", Addison - Wesley publishing company, London, 1969.
2. Bernard Kolman & Robert C.Busby, "Discrete Mathematical Structure for Computer Science" Prentice Hall of India, New Delhi, 1987.

**Sem. IV**  
**14PCA4119**

**Hours/Week: 4**  
**Credits: 3**

## **COMPUTER NETWORKS AND SECURITY**

### **Objectives**

\* To provide overall knowledge in Computer Communication Networks and Security Concepts.

### **Unit I (12)**

Introduction: Definition for the networks-Uses of Networks - Network Architecture-Protocol hierarchies - Service Primitives - OSI Reference Model - ARPANET - Internet - Physical Layer Transmission Media - Telephone Systems.

### **Unit II (12)**

Data link layer: Data link layer - Design Issues - Error Detection and Correction - Data Link Protocols - Sliding Window Protocols - Finite state Machine Model - Petri Networks-PPP-Polling - FDM.

### **Unit III (12)**

Network Layer: Design Issues - Routing Algorithms - Congestion Control Algorithms - Inter Network Routing - Fragmentation.

### **Unit IV (12)**

Transport Layer - Design Issues - Elements of Transport Protocols - The Internet - Transport Protocol (TCP &UDP) - Application Layer: Design Issues.

### **Unit V (12)**

Network Security: Security Requirements and Attacks - Confidentiality with Symmetric Encryption - Message Authentication and Hash Functions - Public-key Encryption and Digital Signatures - Secure Socket Layer and Transport Layer Security - IPv4 and IPv6 Security.

### **Books for Study**

Unit I,II,III,IV

1. Andrew S Tanenbaum, "Computer Networks", Prentice Hall of India, New Delhi, 1999.

Unit V

2. William Stallings, "Data and Computer Communications", Prentice Hall of India, Seventh Edition, 2004.

### **Books for Reference**

1. Vijay Ahuja, "Design and Analysis of Computer Communication Networks", McGraw Hill, New York, 1985.
2. Behrouz A Fourouzan, "Data Communications and Networking", McGraw Hill, Fourth Edition, 2006.

**Sem. IV**  
**14PCA4120**

**Hours/Week: 3**  
**Credits: 2**

### **Software Lab-VII:**

## **XML AND ANDROID PROGRAMMING**

### **XML**

1. XML document creation
2. Style sheets: CSS
3. Style sheets: XSL
4. XSL templates
5. Validation using DTD
6. SAX and DOM

### **Android**

1. Different Layout design including nested layout for a single biodata.
2. Arithmetic Operation for two numbers
3. Business Calculator
4. Animation: Bouncing of a ball
5. Intent
6. Database SQLite: Student Biodata
7. Fragments - Tablet Programming
8. Media Player

**Sem. IV**  
**14PCA4121**

**Hours/Week: 2**  
**Credits: 2**

**Software Lab-VIII:**  
**PHP AND MYSQL**

**PHP**

1. Develop a PHP program using controls and functions
2. Develop a PHP program and check message passing mechanism between pages.
3. Develop a PHP program using String function and Arrays.

**PHPADVANCED CONCEPTS**

4. Develop a PHP program using parsing functions (use Tokenizing)
5. Develop a PHP program and check Regular Expression, HTML functions, Hashing functions.
6. Develop a PHP program and check File System functions, Network functions, Date and time functions.
7. Develop a PHP program using session
8. Develop a PHP program using cookie and session

**PHP/MYSQL**

9. Develop a PHP program to display student information using MYSQL table.
10. Develop a college application form using MYSQL table.

**Sem. IV**  
**14PCA3202A**

**Hours/Week: 4**  
**Credits: 4**

**Core Elective (WS):**  
**LINUX ADMINISTRATION**

**Objectives**

- \* To understand the principles of Linux Operating System for effective System administration.

**Unit I** (12)

Linux Introduction and Installation: Linux-Advantages-Red Hat Linux- New Features-Installation procedures and Methods. Using Desktop-GNOME-KDE-Linux Commands Accessing and Running Applications-Installing Red

Hat Linux Applications, Running Window Application, Running Windows, DOS and Macintosh Applications - Tools for using Internet and Web.

**Unit II** (12)

Administration: Understanding System Administration: Root login super user-GUI tools, commands and Log files-Configuring Hardware-File System and Disk Management-Monitoring performances. Setting Up and Supporting users: Creating user accounts - Setting user defaults - Creating Desktops-Modifying and Deleting Accounts.

**Unit III** (12)

Security Issues: Hacker versus Cracker-Password Protection-Protection from break-in-Filtering Network Access-Firewalls- Detecting Instructions - Encryption techniques.

**Unit IV** (12)

Networking: Setting up a LAN- LAN- Wireless-LAN- Understanding IP Addresses. Connecting to Internet: Dial up connection- Red Hat Linux as a router-VPN connection-Red Hat Linux as a proxy server-proxy clients.

**Unit V** (12)

Setting Up File Server: Setting up- NFS- Netware File Server Setting up a Web Server: Web Server- Starting Apache Web Server -Configuring Apache Server -Starting and Stopping the Server - Monitoring Activities.

**Books for Study**

1. Christopher Negus "Red Hat Linux 9 Bible", John Wiley & Sons, 2005.

**Books for Reference**

1. Thomas Schenk, "Red Hat Linux System Administration", Techmedia, New Delhi, 2003.
2. Christopher Negus "Red Hat Linux 9 Bible", WILEY Dreamtech, India Pvt. Ltd., New Delhi, First Edition, 2003.

Sem. IV  
14PCA3202B

Hours/Week: 4  
Credits: 4

**Core Elective (WS):  
PERVASIVE COMPUTING**

**Objectives**

\* To understand the basic concepts of pervasive computing and its applications.

**Unit I (12)**

Pervasive Computing devices and Interfaces - Device technology trends, Connecting issues and protocols, pervasive computing principles.

**Unit II (12)**

XML and its role in Pervasive Computing - Wireless Application Protocol (WAP) Architecture and Security - Wireless Mark-Up language (WML) - Introduction.

**Unit III (12)**

Programming consumer devices, Smart card programming, messaging components, Database components.

**Unit IV (12)**

Introduction - PDA software Components, Standards, emerging trends - PDA Device characteristics - PDA Based Access Architecture.

**Unit V (12)**

Architecture - Smart Card- based Authentication Mechanisms - Wearable computing Architecture.

**Books for Study**

1. Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaec, Klaus Rindtorff, "Pervasive Computing Technology and Architecture of Mobile Internet Applications", Pearson Education, New Delhi, 2007.
2. Uwe Hansman, Lothar Merk, Martin S Nicklous, Thomas Stober, "Pervasive Computing - Handbook", Springer- Verlag, New Delhi, 2003.

**Book for Reference**

1. Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaec, Klaus Rindtorff, "Pervasive Computing Technology and Architecture of Mobile Internet Applications", Addison Wesley, New Delhi, 2003.

Sem. IV  
14PCA3202C

Hours/Week: 4  
Credits: 4

**Core Elective (WS):  
INFORMATION STORAGE AND MANAGEMENT**

**Objectives**

\* To impart the basic and advanced concepts in Information storage and Management with various storage models and systems.

**Unit-I: Introduction to Information Storage and Management**

Information Storage: Data - Types of Data - Information - Storage - Evolution of Storage Technology and Architecture - Data Center Infrastructure - Core Element - Key Requirement for Data Center Elements - Managing Storage Infrastructure - Key Challenges in Managing Information- Information Lifecycle: Information Life Cycle Management - ILM Implementation - ILM Benefits - Direct Attached Storage and Introduction to Scsi: Types of DAS - Internal DAS, External DAS - DAS Benefits and Limitation - Disk Drive Interfaces - Ide/Ata, Sata, IDE/ATA, SATA Parallel SCSI - Introduction to Parallel SCSI: Evolution of SCSI - SCSI Interface - SCSI-3 Architecture - Parallel SCSI Addressing - SCSI Command Model - CDB Structure - Operation Code - Control Field - Status.

**Unit-II: Storage System Environment and RAID**

Components of Storage System Environment: Host - Connectivity - Storage - Disk Drive Components - Platter, Spindle, Read/Write Head, Actuator Arm Assembly, Controller, Physical Disk Structure, Zoned Bit Recording, Logical Block Addressing - Disk Drive Performance: Disk Service Time - Logical Components of the Host - Operating System - Device Driver - Volume Manager - File System - Application- Data Protection: RAID: Implementation of RAID - Software RAID - Hardware RAID - RAID Array Components - RAID Levels - Striping - Mirroring - Parity - RAID 0 - RAID 1 - Nested RAID- RAID 3 - RAID 4 - RAID 5 - RAID6 - RAID Comparison - RAID Impact on Disk Performance: Application IOPS and RAID Configuration - Hot Spares.

**Unit-III: Intelligent Storage System and Storage Area Network**

Components Of An Intelligent Storage System: Front End - Cache - Back End - Physical Disk - Intelligent Storage Array - High End Storage Systems - Midrange Storage System - Storage Area Network: Fibre Channel: Overview - The SAN and its Evolution - Components of SAN - Node Ports - Cabling - Interconnect Devices - Storage Arrays - SAN Management Software - FC Connectivity - Point to Point - Fibre Channel Arbitrated Loop - Fibre Channel



Switched Fabric - Fibre Channel Ports - Fibre Channel Architecture : Fibre Channel Protocol Stack - Fibre Channel Addressing - FC Frame - Structure and Organization of FC Data - Flow Control - Classes of Service - Zoning - Fibre Channel Login Types - FC Topology - Core-Edge Fabric - Mesh Topology.

**Unit-IV: Network Attached Storage and Content Addressed Scheme**

Network Attached Storage: General Purpose Servers Vs NAS Devices - Benefits of NAS - NAS File I/O - File System And Remote File Sharing - Accessing a File System - File Sharing - Components of NAS - Nas Implementation: Integrated NAS - Gateway NAS - Integrated NAS Connectivity - Gateway NAS Connectivity - NAS File Sharing Protocols - NFS, CIFS - NAS

I/O Operations - Hosting and Accessing Files on NAS - Factors Affecting NAS Performance and Availability - Content Addressed Storage: Fixed Contents and Archives - Types of Archives - Features and Benefits of CAS - CAS Architecture - Object Storage and Retrieval in CAS - CAS Example - Healthcare Solution : Storing Patient Studies.

**Unit-V: Storage Virtualization, Backup and Recovery**

Forms of Virtualization: Memory Virtualization - Network Virtualization - Server Virtualization - Storage Virtualization - SNIA Storage Virtualization Taxonomy - Storage Virtualization Configuration - Storage Virtualization Challenges - Scalability - Functionality - Manageability - Support - Types Of Storage Virtualization: Types of Storage Virtualization - Block-Level Storage Virtualization - File Level Virtualization - Backup And Recovery: Backup Process - Disaster Recovery - Operational Back Up - Archival - Backup Consideration - Backup Granularity - Recovery Considerations - Backup Methods - Backup Process - Backup And Restore Operations - Backup Topologies - Serverless Backup - Backup in NAS Environment - Backup Technologies - Backup to Tape - Physical Tape Library - Backup to Disk - Virtual Tape Library.

**Book for Study**

1. EMC Education services, “Information Storage and Management Storing”, Wiley India Edition, ISBN:9788126521470.

**Book for Reference**

1. G. Somasundaram and Alok Shrivatsava, “Information Storage and Management: Storing, Managing, and Protecting Digital Information”, Wiley, 2009.

**Sem. III & IV  
14PCA4123**

**Hours/Week: 2  
Credits: 2**

**Skill Based Course:  
QUANTITATIVE APTITUDE**

**Objectives**

- \* To revise and master the basic techniques of arithmetic operations so that these skills will augment to their professional capacity.

**Unit I (12)**

Numbers, HCF, LCM, Decimal Fractions, Simplification, Square Roots, cube roots, averages, Problems in numbers and ages.

**Unit II (12)**

Surds, Indices, Percentages, Profit and Loss, Ratio and Proportion, Partnership, Chain Rule, Time and Work, Pipes and Distances.

**Unit III (12)**

Time and Distance, Problems on Trains, Boats and Streams, Alligation, Simple Interest, Compound Interest, Logarithms, Area.

**Unit IV (12)**

Volume and Surface Area, Races and Games of Skill, Calendar, Clocks, Stocks and Shares, Permutation and Combination, Probability.

**Unit V (12)**

True discount, Banker’s Discount, Height and Distances, Odd man out and Series, Tabulation, Bar graphs, Pie charts, Line Graphs.

**Book for Study**

1. R.S. Aggarwal, “Quantitative Aptitude for Competitive Examinations”, Seventh Revised Edition, S. Chand and Co. Ltd, New Delhi, 2005.

**Book for Reference**

1. Barron’s Guide for GMAT, Galgotia Publications, New Delhi, 2006.

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**Sem. V**  
**14PCA5124**

**Hours/Week: 4**  
**Credits: 3**

### **DISTRIBUTED TECHNOLOGIES**

#### **Objectives**

\* To know the architectures of Distributed systems, to understand and compare the technologies associated with J2EE and DOTNET.

#### **Unit I (12)**

Client server architecture: 2-tier model - 3-tier model - n-tier model - J2EE architecture - DOTNET architecture - MVC architecture.

#### **Unit II (12)**

Presentation services: Servlet - JSP - Javamail - Interaction services: RMI - CORBA - XML.

#### **Unit III (12)**

Component model: EJB : Session Beans: Stateless and Stateful - Entity Beans - CMP and BMP - Message Driven Beans.

#### **Unit IV (12)**

ASP.NET : Introduction - architecture - ASP.NET Runtime - ASP.NET Parser - Assembly - Page class. Web Server Controls - HTML Controls - AdRotator and Calendar controls - Validation Controls - Security Management.

#### **Unit V (12)**

ADO.NET: System.Data, SqlClient and Xml namespaces - Provider objects and Consumer objects - Disconnected data access - GridView & FormView.

#### **Books for Study**

Unit I,II

1. Justin Couch, Daniel H.Steinberg, "J2EE Bible", Wiley India(P) Ltd, New Delhi, 2002.

Unit III

2. Paul Tremblett, "Instant Enterprise Java y - Beans", Tata McGraw Hill Publishing company, New Delhi, 2001.

Unit IV,V

3. Platt S David, "Introducing Micorsoft .Net", Prentice Hall of India, New Delhi, 2003.

#### **Books for Reference**

1. Stephanie Bodoff, Dale Green, Eric Jendrock, "The J2EE tutorial", Addison-Wesley, 2002.
2. Hitesh Seth, "Microsoft .NET: kick start", Sams Publishing, 2004.

**Sem. V**  
**14PCA5125**

**Hours/Week: 4**  
**Credits: 3**

### **PROGRAMMING WITH WIN32 API AND MFC**

#### **Objectives**

\* To understand and explore the windows programming using Win32 API and MFC.

#### **Unit I (12)**

Windows and Messages: Architectural Overview - Registering the window- Create and display Window - Message Loop - Windows Procedure - Processing the messages - Playing a sound file - WM\_PAINT Message, WM\_DESTROY Message. GDI: Introduction -Structure - Device context - Painting and repainting - GDI mapping modes - Basic drawing tools. Keyboard Basics: Messages -Character Message -The Caret - Mouse Basics: Client - Non Client Area mouse messages - Capturing the mouse.

#### **Unit II (12)**

Child Window Controls: -Button class - Controls and Colors - Static Class - Scroll bar, Edit, List box -Classes. Menus: Menus and other resources - Icons -Cursor - String and custom resources - Keyboard Accelerators. Dialog boxes: Modal And Modeless - Common dialog boxes. Timer: -Basics - Methods.

#### **Unit III (12)**

Fundamentals of Windows and MFC: Windows programming model - Introduction to MFC - MFC Application - Drawing in a window :Windows GDI - Drawing with GDI - Mouse and Keyboard: Mouse messages - keyboard messages - Menus : Basics - Shapes - Menu Magic - MFC Collection Classes - Arrays - Lists, Maps, Pointer, Classic Controls, Dialog box : Modal, modeless dialog box - Property sheets.

#### **Unit IV (12)**

File: File I/O and Serialization - CFile Class - CArchive Class -Document - View Architecture : Fundamentals - Single Document Interface - Scroll View - HTML View - List View - Multiple Document Interface - Splitter windows.

**Unit V (12)**

Threads: Threads and Thread Synchronization - MFC Component Object Model - MFC and COM - ClipBoard and OLE: Legacy, OLE Clipboard - OLE Drag - Drop - ActiveX Controls: Basics - Building ActiveX Control - MFC application using Active X.

**Books for Study**

Unit I,II

1. Charles Petzold, "Programming Windows", Microsoft Press, 5th Edition, 2002.

Unit III,IV,V

2. Jeff Proise, "Programming Windows with MFC", Microsoft Press, Second Edition, 2003.

**Books for Reference**

1. Jim Conger, "Windows Programming Primer Plus", Galgotia Publications, New Delhi, 1996.
2. Shirly Wodtke, "Learn MFC C++ Classes", BPB Publications, New Delhi, 1997.
3. Peter Norton and Rob McGregor, "Peter Norton's Guide to Windows 95/NT programming with MFC", Prentice- Hall of India, New Delhi, 1997.

**Sem. V**  
**14PCA5126**

**Hours/Week: 4**  
**Credits: 3**

**UML AND MIS**

**Objectives**

\* To specify, visualize, construct and document the artifacts of a software systems and to give an understanding of the importance of Information Systems, how it relates to managerial end-users and the vital role of Information Technology in business.

**Unit - I (12)**

UML: Introduction to UML - Basic Structural Modeling: Classes - Relationships-Common Mechanism - Diagrams - Class diagrams.

**Unit - II (12)**

Advanced Structural Modeling: Advance classes - Advance relationships - Interfaces - Types and Roles - Packages - Instances - Object diagrams.

**Unit - III (12)**

Basic Behavioral Modeling - Interactions - Use Case -Use Case diagrams- Interaction Diagrams - Activity diagram.

**Unit - IV (12)**

Introduction to Information Systems (IS) - study of IS - Need of Information Technology (IT) in business - Fundamentals of IS concepts - overview of IS - solving business problems with IS - developing IS solutions.

**Unit - V (12)**

Information Systems for Business operations - Business IS - Marketing, manufacturing, human resource, accounting and financial information systems - transaction processing system - management information and decision support systems.

**Books for Study**

Units I, II and III

1. Grady Booch, James Rumbaugh and Ivar Jacobson, "The Unified Modeling Language User Guide", Addison - Wesley Longman Pvt.Ltd., Singapore, 2001.

Units IV and V

2. James A O'Brien, "Management Information Systems for managing IT in the Internetworked Enterprise", 4th edition, Tata McGraw Hill Publishing Company Limited, New Delhi, 1999.

**Books for Reference**

1. Grady Booch, James Rumbaugh and Ivar Jacobson, "The Unified Modeling Language Reference Manual", Addison Wesley Longman Pvt. Ltd, Singapore, 2000
2. W.S. Jaswadekar, " Management Information Systems", Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1998.

Sem. V  
14PCA5127

Hours/Week: 4  
Credits: 3

### OPERATIONS RESEARCH

#### Objectives

\* To give detailed knowledge about Linear programming. Also to give the basics of Inventory models, Queueing Theory and project scheduling.

#### Unit I (12)

Linear Programming : Formulations and Graphical solution to L.P. Problem - Simplex method - Degeneracy, unbounded and infeasible solution -Method of penalty - Two Phase Method.

#### Unit II (12)

Linear Programming(contd):Duality-Primal and Dual Computations -Dual Simplex Method - Transportation problem and its solution - Assignment problem and its solution by Hungarian method.

#### Unit III (12)

Project scheduling by PERT - CPM : Phases of project scheduling -Arrow Diagram - Critical Path Method - Probability and Cost Considerations in Project Scheduling - Crashing of Networks.

#### Unit IV (12)

Queueing Theory : Queueing System - Characteristics of Queueing system - classification of queues - Poisson Queues - M/M/1 and M/M/C Queueing Models.

#### Unit V (12)

Inventory Management : Inventory Control - ABC analysis - Economic Lot size Problems - EOQ with uniform Demand and shortages - Limitations of inventories - Buffer stock - Determination of Buffer stocks.

Note: Stress to be on solving Numerical Problems only.

#### Books for Study

1. Kanti Swarup, P K Guptha and Man Mohan, "Operations Research", Sultan Chand & Sons, New Delhi, 2013.

#### Books for Reference

1. Hamdy A. Taha, "Operations Research-An Introduction", Macmillan Publishing Co, 5th Edition, 1987.
2. P.K.Gupta, Man Mohan, "Operations Research and Quantitative Analysis", Sultan Chand & Sons, New Delhi First Edition, 1987.

Sem. V  
14PCA5128

Hours/Week: 3  
Credits: 2

### Software Lab-IX: DISTRIBUTED PROGRAMMING

1. RMI - Invocation of server side methods.
2. Servlets - Returning Information received from the client.
3. Servlets and JDBC - Constructing a response by accessing a database.
4. JSP - use of scriptlet.
5. JSP - use of java beans.
6. EJB - Session Bean.
7. EJB - Entity Bean.
8. ASP.NET - Server & Client side controls.
9. ASP.NET and ADO.NET - use of disconnected data object.
10. ASP.NET: Databind Controls.
11. DOM usage on the server side.
12. AJAX: Dynamic client - server interaction example.

Sem. V  
14PCA5129

Hours/Week: 3  
Credits: 2

### Software Lab-X: VC++

1. Creating a Overlapped Window using Windows API.
2. Display Text, Draw Lines, Ellipse, Circles on capturing the mouse messages using Windows API.
3. Maximize, Minimize the Window, Change the cursor shapes using Menus, find and change the status of the menu items using Windows API.
4. Create a Overlapped window by deriving the classes from the MFC base classes without using the tools. Register your own window; create your own cursors and icons.
5. Display Text and bitmaps, Draw lines, ellipse, circles for different mouse messages by mapping the messages - do not use the class-wizard.
6. Creation of user dialogs and usage of standard dialogs.
7. Create a student file and display the student information using SDI and Serialization.
8. Database operations using DAO/ODBC.

**Sem. V**  
**14PCA5203A**

**Hours/Week: 4**  
**Credits: 4**

**Core Elective (WS):**  
**PRINCIPLES OF COMPLIER DESIGN**

**Objectives**

\* To introduce the various phases of a compiler and also to develop skills in designing a compiler.

**Unit I (12)**

Different phases of a compiler - Finite state automaton and Lexical analysis - A simple approach to the design of lexical analyzers - Regular expressions NFA-DFA-reduced DFA- implementation of lexical analyzer- A language for specifying lexical analyzers.

**Unit II (12)**

Context free grammars - Parsers - Derivation and Parse trees - Shift - reduce parsing - Operator-precedence parsing - Top-down parsing - Predictive parsers.

**Unit III (12)**

Intermediate code generation - Translation - Implementation of syntax - directed translators - Intermediate code - Postfix notation - Parse trees and Syntax trees - Three-address codes - Quadruples and Triples - Translation of assignment statements.

**Unit IV (12)**

Symbol tables - Data structures for symbol tables - Implementation of a simple stack allocation scheme - Implementation of block structured languages - Errors - Lexical phase error.

**Unit V (12)**

Code optimization and Code generation: Elementary code optimization technique - Loop optimization - DAG representation of basic blocks - Value numbers and Algebraic laws - Object programs - Problems in code generation - A Machine model - A simple code Generator.

**Book for Study**

1. Alfred V. Aho, Jeffery D. Ullman, "Principles of Compiler Design", Narosa Publishing House, New Delhi, 1985.

**Books for Reference**

1. William A.Barrett, Rodney M.Bates, David A.Gustafson and John D.Couch-"Compiler Construction Theory and Practice", Galgotia Publishing Co., 1990.
2. Jean-Paul Trembley and Paul G. Sorenson,- "The Theory and Practice of Compiler Writing", McGraw Hill,1985.

**Sem. V**  
**14PCA5203B**

**Hours/Week: 4**  
**Credits: 4**

**Core Elective (WS):**  
**CLOUD COMPUTING**

**Objectives**

\* To impart Knowledge on Cloud Computing, Management and Governance of Cloud-Based Business Operations.

**Unit I (12)**

Cloud Computing: Introduction, Cloud types, Uses of Cloud, Scalability and Virtualization; Software as a Service (SaaS): Concepts, Multitenant Nature of SaaS Solutions, OpenSaaS Solutions, and Service-Oriented Architecture (SOA); Platform as a Service (PaaS): IT Evolution Leading to the Cloud, Benefits and Disadvantages of PaaS Solutions. Infrastructure as a Service (IaaS): Understanding IaaS, Improving Performance through Load Balancing, System and Storage Redundancy, Utilizing Cloud-Based NAS Devices, Advantages and Server types of IaaS Solutions.

**Unit II (12)**

Identity as a Service (IDaaS): Understanding Single Sign-On and OpenID, Mobile ID Management; Data Storage in the Cloud: Evolution of N/W Storage, Cloud-Based Data Storage - Introduction, Advantages and Disadvantages, the Fear of Cloud-Based Data, and Backup Systems, File System, Industry-Specific Cloud-Based Data storage, Cloud-Based Database Solutions and Block Storage; Virtualization: Introduction, History, Leveraging Blade Server, Server & Desktop Virtualization, Desktop Solution on Demand, Virtual N/W, Data Storage Virtualization and Need for Virtualization.

**Unit III (12)**

Securing the Cloud: Security Advantages of Cloud-Based Solutions, Introduction of Business Continuity and Disaster Recovery; Disaster Recovery and Business Continuity and the Cloud: Understanding the

Threats, Service Level Agreements (SLA), Risk Mitigation, Disaster Recovery Plan Template; Service Oriented Architecture (SOA): Understanding SOA, Web Services Vs Web pages, Web Service Performance, Web Service and Reuse, Scaling Web Services, Web Service and Loose Coupling, Web Service as a Black Box, Web Service Interoperability, Governing Web Service.

**Unit IV (12)**

Managing the Cloud: Knowing SLA, Ensuring and Auditing System Backups, System's Data Flow, Vendor Lock-In, Provider's Security Policies and Procedures, Monitoring Capacity Planning, Scaling Capabilities and Audit-Log Use, Solution Testing and Validation; Migrating to the Cloud: System Goals and Requirements, Protecting Existing Data, Knowing Application's Current Characteristics, Considering Vendor Lock-In, Defining Training Requirements, Budget Factors, IT Governance Issues, Cloud Bursting; Mobile Cloud Computing: Evolution, Mobile Cloud Eco-System, The Mobile Players, Mobile Deployment Considerations.

**Unit V (12)**

Governing the Cloud: Understanding Corporate Governance, Extending Governance to IT, Cloud Computing Governance; Evaluating the Cloud's Business Impact and Economics: Business Economics 101, Moor's Law and the Cloud, Understanding Right-Sizing, Defining a Large Data Centre, Economic Key Performance Indicators, Marketing the Cloud; Designing Cloud-Based Solutions: Revisit the System Requirements, Give-and-Take Process.

**Books for Study**

1. Kris Jamsa, "Cloud Computing" Jones and Baretlett Learnig, 2013.

**Books for Reference**

1. Barrie Sosinsky, "Cloud Computing Bible," Wiley India Pvt. Ltd. 2012
2. George Reese, "Cloud Application Architectures", Shroff/O' Reilly, 2009.

**Sem. V  
14PCA5203C**

**Hours/Week: 4  
Credits: 4**

**Core Elective (WS):  
CYBER CRIMES AND CYBER LAWS**

**Objectives**

- \* To impart the awareness and knowledge on Cyber Crimes and various cyber laws.

**Unit I (12)**

Introduction to Cyber Law: Evolution of Computer Technology - Emergence of Cyber space. Cyber Jurisprudence - Jurisprudence and law - Doctrinal approach - Consensual approach - Real Approach - Cyber Ethics - Cyber Jurisdiction - Civil and criminal jurisdictions, Cyberspace- Web space - Web hosting and web Development agreement - Legal and Technological Significance of domain Names - Internet as a tool for global access.

**Unit II (12)**

Information technology Act Overview of IT Act 2000: Amendments and Limitations of IT Act - Digital Signatures - Electronic Governance - Legal Recognition of Electronic Records - Legal Recognition of Digital Signature - Certifying Authorities - Cyber Crime and Offences - Network Service Providers Liability - Cyber Regulations Appellate Tribunal - Penalties and Adjudication.

**Unit III (12)**

Cyber law and related Legislation: Patent Law - Trademark Law - Copyright, Software - Copyright or Patented - Domain Names and Copyright disputes - Electronic Data Base and its Protection - IT Act and Civil Procedure Code - IT Act and Criminal Procedural Code.

**Unit IV (12)**

Cyber law and related Legislation: Relevant Sections of Indian Evidence Act - Relevant Sections of Bankers Book Evidence Act - Relevant Sections of Indian Penal Code - Relevant Sections of Reserve Bank of India Act - Law Relating To Employees And Internet - Alternative Dispute Resolution - Online Dispute Resolution (ODR).

**Unit V (12)**

Electronic Business and legal issues: Evolution and development in E-commerce- paper vs paperless contracts. E-Commerce models- B2B - B2C - E

security. Application area: business - taxation - electronic payments - supply chain - EDI - E-markets - Emerging Trends.

### Books for Study

Unit I,II,III,IV

1. Krishna Kumar “Cyber Laws: Intellectual property & E Commerce Security”, Dominant Publisher and Distributors

Unit V

2. NIIT, “Information Security: Policies and Implementation Issues”, PHI Learning, 2004.

### Books for Reference

1. NIIT, “Information Security An Overview”.
2. Marine R.C “Cyber Crime Impact in the new millennium”, Auther press.

**Sem. V**  
**14PCA5130**

**Hours/Week: 2**  
**Credits: 2**

## COMPREHENSIVE EXAMINATIONS

### Objectives

\* To consolidate the understanding of the basics through frequent tests and interaction. Emphasis is on the concepts and fundamentals and the orientation is towards placement.

**Unit I:** (6)  
C Debugging - Object Oriented Programming.

**Unit II:** (6)  
Operating Systems - Smart Devices Operating Systems.

**Unit III:** (6)  
Data Structures - Algorithms - Discrete Mathematics and Applications of Operations Research.

**Unit IV:** (6)  
Database Concepts - Software Engineering.

**Unit V:** (6)  
Web Technologies - Networking - Android programming.

### Books for Reference

#### Unit I

1. Brian W. Kernighan, Dennis M. Ritchie, “The C Programming Language”, Prentice Hall of India Pvt. Ltd., New Delhi, 1989.
2. Robert Lafore, “Object Oriented programming in Microsoft C++”, Galgotia Publications, New Delhi, 2000.

#### Unit II

3. Andrew S. Tanenbaum, “ Modern Operating Systems”, Prentice Hall of India Private Ltd, New Delhi, 1997

#### Unit III

4. Ellis Horowitz and Sartaj Sahni, “Fundamentals of computer algorithms”, Galgotia Publications, New Delhi, 1985.
5. Bernard Kolman & Robert C. Busby, “Discrete Mathematical Structure for Computer Science”, Second Edition, Prentice Hall of India, New Delhi, 1987
6. Rathindra P. Sen, “Operations Research Algorithms and Applications”, PHI, New Delhi, EEE. 2010

#### Unit IV

7. Nilesh Shah, “Database Systems using ORACLE”, Prentice Hall of India, 2005.
8. S.K. Singh, “Database Systems - Concepts, Design and Applications”, Dorling Kindersley (India) Pvt. Ltd., Second Impression, 2008.
9. Roger S Pressman, “Software Engineering”, McGraw Hill, International 6th Edn, New York.

#### Unit V

10. Andrew S Tanenbaum, “Computer Networks”, Prentice Hall of India, New Delhi, 1999.
11. Mark L. Murphy, “The Busy Coder’s Guide to Android Development” CommonsWare Pub., 2011, ISBN: 978-0-9816780-0-9 (available at: <http://commonsware.com/Android/index.html>)

### Web Reference

1. <http://www.indiabix.com/>
2. <http://www.mcqquestions.com/>

Sem. V  
14PCA5132

Hours/Week: 2  
Credits: 2

## MANAGERIAL SKILLS

### Objectives

\* The learning objective of this paper is to enable the students to learn the art of getting things done in the modern business world by learning topics like lateral thinking, decision making, balancing work and life, corporate social responsibility, and work ethics.

### Unit-I: THINKING STRATEGIES (6)

Strategic thinking - meaning - questions - thinks included in Strategic thinking - Process consideration in Strategic thinking - Strategic thinking competencies - importance of Strategic thinking - characteristics of Strategic Thinkers - Points to be kept in mind in Strategic thinking.

Lateral Thinking - meaning - why Lateral Thinking - when to use Lateral Thinking - Benefits of Lateral Thinking - Techniques used in Lateral Thinking - Who needs Lateral Thinking - How to use Lateral Thinking? - Conventional Vs Lateral Leaders - Questions asked by Lateral Leaders - becoming a Lateral leader.

### Unit-II: INTERPERSONAL STRATEGIES (6)

Conflict Resolution - meaning - points to be understood before studying conflict resolution - sources of conflict - common reactions to conflict - role of perception in conflict - steps for Conflict Resolution - Conflict handling matrix - Functional and Dysfunctional outcome of conflict.

Negotiation skills - process - styles - outcome - principles involved - negotiation model - being a negotiator - qualities of negotiator.

### Unit-III: IMPACT OF RESISTANCE (6)

Reasons for Resistance - Types of people in facing changes - introducing change. Facing challenges - meaning - importance - path to facing challenges - benefits of facing challenges.

### Unit-IV: ACTION BASED STRATEGIES (6)

Risk taking - meaning - factors determining Risk Taking - Risk Management - users of Risk Management - Steps in Risk Management.

Effective decision making - meaning - approaches - methods - steps - Decision making at the work place.

### Unit-V: BEHAVIOURAL STRATEGIES (6)

Motivation and Staying motivated - meaning - finding reason for being motivated - staying motivated at work place - staying motivated in negative work environment - staying motivated during crisis

Balancing work and life - meaning - work satisfaction - gender differences - responsibility of the employers and employees - ways of balancing work and life - handling professional and personal demands - organizing your desk

### Books for Study

1. Alex, K. "Managerial Skills", S.Chand & Co Ltd., New Delhi.

### Books for Reference

1. Meena, K. and Ayothi, V. "A book on development of Soft Skills".
2. Daniel Goleman, "Emotional Quotient".
3. Norman Vincent Peale, "Power of the Plus factor".
4. Stephen Covey, "The Seven Habits of Highly Effective People".



**Sem. VI**  
**14PCA6133**

**Hours/Week: 30**  
**Credits: 20**

**MAJOR PROJECT DISSERTATION**  
**&**  
**VIVA VOCE**

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