SRM
INSTITUTE OF SCIENCE & TECHNOLOGY
(Deemed to be University u/s 3 of UGC Act, 1956)

MASTER OF COMPUTER APPLICATIONS

CURRICULUM AND SYLLABUS

(For Regular and Lateral Entry students admitted from the Academic year 2018-2019)

UNDER CHOICE BASED CREDIT SYSTEM

DEPARTMENT OF COMPUTER APPLICATIONS
FACULTY OF SCIENCE AND HUMANITIES
SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
SRM NAGAR, KATTANKULATHUR – 603 203

MASTER OF COMPUTER APPLICATIONS

(For Regular and Lateral Entry students admitted from the academic year 2018-2019)

CURRICULUM

SEMESTER – I

Category	Course Code	Course Title	L	T	P	Total LTP	C
Compulsory Core	PCA18101	Programming in C	3	1	3	7	4
	PCA18102	Data Structures	3	1	0	4	3
	PCA18103	Digital Computer Fundamentals	3	1	0	4	3
	PCA18104	Operating Systems	3	1	0	4	3
	PCA18105	Web Technology	3	1	3	7	4
Supportive course	PCA18106	Principles of Programming Languages	3	1	0	4	3
Total			**18**	**6**	**6**	**30**	**20**

SEMESTER – II

Category	Course Code	Course Title	L	T	P	Total LTP	C
Compulsory Core	PCA18201	Object Oriented Programming using C++	3	1	3	7	4
	PCA18202	Database Management Systems	3	1	3	7	4
	PCA18203	Computer Networks	3	1	0	4	4
Elective 1	PCA18E01	AI and Expert Systems	3	1	0	4	4
	PCA18E02	Design and Analysis of Algorithms					
	PCA18E03	Computer Architecture					
Supportive course 1	PCA18204	Discrete Mathematics	2	3	0	5	3
Supportive Course 2	PCA18205	Mini Project - Basic	0	1	2	3	1
Total			**14**	**8**	**8**	**30**	**20**

SEMESTER - III

Category	Course Code	Course Title	L	T	P	Total LTP	C
Compulsory Core	PCA18301	Software Engineering	3	1	0	4	3
	PCA18302	Linux administration and Network Programming	3	2	2	7	4
Choice Based Core 1	PCA18303	Programming in Java	3	0	4	7	4
	PCA18304	Visual Programming Using C# and VB.Net					
Elective 2	PCA18E04	Database Administration	3	1	0	4	3
	PCA18E05	Microprocessor And Its Applications					
	PCA18E06	Network Security					
Non-Major Elective 1		Open Elective I	0	1	1	2	2
Supportive Course	PCA18305	MATLAB - LABORATORY	0	1	2	3	2
Supportive Course	PCA18306	Personality Development – I	2	1	0	3	2
		Total	**14**	**7**	**9**	**30**	**20**

SEMESER - IV

Category	Course Code	Course Title	L	T	P	Total LTP	C
Compulsory Core1	PCA18401	Software Testing and Quality Assurance	3	0	3	6	4
Choice Based Core 1	PCA18402	Advanced java	3	0	3	6	4
	PCA18403	ASP.NET					
Elective 3	PCA18E07	Ad hoc Wireless Networks	3	1	0	4	3
	PCA18E08	Professional Ethics					
	PCA18E09	Machine Learning and its Applications					
Elective 4	PCA18E10	Digital Image Processing with MATLAB	2	1	2	5	3
	PCA18E11	Android Applications Development					
	PCA18E12	Object Oriented Analysis and Design With UML					
Non-Major Elective		Open Elective II	0	1	1	2	2
Supportive Course 1	PCA18404	Resource Management Techniques	3	1	0	4	3
Supportive Course 2	PCA18405	Personality Development – II	2	1	0	3	2
		Total	**16**	**5**	**9**	**30**	**21**

SEMESTER - V

Category	Course Code	Course Title	L	T	P	Total LTP	C
Compulsory Core 1	PCA18501	XML and Web services	3	1	3	7	4
Choice Based Core	PCA18502	Data Mining and Data Warehousing	3	2	2	7	4
	PCA18503	Open Source Technologies					
Elective 5	PCA18E13	Information Storage and Management	3	1	0	4	3
	PCA18E14	Organizational Behavior					
	PCA18E15	Enterprise Resource Planning					
Elective 6	PCA18E16	Cloud Computing	3	1	0	4	3
	PCA18E17	Social Network Analysis					
	PCA18E18	Neural Networks					
Elective 7	PCA18E19	Big Data and its Applications	3	1	0	4	3
	PCA18E20	Internet of Things(IoT)					
	PCA18E21	Wireless Application Protocols					
Compulsory Core2	PCA18504	Mini Project – Advanced	1	1	2	4	3
	PCA18505	Corporate Internship*	-	-	-	-	2
		Total	**16**	**7**	**7**	**30**	**22**

* Includes mandatory Industry Visit of 30 days for each student

SEMESTER - VI

Category	Course Code	Course Title	L	T	P	Total LTP	C
	PCA18601	Project Work	0	0	30	30	17
		Total	**0**	**0**	**30**	**30**	**17**

Total Credits to be earned for the degree (Regular) : 120

Total Credits to be earned for the degree (Lateral Entry) : 80

Department of Computer Applications
Master of Computer Applications

Program Educational Objectives (PEOs)

- **PEO1**: To prepare the students to outclass in their profession by providing concrete technical foundations in the field of Computer Applications.
- **PEO2:** To provide the students various computing skills like the analysis, design and development of pioneering software products with modern tools to meet the industry needs.
- **PEO3**: To motivate the students to pursue continuous/lifelong learning and to involve them in research as computing professionals and experts in the broadest context of technological change.
- **PEO4:** To prepare the students who will achieve peer-recognition effectively as individuals or as team members in various projects/internships involving technical, decision-making, economical and social constrictions to contribute to the growth of the nation and society.
- **PEO5:** To encourage the students to communicate and function efficiently in teams in multidisciplinary fields within the global, societal and environmental context, with ethical values.

Student outcomes (SOs/POs-Program Outcomes)

The curriculum and syllabus for Master degrees (2018) conform to outcome based teaching learning process. In general, TWELVE STUDENT OUTCOMES (a-k) have been identified and the curriculum and syllabus have been structured in such a way that each of the courses meets one or more of these outcomes. Student outcomes describe what students are expected to know and be able to do by the time of attainment. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program. Further each course in the program spells out clear instructional objectives which are mapped to the student outcomes.

a. **Domain Knowledge**: Apply the knowledge/understanding of mathematics, science, to the solution of complex problems applicable to the discipline

b. **Problem Analysis**: Recognize, formulate, and analyze computer applications problems, reaching verified conclusions using the principles of mathematics, natural sciences, and engineering sciences and arriving at an appropriate solution.

c. **Design/Development of Solutions**: Design, implement, and evaluate a computer-based system, process, component, or program to meet desired solutions that meet

the specified needs with suitable concern for the public health and safety, and the cultural, societal, and environmental considerations.

d. **Analyzing Complex problems:** Use domain based knowledge to function effectively on various problems to achieve a common goal to provide effective solutions for complex problem types.

e. **Usage of Modern IT tools:** Create, select, and apply applicable techniques, resources, and modern engineering and IT tools to complex engineering activities with an understanding of the limitations.

f. **The Professional and Society**: Apply reasoning informed by the relative knowledge to assess societal, health, safety, legal and cultural issues and the subsequent accountabilities relevant to the professional engineering practice.

g. **Environment and Sustainability:** Recognize the impact of the professional engineering solutions in societal and environmental backgrounds, and demonstrate the knowledge and need for supportable development.

h. **Ethics and Ethical Implications:** Apply ethical values/principles and pledge to professional ethics and responsibilities and norms of the engineering practice.

i. **Individual and Team work**: Function successfully as an individual, and as a member or leader in assorted teams, and in multidisciplinary settings.

j. **Communication:** Communicate effectively on difficult engineering activities with the engineering community and with society at large, such as, being able to understand and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

k. **Project Supervision:** Prove knowledge and understanding of the engineering and management principles and apply the same to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

l. **Continuous/Life-long Learning:** Be aware of the need for, and have the groundwork and ability to engage in independent and life-long learning in the widest context of technological change.

SEMESTER I

Course Code	Subject Title	L	T	P	Total LTP	C
PCA18101	PROGRAMMING IN C	3	1	3	7	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To learn the programming concepts and write simple programs in C.	a	c			
2.	To understand sequential steps or procedures to solve any given problem.	a	b	c		
3.	To enable the learner to become an application developer using this language.	a	c	k	l	

UNIT I - INTRODUCTION (9 Hours)

C Fundamentals: Introduction to C - The C Character Set - Identifiers and Keywords - Data Types- Constants- Variables and Arrays- Declarations- Expressions- Statements- Symbolic Constants - Operators and Expressions: Arithmetic Operators - Unary Operators- Relational and Logical Operators- Assignment Operators - The Conditional Operator- Library Functions- Data Input and Output: The getchar() Function- The putchar() Function- The scanf() Function- The printf() Function- The gets() and puts() Functions.

UNIT II - CONTROL STATEMENTS (9 Hours)

Branching Statements: if...else - switch - Looping Statements: while - do...while - for - Nested Control Structures - break - continue - Comma Operator- goto.

UNIT III - FUNCTIONS AND ARRAYS (9 Hours)

Overview of functions - Defining a Function - Accessing a Function - Function Prototypes- Passing arguments to a function - Recursion - Program Structure: Storage Classes - Automatic Variables - Global Variables - Static Variables - Multifile Programs- Arrays: Defining an Array- Processing an Array- Passing Arrays to Functions- Multidimensional Arrays- Arrays and Strings.

UNIT IV -POINTERS (9 Hours)

Fundamentals of Pointer- Pointer Declarations - Passing Pointers to Functions - Pointers and One Dimensional Arrays - Dynamic Memory Allocation - Operations on

Pointers - Pointers and Multidimensional Arrays - Arrays of Pointers - Passing Functions to Other Functions

UNIT V - STRUCTURES, UNIONS AND DATA FILES (9 Hours)

Structures and Unions: Defining a Structure- Processing a Structure- User Defined Data Types- Structures and Pointers- Passing Structures to Functions- Self Referential Structures - Unions - Data Files: Opening and Closing a Data File- Creating a Data File- Processing a Data File- Unformatted Data Files

TEXT BOOK

1. Gottfried B.S. (1997),Theoryand problems of Programming with C, Schaum's Outline Series, Tata McGraw Hill, New Delhi (For 1 to 5 units)

REFERENCES

1. DeitelH.M.&DeitelP.J.(2001), How to Program C, Prentice Hall India, New Delhi.
2. KanetkarY (1995), Let us C, BPB Publications, New Delhi.

Course Nature : Theory with Lab							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Theory Exam**	**Model Practical Exam**	**Attendance**	**Total**
	Marks	5	5	10	5	5	**30**
						End Semester Practical	**20**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18102	DATA STRUCTURES	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To learn Several data structure concepts like stack, queue, linked list, trees and files	**a**	**c**			
2.	To learn the Applications of data structures	**a**	**b**			
3.	To improve the Problem solving quality using data structure techniques.	**b**	**d**			
4.	To enable the learner to aim for careers in Data Analysis and Software Designs	**c**	**d**	**l**		

UNIT I - DATA STRUCTURES AND ALGORITHMS (9 Hours)

Data structures & algorithms-Introduction to Data Structures and algorithms, Data structure operations, control structures, complexity of algorithms, asymptotic notations for complexity, Variables, data types, string operations, word processing, pattern matching algorithms, Linear Arrays, Representation of linear arrays, traversing linear arrays, inserting and deleting linear arrays, pointers, Records.

UNIT II - CONCEPTS OF LINKED LIST (9 Hours)

Linked lists-Representation of linked lists in memory, traversing a linked list, searching a linked list, insertion in to a linked list , deletion from a linked list-header linked lists, memory allocation – two way lists, operations on two way lists .

UNIT III - REPRESENTATION OF STACKS AND QUEUES (9 Hours)

Stacks & queues-Array representation of stacks, Linked representation of stacks Arithmetic expressions, Towers of Hanoi, Array representation of queues, Linked representations of queues, De queue, priority queues.

UNIT IV - TREES AND GRAPHS TRAVERSAL (9 Hours)

Trees-General Trees- binary Trees-representation of binary trees, traversing, binary trees -traversal algorithms of binary trees, path lengths- Huffman's algorithm, graph theory terminology, representations of graphs, Warshalls's algorithms, operations on graphs, traversing a graph- topological sorting

UNIT V - SORTING AND SEARCHING ALGORITHMS (9 Hours)

Sorting-bubble sort, binary search, linear search, Quick sort, Heap sort, insertion sort, selection sort, merging, Radix sort, Hashing

TEXT BOOKS:

1. Ellis Horowitz &SartajSahni (1992), Fundamentals of Data Structures, Galgotia Book Source, 2nd Edition, New Delhi (UNIT I&2)
2. SeymoutrLipschutz (2006), Data Structures, Tata McGraw Hill, 2ndEdition, New Delhi.(UNIT III, 4, & 5)

REFERENCES

1. AhoV, Hopcroft, E., Ullman, D.,(1993), Data Structures and Algorithms, Pearson Education,1st Edition, New Delhi.
2. AlfredV, AhoJohne, Hopcroft (2008), Data Structures and Algorithms, Pearson, NewDelhi.
3. Mark Allen Weiss (2008), Data Structures and Algorithm Analysis in C, Pearson, 2nd Edition, NewDelhi.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18103	DIGITAL COMPUTER FUNDAMENTALS	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To impart knowledge on the fundamentals of digital systems	a	d			
2.	To describe the logical functioning of the circuits to the learners.	c	b	l		

UNIT I - OVERVIEW OF NUMBER SYSTEMS (9 Hours)

Binary Number System: Binary to Decimal and Decimal to Binary Conversion - Hexadecimal number System : Hexadecimal to Decimal and Decimal to Hexadecimal conversion - Hexadecimal to Binary and Binary to Hexadecimal Conversion – Octal Number system : Octal to Decimal and Decimal to Octal Conversion – Complementation - Logical Gates : AND,OR, NOT, NAND, NOR, EX-OR and EX-NOR.

UNIT II - BOOLEAN ALGEBRA AND K-MAP (9 Hours)

Laws of Boolean algebra - DeMorgan's Theorems - Logical Expressions: Sum of Product – Product of Sum - Simplification of Boolean expression: Using Boolean algebra - Using Karnaugh Map - Using McClausky Method.

UNIT III- COMBINATIONAL CIRCUITS (9 Hours)

Binary addition: Half adder - Full adder - Four bit binary adder - BCD adder - Binary Subtraction Half subtractor- Full subtractor – Multiplexer - Demultiplexer- Decoder - Encoder- Flip flops: SR Flip flop - D Flip flop - JK Flip flop - T Flip flop.

UNIT IV -: SEQUENTIAL CIRCUITS (9 Hours)

Registers - Shift Registers- Asynchronous counters - Synchronous counters - Ring counter - Design of synchronous counters.

UNIT V – ALU (9 Hours)

Introduction to Arithmetic Unit - Design of Arithmetic Unit - Design of Logic Unit - Design of ALU - Control Unit- Design of Control Unit.

TEXT BOOK

1. Bartee T.C. (2008), Digital Computer Fundamentals, McGraw Hill, New Delhi.(For 1 to 5 units)

REFERENCES

1. Donald P Leach, Albert Paul Malvino, GouthamSaha (2008), Digital Principles and Applications, Tata McGraw Hill, 6th Edition (Special Indian Edition), New Delhi.
2. Morris Mano, M (2008), Digital Logic and Computer Design, Pearson Education, New Delhi.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18104	OPERATING SYSTEMS	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To introduce different types of Operating Systems	a				
2.	To learn about components of Operating Systems.	a				
3.	To implement Input / Output and File Systems.		c			
4.	To enable the learner to aim for careers in Software Development with knowledge on OS.			l	k	

UNIT I - INTRODUCTION TO OPERATING SYSTEM (9 Hours)

Basic OS Concepts- Organization- Architecture-Structure of OS- OS Operations- OS Services -System Calls-Types- System Programs- System Design and Implementation

UNIT II - PROCESS MANAGEMENT AND SCHEDULING (9 Hours)

Overview of Process Scheduling- Operations on Processes – Cooperating Processes – Inter process Communication-Shared Memory - Message Passing Systems- CPU Scheduling- Scheduling Concepts- Scheduling Criteria- Scheduling Algorithms- Multiprocessor Scheduling.

UNIT III - PROCESS SYNCHRONIZATION AND DEADLOCKS (9 Hours)

Critical Section Problem- Peterson's solution -Semaphores- Classic Problems of Synchronization- Monitors – Deadlocks characterization –Methods - Prevention- Avoidance – Detection- Deadlock Recovery.

UNIT IV - MEMORY MANAGEMENT (9 Hours)

Swapping- Contiguous Memory Allocation- Paging-Hardware support - Protection- Shared Pages- Structure of page table- Segmentation- Virtual Memory- Demand Paging- Page Replacement Methods- Thrashing.

UNIT V - STORAGE MANAGEMENT (9 Hours)

File Concepts- Access Methods- Directory Structures- Protection -File System Structure-Implementation- Directory Implementation- Allocation Methods- Disk Structure- Disk Scheduling algorithms

TEXT BOOK

1. Silberschatz, Galvin & Gagne (2009), Operating system principles, John Wiley & Sons,7thEdition, New York (For 1 to 5 units).

REFERENCES

1. Milan Milenkovic (2003), Operating System Concepts and Design, McGraw Hill, New Delhi.
2. AndrewS. Tennenbaum (1997), Modern Operating System,Prentice Hall India, New Delhi.
3. Deital (1990), An Introduction to Operating System, Pearson Education, New Delhi.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
					End Semester Theory Exam		**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18105	WEB TECHNOLOGY	3	1	3	7	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To provide knowledge on Internet and its related concepts.	**a**	**c**			
2.	To enrich the knowledge of scripting languages.		**a**			
3.	To introduce advance HTML tags.			**l**		
4.	To enable the learner to become a Web Designer.				**f**	**i**

UNIT I - INTRODUCTION TO INTERNET AND WORLD WIDE WEB (9 Hours)

Introduction to networks, LAN,MAN and WAN, History of the Internet, Email concepts, Sending and Receiving files by E-mail, Intranet, Web system Architecture, Exploring HTTP, URL, Domain Name System, Web Browsers, Web Pages

UNIT II - HYPERTEXT MARKUP LANGUAGE AND WEB DESIGN (9 Hours)

Basics of HTML, HTML Document display, Formatting Text, Link, Lists, Images, Tables, Forms, Frames, Website Design consideration, Case study: Designing Layout of a web page for any Domain

UNIT III - USAGE OF CASCADING STYLE SHEET (9 Hours)

Syntax of CSS, Style sheets types, Properties and Text attributes Padding, List properties, List Properties, Positioning, Margins, Colors, Properties and Table attributes

UNIT IV - FUNDAMENTALS OF JAVA SCRIPT (9 Hours)

DHTML, HTML and JavaScript, JavaScript Elements, Variables, Operators, Flow Control Statements, Arrays, Functions, Event Handling, Browsers and JavaScript, Web Pages and JavaScript, Frames and JavaScript, Validation of User Form

UNIT V - SERVER-SIDE PROGRAMMING (9 Hours)

Client-Side Scripting and Server-Side Scripting, Servlets – Definition, Advantages, Life Cycle of a Servlets, Creating a Servlet and Configuring, Java Sever Page – Life Cycle and Structure of JSP, Active Server Pages – Creating an ASP, IIS installation for ASP, Built-in Objects, Exploring Forms, Comparison of ASP over JSP.

TEXT BOOK

1. Deven N. Shah (2012), A Complete Guide to Internet and Web Programming, DreamTech Press, New Delhi (For 1 to 5 units).

REFERENCES

1. Raj Kamal (2002), Internet and Web Technologies, TataMcGraw Hill, New Delhi.
2. Margaret Levine Young (2002), Internet: The Complete Reference, TataMcGraw Hill, Second Edition, New Delhi

Course Nature : Theory with Lab							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Theory Exam**	**Model Practical Exam**	**Attendance**	**Total**
	Marks	5	5	10	5	5	**30**
						End Semester Practical	**20**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18106	PRINCIPLES OF PROGRAMMING LANGUAGES	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To Learn the High level language concepts and grammars	c	e			
2.	To perform study of imperative languages.	g				l
3.	To able to derive functions and binding of values.		c			
4.	To able to study of relations and their implementation.		d			

UNIT I -PRELIMINARY CONCEPTS (9 Hours)

High Level Languages, Issues in Programming - Case studies, Programming paradigms, Language implementation. Syntactic Structure — Language representation, Abstract Syntax tree, Lexical syntax, Context Free Grammars, Variants of CFG, Issues involved and Normal Forms for CFG.

UNIT II -IMPERATIVE LANGUAGES (9 Hours)

Structured Programming — Need and Design issues. Block Structures (Pascal), types arrays, records, sets, pointers, procedures, parameter passing, scope rules (in C).

UNIT III - OBJECT ORIENTED LANGUAGES (9 Hours)

Grouping of data and Operations — Constructs for Programming Structures, abstraction Information Hiding, Program Design with Modules, Defined types, Object oriented programming — concept of Object, inheritance, Derived classes and Information hiding – Templates- Exception handling (Using C++ and Java as example language).

UNIT IV -FUNCTIONAL PROGRAMMING (9 Hours)

Functional Programming — Features, Implementation, Types — values and operations, Product of types. Lists and Operations on Lists, Functions from a domain to a range, Function Application, Lexical Scope. Bindings of values and functions (Using Haskell/ Lisp as example language)

UNIT V -LOGIC PROGRAMMING (9 Hours)

Formal Logic Systems, Working with relations and their implementation (Using Prolog as example). Database query Languages, Exception handling (Using SQL as example)

TEXT BOOK

1. Pratt, Zelkowitz, "Programming Languages: Design and Implementation Edition, Pearson Education," 2nd Edition, 2004

REFERENCES

1. Ravi Sethi, "Programming Language Concepts and Constructs", Pearson Education, 2006
2. Kenneth C.Louden, "Programming Languages- Principles & Practice", Thomson, 2nd Edition
3. Doris Appleby, Julius J. Vandekopple, "Programming Languages: Paradigms and Practice", McGraw Hill, 1997
4. DamirMedak and Gerhard Navratil, "Haskell-Tutorial", Available on the Web, Feb2003.
5. Paul Hudak, John Peterson and Joseph H. Fasel, "A gentle Introduction to Haskell-98",2004
6. TuckerA.B, Robert, Noonan, "Programming Languages", McGraw Hill, 2002.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
						End Semester Theory Exam	**50**
						Total	**100**

SEMESTER – II

Course Code	Course Title	L	T	P	Total LTP	C
PCA18201	OBJECT ORIENTED PROGRAMMING USING C++	3	1	3	7	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To introduce the concepts of Object Oriented Programming.	**a**				
2.	To learn the concepts of class & objects		**c**			
3.	To become a Software Developer			**l**	**k**	

UNIT I -INTRODUCTION TO OBJECT ORIENTED PROGRAMMING AND C++ (9 Hours)

Object Oriented Programming Paradigm - Basic concepts of Object Oriented Programming - Benefits of OOP - Object Oriented Languages - Applications of OOP. Beginning with C++ - Tokens, Expressions and Control Structures - Functions in C++.

UNIT II - CLASS, OBJECTS AND CONSTRUCTORS (9 Hours)

Classes and Objects – Constructors and Destructors: Default Constructors parameterized Constructors, Multiple Constructors in a class, Constructors with default Arguments, Dynamic initialization of objects, Copy Constructors, Dynamic constructors, Destructors.

UNIT III - OPERATOR OVERLOADING & TYPE CONVERSION (9 Hours)

Operator Overloading – overloading unary , binary operators using member function & friend functions - Overloading I/O operators – manipulation of strings using operators - Type Conversions – Built in to class type – Class to built in type – one class to another class –arrays

UNIT IV - INHERITANCE, VIRTUAL FUNCTIONS & POLYMORPHISM (9 Hours)

Extending Classes: Defining derived classes, single, Multilevel, Multiple, Hierarchical and Hybrid Inheritance. Virtual Base Classes, Abstract Classes – Constructors in derived classes – Polymorphism – Compile time & run time polymorphism - Pointers – pointers to objects - Virtual Functions – Pure virtual functions.

UNIT V - I/O OPERATIONS AND FILES (9 Hours)

Managing Console I/O Operations: C++ Streams, C++ Stream Classes, And unformatted I/O Operations, Formatted Console I/O operations, Managing output with Manipulators – Working with Files: Classes for File Stream Operations, Opening and

closing a file, Detecting end-of-file, File Modes and Error handling during file operations.

TEXT BOOKS

1. Herbert Schildt (2001), C++ the Complete Reference, TATA McGraw Hill, Third Edition, New Delhi

REFERENCES

1. Balagurusamy E(2007), Object Oriented Programming with C++, TATA McGraw Hill, Third Edition, New Delhi
2. Rob McGregor (2001), Using C++ - Prentice, Hall India, New Delhi.

Course Nature : Theory with Lab							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Theory Exam**	**Model Practical Exam**	**Attendance**	**Total**
	Marks	5	5	10	5	5	**30**
						End Semester Practical	**20**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18202	DATABASE MANAGEMENT SYSTEMS	3	1	3	7	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the concepts of database security and reliability.	**a**				
2.	To enable the learner to become a Database application programmer			**l**	**k**	**j**

UNIT I - INTRODUCTION AND CONCEPTUAL MODELING (9 Hours)

Purpose of database system - Advantages of DBMS - file processing System-View of data-Data abstraction-Data Independence - Data models - Database languages - Database users - Database Administrator - DBMS system structure.

UNIT II - SQL AND PL/SQL (9 Hours)

SQL: Data Definition Language Statements – Data manipulation language statements – Transaction Control Language Statements - Data Control Language statements – SQL Scalar functions – Group functions – Set operators – Joins. PL/SQL: Basics – Trigger – Exception Handling.

UNIT III - RELATIONAL MODEL AND NORMALIZATION (9 Hours)

Entity Relationship model basic concepts - Relational Algebra - Pitfalls in relational Database design – Decomposition – Functional Dependency – Normalization: 1NF - 2NF-3NF - BCNF- Multi value dependency and 4NF - 5NF.

UNIT IV -DATA STORAGE (9 Hours)

Data Storage: Physical Storage media – Magnetic Disks – RAID – Tertiary storage – File and Record organization. Indexing: Primary index – Secondary indices – B tree Index – B+ tree Index. Hashing: Static indexing – Dynamic indexing.

UNIT V - TRANSACTION MANAGEMENT (9 Hours)

Transaction Management: Basic concepts – Implementation of Atomicity and Durability - Serializability – Implementation of Isolation. Concurrency control: Types of locks - Two Phase locking Protocol - Timestamp based Protocols. Recovery System: Types of failure – Log based recovery - Shadow paging.

TEXT BOOK

1. Abraham Silberschatz, Henry F. Korth, Sudarshan, S (2005), Database System concepts, Fourth Edition, McGraw Hill, New Delhi (For 1 to 5 units).

REFERENCES

1. Kevin Loney,Gerorge Koch (2002), Oracle The Complete Reference, McGraw Hill, New Delhi.
2. Ragu Ramakrishnan (1998), Database management Systems, WCB/McGraw Hill, New Delhi.
3. Alexis Leon, Mathews Leon (1999), Database Management Systems,Vikas Publishing House Pvt. Ltd., New Delhi.
4. Date C.J (2003), An Introduction to database, version 2, Addison Wesley, New York.

Course Nature : Theory with Lab							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Theory Exam**	**Model Practical Exam**	**Attendance**	**Total**
	Marks	5	5	10	5	5	**30**
						End Semester Practical	**20**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18203	COMPUTER NETWORKS	3	1	0	4	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand data communication and networking with little or no background in data communication..	a		e		
2.	To enable the learner to become developers, IT staff and help desk professional			l	k	

UNIT I –INTRODUCTION (9 Hours)

Network hardware, network software, OSI reference model, TCP/IP reference models - Comparison of OSI reference model, TCP/IP reference models Physical Layer: Theoretical basis for data communication, guided transmission media, wireless transmission media, modulation, multiplexing, structure of the telephone system, the mobile telephone system spectrum allocation.

Unit II - DATALINK LAYER (9 Hours)

Design issues, Error detection and correction, elementary data link protocols, sliding window protocols. THE MEDIUM ACCESS CONTROL SUB LAYER: Static and dynamic channel allocation – multiple access protocols- classic Ethernet physical layer, classic Ethernet Mac sub layer protocol, Bluetooth architecture, RFID architecture.

UNIT III - THE NETWORK LAYER (9 Hours)

DESIGN issues- routing algorithms-congestion control algorithms-tunneling-routing – fragmentation.

UNIT IV -THE TRANSPORT LAYER (9 Hours)

Elements of transport layer protocols- UDP-TCP PROTOCOL-delay tolerant networking.

UNIT V -THE APPLICATION LAYER (9 Hours)

DOMAIN NAME SYSTEM-architecture and services of Email-world wide web-streaming audio and video-content delivery.

TEXT BOOK

1. Andrew S. Tanenbaum “Computer Networks”, V Edition, Pearson Education.

REFERENCES

1. Green P – Computer Network Architectures and protocols, Plenum Press, 1982.
2. Harry Katzan – An Introduction to "Distributed Data Processing", a Petrocelli Book, New York / Princeton.
3. Tittel – Theory and problem of Computer Networking, Schaum's outline series. TMH.
4. Godbole – Data Communication & Networking, TMH.
5. Lean Garcia – Communication Networks: Fundamental Concepts & Key Architecture, TMH.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
					End Semester Theory Exam		**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E01	AI AND EXPERT SYSTEMS	3	1	0	4	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To impart knowledge on Artificial Knowledge concepts	a				
2.	To learn all searching algorithms and Hill-climbing procedures		b			
3	To improve their gaming skills and learn about Expert system			e		
4	To enable the learners for aspiring careers in the field of Artificial Intelligence.			l	f	k

UNIT I - INTRODUCTION TO AI & AI TECHNIQUES (9 Hours)

Introduction to types of knowledge - Ai Techniques and Production system - Control strategies - Breadth-First Algorithm - Depth-First Algorithm - Heuristic Search - Problem characteristics and production system characteristics - Best-first Search.

UNIT II -: KNOWLEDGE REPRESENTATION USING PREDICATE LOGIC (9 Hours)

Knowledge Representations – Mappings - Approaches to knowledge representations – simple and Inheritable - Approaches to knowledge representations –Inferential & Procedural knowledge - Predicate logics – symbols and rules - Sample examples on predicates logics - Representing simple facts in logic - Representing knowledge using rules – PROLOG - Forward and Backward reasoning - Truth Maintenance System - Statistical reasoning - Bayesian Networks

UNIT III - WEAK – AND – STRONG SLOT FILLER STRUCTURES (9 Hours)

Weak – slot – filler structure - Semantic nets – intersection search - Making some important distinctions on semantic nets - Partitioned semantic net - Partitioned semantic net - Creating Frames - Strong-slot-filler structures – conceptual dependencies - Actions and Rules – CD - Scripts introduction and components - Creating a sample script for RESTAURANT - CYC & CYC

UNIT IV - GAME PLAYING & PLANNING (9 Hours)

Game playing techniques – The Minimax Search Procedure -Iterative deepening - Depth first iterative deepening - How to plan a system –Components of a planning System – Goal Stack Planning -Hierarchical planning - Reactive systems – Understanding -

UNIT V - LEARNING &EXPERT SYSTEMS (9 Hours)

Types of learning - General learning models - Expert system components and descriptions - Expert system shells - Types Explanation - Knowledge Acquisition – issues

TEXT BOOKS

1. Elaine Rich, Kevin Knight, Shivashankar B Nair (2009) – Artificial Intelligence – Third Edition-TataMcGraw Hill, New Delhi (For 1 to 5 units).

REFERENCES

1. Patterson W Dan (2009, 2013), Introduction to Artificial Intelligence and Expert system – Prentice Hall of India, New Delhi.
2. Peter Jackson (1999), Introduction to Expert systems – 3rd Edition – Addison-Wesley, New York.
3. Craig Larman – Applying UML & Patterns: An Introduction to Object oriented analysis and design – Addison Wesley Professional, 3rd Edition, 2004.
4. H. Srimathi, H.Sriram, and A. Krishnamoorthy – Object oriented analysis and design using UML – Scitech publication, 2nd edition, 2006.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E02	DESIGN AND ANALYSIS OF ALGORITHMS	3	1	0	4	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To analyze the algorithms, with the optimization on time and memory effectiveness.	**a**	**b**			
2.	To develop the system design based on the given requirements		**c**			
3	To enable the learner to aim for careers in software development		**e**		**k**	**j**

UNIT I – INTRODUCTION (9 Hours)

Introduction to algorithm- Algorithm Specification - Performance Analysis - Space Complexity- Performance Analysis II Time Complexity- Asymptotic Notations

UNIT II -DIVIDE AND CONQUER METHOD AND GREEDY METHOD (9 Hours)

Divide and Conquer - Binary Search- Finding the Maximum and Minimum – Quick sort - Strassens Matrix Multiplication- Greedy Method – Knapsack Problem -Tree Vertex Splitting Problem –Job Sequencing with Deadlines -Minimum Cost Spanning Trees - Prims Algorithm – Kruskal Algorithm - Transitive Closure - Single Source Shortest Paths.

UNIT III - DYNAMIC PROGRAMMING (9 Hours)

Dynamic Programming – General Method - Multistage Graphs - String Editing – Travelling Salesperson Problem - Connected components and Spanning Trees - Bi-connected Components and DFS.

UNIT IV - BACKTRACKING AND BRANCH AND BOUND (9 Hours)

Backtracking - General Method - 8 Queens Problem - Sum of Subsets - Knapsack Problem -Branch and Bound: The Method-LC Search - Branch and Bound: The Method-Bounding 0/1 Knapsack Problem-LC Branch and Bound - 0/1 Knapsack Problem-FIFO Branch and Bound - Travelling Salesperson (*).

UNIT V - LOWER BOUND THEORY AND NP COMPLETE / HARD PROBLEMS

(9 Hours)

Lower Bound Theory-comparison trees - Oracles and Adversary Arguments - NPComplete and Hard Problems – Basic Concepts - Cooks theorem(*)- NP Hard Graph problems- CDP, NCDP, CNDP - Cooks theorem-II - DHC, TSP, AOG - NP-Hard Scheduling Problems

TEXT BOOK

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran (2008), Fundamentals of Computer Algorithms, University Press, Second Edition, New Delhi (For 1 to 5 units).

REFERENCES

1. Puntambekar A.A. (2010), Design and analysis of algorithms, First Edition, Technical Publications, Pune.
2. Chandra Mohan (2008), Design and analysis of algorithms, Prentice Hall of India, New Delhi.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
					End Semester Theory Exam		**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E03	COMPUTER ARCHITECTURE	3	1	0	4	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To learn the structure and behavior of the various functional modules of the computers	a				
2.	To provide the hardware knowledge for the user		c	l		
3	To enable the learner to aim careers in Hardware Engineering and Academics	a		l		h

UNIT I - REGISTER TRANSFER LANGUAGE (9 Hours)

Register Transfer Language - Register Transfer - Bus and Memory Transfer - Arithmetic Micro Operations - Arithmetic Micro Operations-Continue - Logic Micro Operations - Shift Micro Operations - Arithmetic Logic Shift unit.

UNIT II - BASIC COMPUTER OPERATIONS (9 Hours)

Instruction Codes - Computer Registers - Computer Instructions - Timing and Control - Instruction Cycle - Memory reference Instructions - Input Output and Interrupt - Complete Computer Description - Design of Basic Computer - Design of Accumulator logic.

UNIT III - CPU ORGANIZATION (9 Hours)

Introduction to CPU - General Register Organization - Stack Organization - Instruction Formats - Addressing Modes - Data Transfer and Manipulation - Data Transfer and Manipulation-cont. - Program Control – RISC – CISC.

UNIT IV - I/O INTERFACE (9 Hours)

Peripheral Devices - Input Output Interface - Asynchronous Data Transfer - Asynchronous Data Transfer-cont. - Modes of Transfer - Priority Interrupt - Priority Interrupt-cont. – DMA – IOP - Serial Communication.

UNIT V - MEMORY ORGANIZATION (9 Hours)

Memory Hierarchy - Main Memory - Auxiliary Memory - Associative Memory - Cache Memory - Virtual Memory - Virtual Memory Continuation - Memory Management Hardware.

TEXT BOOK

1. Morris Mano, M (2002), Computer System Architecture, Prentice Hall of India, New Delhi

REFERENCE

1. Sivarama P.Thandamudi (2003), Fundamental of Computer Organization & Design, Springer, New York.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
					End Semester Theory Exam		**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18204	DISCRETE MATHEMATICS	2	3	0	5	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand Logic and mathematical reasoning and to count /enumerate objects in a Systematic way	a				
2.	To understand Mathematical induction and recursion. To understand Set theory, relations and functions and to Read, understand and Construct mathematical arguments		b			
3	To understand Recurrence Relation, Generating functions and Algebraic Systems and Boolean algebra		d			

UNIT I - MATHEMATICAL LOGIC (9 Hours)

Statements- Connectives- Truth tables- Normal forms DNF and CNF-,PCNF and PDNF- Validity using truth tables- Inference theory of statement calculus- Direct and Indirect method- Inference theory of statement calculus using CP Rule - Consistency and Inconsistency.

UNIT II -COUNTING PRINCIPLES (9 Hours)

Mathematical logic- problems- Pigeonhole Principle-Generalized Pigeonhole principle-Principle of inclusion and exclusion (simple Problems only)

UNIT III -RECURRENCE RELATIONS (9 Hours)

Recurrence relation-Formation of Recurrence relation –solution of Recurrence Relation-Solution of Homogeneous Recurrence relation-Solution of Non-Homogeneous recurrence relation-- Formation of Generating functions-Solution of Recurrence relations using generating functions.

UNIT IV -ALGEBRAIC SYSTEMS (9 Hours)

Groups- Properties of Groups -Cyclic groups and its properties -Permutation groups-Subgroups – homomorphism-Isomorphism- Lagrange's Theorem-Normal subgroups-Fundamental Theorem of Groups

UNIT V -BOOLEAN ALGEBRA (9 Hours)

Relation -.Types of relations-Equivalence relations- Partial orderings-Poset- Lattice-Hasse diagram-Boolean algebra-simple properties (Simple Problems in Boolean algebra)

TEXT BOOKS

1. Tremblay J.P. and Manohar R. - Discrete Mathematical Structures with applications to Computer Science - Tata Mc Graw Hill Edition, 2001
2. Prof.Sundaresan V, Ganapathy Subramanian K.S and Ganesan K.- Discrete Mathematics - New revised edition, 2002 .

REFERENCES

1. Alan Doerr and Kenneth Levasseur - Applied Discrete Structuresfor Computer Science – Galgotia publications, 1992
2. Kenneth H Rosen - Discrete Mathematics and its applications- Tata McGraw Hill,7th ed, 2011.
3. Liu C.L - Elements of Discrete Mathematics - 2ndedition, McGraw Hill Publications, 2002

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
					End Semester Theory Exam		**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18205	MINI PROJECT- BASIC	0	1	2	3	1
Students can choose problems of their own interest to develop software package using the programming languages/tools available. There will be two reviews conducted during the project period for all the students. At the end of the project, every student shall submit a structured project report.						

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		**Student Outcomes**				
1.	Acquire practical knowledge within the chosen area of technology for project development	a				
2.	Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach		b			
3	Contribute as an individual or in a team in development of technical projects		c			k
4	Develop effective communication skills for presentation of project related activities					j

Course Nature : PROJECT						
Assessment Method (Max.Marks: 100)						
In Semester	**Assessment Tool**	**Review 1 (Abstract)**	**Review 2**	**Review 3**	**Thesis submission**	**Total**
	Marks	10	10	20	10	50
End Semester	**Assessment Tool**	**Report Evaluation**	**Presentation**		**Viva-Voce**	**Total**
	Marks	15	15		20	50
					Total	100

SEMESTER – III

Course Code	Course Title	L	T	P	Total LTP	C
PCA18301	SOFTWARE ENGINEERING	3	1	0	4	3

	INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:	Student Outcomes				
1.	To gain knowledge about various Software Engineering Paradigms	a		l		
2.	To carry out testing at various levels by applying the Testing Tactics		e			
3.	To identify the Software Risks and Prepare suitable Mitigation Plans		b			j
4.	To understand the Quality Assurance and Change Management Activities	a				j
5.	To enable the learner to aim careers in Software Engineering related fields		d	l	f	k

UNIT I - INTRODUCTION TO SOFTWARE ENGINEERING (9 Hours)

Characteristics of software -The Changing Nature of software – Legacy Software and Software myths – A Generic view of process – Software Engineering: A layered Technology and A process framework - Capability Maturity Model Integration - Process Models – Prescriptive models -Specialized Process Models and The Unified Process -An agile view of Process.

UNIT II - REQUIREMENTS ANALYSIS AND DESIGN (9 Hours)

System Engineering - Requirements Engineering – Requirements Engineering Tasks - Initiating the Requirements Engineering Process-Eliciting Requirements – Building the Analysis Model - Analysis Modeling Approaches – Data Modeling Concepts and Scenario based Modeling and Flow Oriented Modeling– Design Engineering - Software Design Concepts- The Design Model

UNIT III -TESTING STRATEGIES AND TACTICS (9 Hours)

Introduction to Testing - Definition of Testing Terminologies-Testing Strategies for Conventional Software-Validation Testing - System Testing - Debugging Process-Testing Tactics – White Box Testing - Black Box Testing - Testing for Specialized Environments

UNIT IV - PROJECT MANAGEMENT, ESTIMATION AND SCHEDULING (9 Hours)

Project Management Spectrum - The People and the Product- The Process and the Project -Metrics for Process and Projects-Estimation - The Project Planning Process – Resources - Decomposition Techniques - Empirical Estimation Models - Project Scheduling Concepts – Timeline charts and Tracking the Scheduling

UNIT V: QUALITY, CHANGE AND RISK MANAGEMENT (9 Hours)

Reactive and Proactive Risk Strategies – Software Risks –Risk Identification and Risk Projection – Risk refinement and Risk Mitigation, Monitoring and Management - Quality Concepts -Software Quality Assurance -Software Reviews and Formal Technical Reviews -Statistical Quality Assurance -The Software Configuration Management and the SCM Repository -Business Process Reengineering - Reverse Engineering

TEXT BOOK

1. Roger, S. Pressman (2004), Software Engineering: A Practitioner Approach, McGraw Hill International Edition, Sixth Edition, New Delhi (For 1 to 5 units).

REFERENCES

1. Waman, S Jawadekar (2004), Software Engineering: Principles and Practice, McGraw Hill Education Pvt. Limited, New Delhi.
2. Rohit Khurana (2011), Software Engineering-Principles and Practices, Vikas Publishing House Pvt. Ltd., Second Edition, New Delhi.
3. Chairperson, Counting Practices Committee, Valerie Marthaler, EDS, Troy, Michigan, Function Point Counting Practices Manual Release 4.1.1, The International Function Point User Group, April 2000.
4. Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli (1991), Fundamentals of Software Engineering, Prentice Hall of India, New Delhi.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
					End Semester Theory Exam		**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18302	LINUX ADMINISTRATION AND NETWORK PROGRAMMING	3	2	2	7	4

	INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:	Student Outcomes				
1.	To provide a background on the UNIX system call interface	a				
2.	To learn Advanced Programming concepts in UNIX Environment		d			
3.	To introduce network programming under UNIX		b			
4.	To enable the learner to become Unix System Analyst / Unix Administrator in the IT Industries		e	l	j	k

UNIT I - LINUX SHELL AND FILE STRUCTURE (9 Hours)

Introduction to Linux- Linux distribution-operating systems and Linux-History of Linux and Unix –Linux Overview-Open source software –Linux Software -The shell- The shell Scripts and programming-Shell configuration-Linux files- Directories and archives

UNIT II -INTERNET AND NETWORK SERVICES (9 Hours)

Managing services -system startup files-starting services-service management-service scripts-FTP server-The FTP user account-Running vsftpd-configuring vsftpd-vsftpd access controls-web servers-apache web server-apache configuration files-apache configuration and directives –apache configuration tools.

UNIT III - FILES AND PROCESS CREATION (9 Hours)

Study of Open, Close, Read, Write, Lseek, Dup,stat, fstat, and lstat functions-.File Types - File Access Permissions -Study of Access, Link and Unlink Functions-Reading Directories - Time and Date Routines- Setjmp and Longjmp Functions-fork and Vfork –wait-waitpid.

UNIT IV - SIGNALS AND INTER PROCESS COMMUNICATION (9 Hours)

Signal concepts, signal function -kill and raise – alarm and pause – abort and sleep – Pipes –FIFO-System V IPC – Message Queue- – Example Program -Semaphores - Example Program -Shared Memory- Example Program.

UNIT V - SCOCKET PROGRAMMING AND DAEMON PROCESS (9 Hours)

Sockets –Elementary TCP Sockets -TCP Echo Client/ Server -Elementary UDP Sockets -UDP Echo Client/ Server-gethostbyname& gethostbyaddr, getservbyname& getservbyport – getaddrinfo- Syslogd Daemon -syslog function -inetd Daemon – Broadcast Addresses – Unicast Versus Broadcast -Multicast Addresses -Multicasting Versus Broadcasting on LAN, Multicasting on WAN .

TEXT BOOKS:

1. Richard Petersen - Linux : The Complete Reference ,Sixth edition .
2. Richard Stevens .W & Stephen Rago (2005), Advanced Programming in the UNIX Environment, 2nd Edition, Pearson Education, New Delhi (UNIT I,2 & 3).
3. Richard Stevens .W (1999), UNIX Network Programming, Volume II, Prentice Hall, New Delhi (UNIT IV&5).

REFERENCE

1. Stephen A.Rago (1993), Unix System V Network Programming, Addison Wesley, New York.

Course Nature : Theory with Lab							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Theory Exam**	**Model Practical Exam**	**Attendance**	**Total**
	Marks	5	5	10	5	5	**30**
						End Semester Practical	**20**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18303	PROGRAMMING IN JAVA	3	0	4	7	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the principles and concepts of object programming	a				
2.	To learn multithreading concepts		a			
3.	To enable the learner to pursue careers in Java solution Architect/Java Programmer		e	l		k

UNIT I - INTRODUCTION TO JAVA (9 Hours)

The Creation of Java- The Java Buzzwords- An Overview of Java- Data Types,- Variables-Arrays- Operators- Control Statements.

UNIT II - OBJECT ORIENTED CONCEPTS (9 Hours)

Introducing Classes- Overloading Methods- Introducing Access Control- final- Inheritance Basics- Method Overriding- Using Abstract Classes- The String Constructors- Special String Operations- String Comparison- StringBuffer.

UNIT III - PACKAGES INTERFERENCE EXCEPTION HANDLING AND MULTITHREADING (9 Hours)

Packages – Interfaces - Exception Handling - The Java Thread Model - The Main Thread - Creating a Thread - Thread Priorities – Synchronization - Interthread Communication.

UNIT IV - APPLET, AWT AND EVENT HANDLING (9 Hours)

Applet Basics - Applet Architecture - An Applet Skeleton - Simple Applet Display Methods - Requesting Repainting - The HTML APPLET Tag - AWT Classes - Window Fundamentals - Working with Graphics - Event Handling - The Delegation Event Model - Event Classes - Event Listener Interfaces.

UNIT V - JAVA CONSOLE INPUT AND OUTPUT AND FILE (9 Hours)

Enumerations - I/O Basics - Reading Console Input - Writing Console Output - The PrintWriter Class - Reading and Writing Files - Collections Overview - The Java I/O Classes and Interfaces – File - The Stream Classes - The Byte Streams - The Character Streams.

TEXT BOOK

1. Herbert Schildt (2007), Java:The Complete Reference, The McGraw-Hill, Seventh Edition, New Delhi.

REFERENCES

1. Horstmann S., Gray Cornell (2001), Core Java 2 Volume In, Fundamentals, Addition Wesley, New York.
2. Amold and Gosling, J. (2000), The Java Programming Language, Addition Wesley, 2ndEdition, New Delhi.
3. Art Gittleman (2002), Ultimate Java Programming, Wiley Publications, New York.
4. Herbert Schildt (2007), Java:The Complete Reference, The McGraw-Hill, Eight Edition, New Delhi.

Course Nature : Theory with Lab							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Theory Exam**	**Model Practical Exam**	**Attendance**	**Total**
	Marks	5	5	10	5	5	**30**
End Semester Practical							**20**
End Semester Theory Exam							**50**
Total							**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18304	VISUAL PROGRAMMING USING C# AND VB.NET	3	0	4	7	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To gain knowledge in the concepts of the .NET framework as a whole and the technologies that constitute the framework	**a**				
2.	To gain knowledge about various object oriented concepts in C#.		**b**			
3.	To gain programming skills in C# both in basic and advanced levels.		**c**	**e**		
4.	To enable the learner for aiming careers in software development related fields			**l**	**j**	**k**

UNIT I - .NET FRAMEWORK AND VB.NET (9 Hours)

Evolution of the .NET Framework – Overview of the .Net Framework – VB.NET – Simple VB.Net Program. VARIABLES, CONSTANTS AND EXPRESSIONS: Value Types and Reference Types – Variable Declarations and Initializations – Value Data Types – Reference Data Types – Boxing and Unboxing – Arithmetic Operators – Textbox Control – Label Control – Button Control.

UNIT II - CONTROL STATEMENTS AND METHODS (9 Hours)

If Statements – Radio Button Control – Check Box Control – Group Box Control – Listbox Control – Checked List Box Control – Combo box Control – Select Case Statement – While Statement – Do Statement – For Statement. METHODS AND ARRAYS: Types of Methods – One Dimensional Array – Multi Dimensional Arrays – Jagged Arrays. CLASSES: Definition and Usage of a Class – Constructor Overloading – Copy Constructor.

UNIT III - ADDITIONAL CONTROLS AND DATABASE CONNECTIVITY (9 Hours)

Timer – ProgressBar – LinkLabel – Panel – TreeView – Splitter – Menu – SDI & MDI – Dialog Boxes – Toolbar – StatusBar. DATABASE CONNECTIVITY: Advantages Of ADO.NET – Managed Data Providers – Developing a Simple ADO.NET Based Application – Creation of Data Table – Retrieving Data From Tables – Table Updating – Disconnected Data Access Through Dataset Objects.

UNIT IV - OBJECT ORIENTED ASPECTS OF C# (9 Hours)

Introducing C#-Overview of C#- Literals-Variables-Data types-Expressions- Methods - Classes- Objects- Inheritance-Polymorphism- Interfaces- Operator Overloading- Delegates- Events- Errors and Exceptions.

UNIT V - APPLICATION DEVELOPMENT ON .NET (9 Hours)

Building Windows Applications- Building Windows Applications using DLL- Accessing Data with ADO.NET -Web Based Application Development on .NET -Programming Web applications with Web Forms-Programming Web Services.

TEXT BOOK

1. Muthu C. (2008), "Visual Basic.NET", 2nd Ed., Vijay Nicole Imprints Pvt.Ltd.,.(Unit I ,Unit II & Unit III)
2. Programming in C#, E.Balagurusamy (Unit IV & Unit V)

REFERRENCES

1. Jeffrey R.Shaprio (2002), "Visual Basic .NET The Complete Reference", Mac Graw Hill
2. Michael Halvorson (2010), "Visual Basic 2010 Step by Step", Microsoft Press.
3. Harold Davis (2002), "Visual Basic.NET Programming", Sybex.
4. Prgramming in C#, J. Liberty 2nd Edition – O'Reilly (Unit V)

Course Nature : Theory with Lab							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Theory Exam**	**Model Practical Exam**	**Attendance**	**Total**
	Marks	5	5	10	5	5	**30**
						End Semester Practical	**20**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E04	DATABASE ADMINISTRATION	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To provide a reliable, consistent, secure, and available corporate-wide data	a	f			
2.	To distinguish database administration and data administration	a				
3.	To introduce several database operation and maintenance issues		e			h
4.	To enable the learner to become a Data Base Administrator			l	k	j

UNIT I - CREATING AND MANAGING TABLES, VIEWS, INDEXES, CLUSTERS AND SEQUENCES (9 Hours)

Creating a Table-Constraints in create table-Dropping Tables-Altering Tables-Creating a table from a table- Using an index organized table-creating a view-Indexes- Clusters. Case Study: Simple examples for DDL-DML and DCL commands.

UNIT II -BASICS OF THE ORACLE DATABASE ARCHITECTURE & MANAGING THE PHYSICAL DATABASE STRUCTURE (9 Hours)

Oracle Server Architecture - Connect Users to Servers and Processing queries, changes and commits - Oracle Universal Installer - Setting up OS and Password File Authentication Oracle Enterprise Manager Components - Starting and Shutting an Instance - Opening and Closing a Database - Logical Structure of the Database –

UNIT III - MANAGING DATABASE OBJECTS

Planning and Creating Rollback Segments - Maintaining Rollback Segments - Oracle Data types -Creating and Controlling Tables –Creating Different Indexes - Reorganizing Indexes - Dropping Indexes – Integrity Constraints and Triggers - Implementing Integrity Constraints and Triggers - Maintaining Integrity Constraints and Triggers

UNIT IV - MANAGING DATABASE USE (9 Hours)

Creating Database Users - Altering and Monitoring Existing Users – Administering Profiles -Controlling Resource Use and Administering Passwords – System Privileges - Object Privileges - Granting and Revoking Privileges - Controlling OS and Auditing

UNIT V - OVERVIEW OF BACKUP AND RECOVERY (9 Hours)

Backup Considerations – Recovery Considerations - Components for Backup and Recovery - Types of Failures - - Recovery Implications and Performing Offline, Online Backups

TEXT BOOKS

1. Kevin Loney (Fifth RePrint-2007), Oracle Database 10G: The Complete Reference, McGraw Hill, New Delhi (Unit-1) (Oracle Database 10g The Complete Reference-Chapter- 17)
2. Jason Couchman and Ulrike Schwinn (2001), DBA Certification Exam Guide, Osborne/McGraw-Hill, New York (For Units II ,III ,IV and V).

REFERENCES

1. Donald K.Burleson (2006), Oracle Tuning The Definitive Reference, 2nd Edition, Rampant Tech. Press, North Carolina.
2. Craig S.Mullins (2002), Database Administration: The Complete Guide to DBA Practices and Procedures, Addison Wesley, 2nd Edition, New York.
3. Kevin Loney (2008), Oracle Database 11G: The Complete Reference, McGraw Hill, New Delhi.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E05	MICROPROCESSOR AND ITS APPLICATIONS	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the basic concepts underlying a programmable device such as data-buses, machine cycles, various processes of data flow, internal register architecture, programming and interfacing	a				
2.	To understand practical design of microcomputer based on the Components of and function of 8086 Architecture		c			
3.	To understand how the system works under minimum and maximum mode and signal functions		d			

UNIT I - MICRO COMPUTER AND MICROPROCESSOR (9 Hours)

An Introduction -Overview of microcomputer structure- Microprocessor evolution and types - The 8086 microprocessor family –overview -8086 internal architecture -Pin configuration of 8086 -Program development steps - Assembly language Program development tools -Writing assembly programs

UNIT II - 8086 INSTRUCTION DESCRIPTION AND ASSEMBLER DIRECTIVES (9 Hours)

8086 Addressing Mode-Instruction set Introduction -Arithmetic instruction -logical instruction -String, Procedure and macros - Loop Instruction , Jump Instruction - Move, stack and Rotate Instruction -BIT Manipulation Instruction -String manipulation instruction -Assembly language Program -Assembler Directives

UNIT III - 8086 SYSTEM CONNECTIONS AND INTERRUPT APPLICATIONS (9 Hours)

Basic 8086 Microcomputer System -Using Logic Analyzer to observe Microprocessor Bus Signals -Minimum Mode system -Troubleshooting a simple 8086 based Microcomputer -8086 Interrupt and Interrupt Responses -8086 Interrupt Types - Hardware and software Interrupt Applications -8259 Priority Interrupt Controller - Software Interrupt Applications

UNIT IV - DISPLAY CONTROLLER AND DMA (9 Hours)

Keyboard / Display Controller -8254 software- programmable Timer/Counter -8254A counter modes and applications- Digital Signal processing and digital filters -DMA data transfer -signal of 8257 -internal architecture of 8237-A Micro computer based industrial process control -Robotics and embedded controller –

UNIT V - 80286, 80386, 80486 MICROPROCESSORS (9 Hours)

Introduction to Multi-user / Multitasking Operating system -Time Slicing Scheduling - Memory Management -Virtual Memory -Intel 80286 Microprocessor Architecture-80286 Real Address mode Protected mode operation-Intel 80386 Microprocessor Architecture-80386 Real Address mode Protected mode operation-Intel 80486 Microprocessor Architecture

TEXT BOOK:

1. Douglas V. Hall – Microprocessors and Interfacing – Programming and Hardware – McGraw Hill – Second Edition - 1991. (Chapter No. 2 – 11,13,15)

REFERENCES

1. Yu-Chengh Liu and Gibson – Microcomputer systems 8086/8088 family – Prentice Hall – Second Edition - 1996.
2. Ray A.K and Bhurchandi – Advance Microprocessors and Peripherals, Architecture programming and Interfacing – McGraw Hill International – First Edition – 2000.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E06	NETWORK SECURITY	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the concept of Transport Level Security, Wireless Network Security and Electronic Mail Security	a				
2.	To know about the IP Security		d			h
3.	To gather extensive Knowledge about the System Security			I		f

UNIT I - TRANSPORT LEVEL SECURITY (9 Hours)

Web Security considerations - Secure Socket Layer SSL Architecture - SSL Record Protocol Change Cipher - Spec Protocol - Handshake Protocol - Cryptographic Computations - Transport Layer Security - Version Number-MAC - Pseudorandom Function - Alert Codes – HTTPS - Connection Initiation & Closure - SSH Transport Layer Protocol – Connection Protocol

UNIT II - WIRELESS NETWORK SECURITY (9 Hours)

IEEE 802.11 Wireless LAN overview, IEEE802.11i Wireless LAN Security IEEE802.11i Services - IEEE802.11I Phases of Operation - Discovery Phase - Authentication Phase - Key Management Phase - Protected Data Transfer Phase - IEEE802.11i Pseudorandom Function - Wireless Application Protocol Overview - Operational Overview - Wireless Markup Language - WAP Architecture - Wireless Application Environment WAP protocol Architecture - Wireless Transport Layer Security WTLS Sessions and Connections WTLS Protocol Architecture - Cryptographic algorithms - WAP End-to-End Security

UNIT III - ELECTRONIC MAIL SECURITY (9 Hours)

Pretty Good Privacy - Notation - Operation Description - Cryptographic Keys and Key Rings - Public Key Management - S/MIME RFC 5322 MIME - S/MIME Functionality and Messages - S/MIME Certificate Processing - Enhanced Security Services - Domain Identified Mail Internet Mail Architecture E-Mail Threats -DKIM Strategy DKIM Functional Flow

UNIT IV - IP SECURITY (9 Hours)

IP Security Overview - IP Security Policy - Security Associations Security Associations Database - IP Traffic Processing - Encapsulating Security Payload ESP Format Encryption and Authentication Algorithms - Padding Anti-Replay Service

Transport and Tunnel Modes - Combining Security Associations Authentication Plus Confidentiality - Basic Combinations of Security Associations - Internet Key Exchange Key Determination Protocol - Header and Payload Formats

UNIT V - SYSTEM SECURITY (9 Hours)

Intruders Intruder Behavior Patterns Intrusion Techniques - Intrusion Detection - Audit Records Statistical Anomaly Detection - Rule-Based Intrusion Detection The Base-Rate Fallacy - Distributed Intrusion Detection Honeypots - Intrusion Detection Exchange Format - Password Management - Password Protection - Password Selection Strategies - Malicious Software - Types Of Malicious Software - Viruses - Virus Countermeasures – Worms - Distributed Denial of Service Attacks – FIREWALLS - Needs of Firewalls - Firewall Characteristics - Types of Firewalls - Firewall Basing - Firewall Location and Configurations

TEXT BOOK

1. William Stallings - Cryptography and Network Security - Pearson Education, New Delhi, 5th Edition, 2011. (Chapter 16 – 19 and online chapter 20 – 22)

REFERENCES

1. Behrouz A. Forouzan, Debdeep Mukhopadhyay - Cryptography and Network Security -Tata McGraw-Hill Education Pvt. Ltd., 2nd Edition, 2011
2. Charles Pfleeger - Security in computing - Prentice Hall of India, 4th Edition, 2006.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18305	MATLAB - LABORATORY	0	1	2	3	2

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To learn the fundamentals of programming and its environment	a				
2.	To be able to apply programming skills in their area of specialization		b			
3.	To learn to work with team members in developing mini projects			l	k	

UNIT I **(9 Hours)**

Practicing the environment for programming to familiarize Workspace – Directory – Windows – Edit options – Help – Shortcuts, etc., - Simple exercise to familiarize basic commands.

UNIT II **(9 Hours)**

Data types – Constants and Variables – Operators – Input-output functions – reading and storing data – Assignment statements – Control Structures – Iterative statements.

UNIT III **(9 Hours)**

Vectors and Matrices – Commands to operate on vectors and matrices – Matrix Manipulations – Arithmetic – Relational and Logical operations on Matrices.

UNIT IV **(9 Hours)**

Polynomial Evaluation - Roots of Polynomial - Arithmetic operations on Polynomials – Basic Graphics: 2D, 3D plots.

UNIT V **(9 Hours)**

Printing labels - Grid & Axes box - Text in plot – Bar and Pie chart – Histograms – Animation – Experiments in solving simple real life problems based on above aspects.

TEXT BOOKS

1. Rudra Pratap., "Getting started with MATLAB", Oxford University Press, 2010.
2. Bansal R.K.Goel A.K., Sharma M.K., "MATLAB and its Applications in Engineering", Pearson Education, 2012.
3. For Web Reference, www.scilab.org

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	**Assessment Tools**	**Observation Note Book**	**Output Result in time**	**Model Examination**	**Regularity and Discipline**	**Total**
	Marks	**10**	**10**	**20**	**10**	**50**
End Semester	**Assessment Tools**	**Record Note Book**	**Program Writing**	**Debugging**	**Result / Output**	**Total**
	Marks	**10**	**10**	**15**	**15**	**50**
Total						**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18306	PERSONALITY DEVELOPMENT - I	2	1	0	3	2

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To inculcate reading habit and develop effective reading skills	a				
2.	To improve basics of grammar	a				
3.	To help students to spot common errors in English					j
4.	To familiarize students with vocabulary and their application in context			l		
5.	To improve aptitude skills, problem solving skills and reasoning ability			l		

UNIT I - READING SKILLS &GRAMMAR (9 Hours)

Reading Comprehension - Fundamentals of Grammar – Parts of Speech I - Fundamentals of Grammar – Parts of Speech II -Fundamentals of Grammar – Articles, Modifiers & Determiners - Fundamentals of Spotting Errors Grammar – Concord Rule - Fundamentals of Grammar – Tenses-Sentence Correction.

UNIT II - VOCABULARY & VERBAL LOGIC (9 Hours)

Synonyms – Antonyms - Examples – Case study - Sentence Completion - Word Analogy - Examples – Case study - Critical Reasoning - Examples – Case study.

UNIT III - NUMBERS &ALGEBRA (9 Hours)

Numbers I - Numbers II – Logarithm -Simple Equations- Ratio & Proportion

UNIT IV - MODERN MATHEMATICS (9 Hours)

Percentage, Profit & Loss - Venn Diagram- Permutation –Combinations - Probability

UNIT V - REASONING (9 Hours)

Analytical Reasoning I - Analytical Reasoning II- Logical Reasoning –Blood Relations / Directions - Logical Reasoning – Number series - Logical Reasoning – Coding /Decoding/ Odd man out

TEXT BOOKS

1. Thomson A.J. & Martinet A.V. (1986), A Practical English Grammar, Oxford University Press, USA, 4th Edition (For 1 to 2 units).
2. Wren & Martin (1991), High School English Grammar and Composition, Faber &Faber, First Canadian Edition, Canada (For 1 to 2 units).
3. Dinesh Khattar (2013), Quantitative Aptitude for Competitive Examinations, Pearson Education, 2nd Edition (For 3 to 4).
4. Agrawal R.S. (2012), Quantitative Aptitude for Competitive Examination, S.chand Publishing, New Delhi (For 3 to 5 units).

REFERENCES

1. Barron's NEW GRE (2012), 19th Edition, Galgotia Publications Pvt. Ltd., New Delhi.
2. Barron's GMAT (2012), 14th Edition, Galgotia Publications Pvt. Ltd., New Delhi.
3. Cambridge Advanced Learner's Dictionary (2008), 3rd Edition, Cambridge University Press, London.
4. Norman Lewis (1949), Word Power Made Easy, Pocket Books, New York.
5. Edgar Thorpe (2003), Objective English, 4th Edition, Pearson education, New Delhi.
6. Arun Sharma (2012), Logical Reasoning, Tata McGraw Hill, New Delhi.
7. Edsar Thorpe (2007), Test of Reasoning - Tata McGraw Hill, 4th edition, New Delhi.
8. Agarwal, R.S. (2012), Verbal & Non Verbal Reasoning, S.Chand Publishing, New Delhi.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
						End Semester Theory Exam	**50**
						Total	**100**

SEMESTER – IV

Course Code	Course Title	L	T	P	Total LTP	C
PCA18401	SOFTWARE TESTING AND QUALITY ASSURANCE	3	0	3	6	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To impart knowledge on the fundamentals of software testing and Quality assurance	**a**				
2.	To provide a complete, comprehensive coverage of various software testing methods		**b**	**e**		
3.	To develop test cases using manual testing		**b**			**h**
4.	To enable the learner to become a Software Tester / Quality Assurance Member		**e**	**l**	**k**	**j**

UNIT I - TESTING FUNDAMENTALS **(9 Hours)**

The Psychology of Testing-Software Testing Principles-Code Inspections-An Error checklist for Inspections-Walkthroughs-Desk Checking-Peer ratings.

Definition of bug-Reasons for bug occurrence-Cost of bugs-Role of a software tester-Software tester traits-Software Development life cycle models-Testing axioms-Software testing terms and definitions.

UNIT II - TESTING METHODOLOGIES **(9 Hours)**

White box testing: Statement coverage-Decision coverage-Condition coverage-Decision-condition coverage-Multiple-condition coverage. Black box testing: Equivalence Partitioning-Boundary-value analysis-Cause-effect graphing-Error guessing.

UNIT III - LEVELS OF TESTING **(9 Hours)**

Unit testing-Incremental testing: Top-down testing-Bottom-up testing. System testing: Facility-Volume-Stress-Usability-Security-Performance-Storage-Configuration-Compatibility-Installability-Reliability-Recovery-Serviceability-Documentation-Procedure.Acceptance testing-Case study: Test case design.

UNIT IV - APPLYING TESTING SKILLS **(9 Hours)**

Configuration Testing -Compatibility Testing-Usability Testing-Testing the Documentation- Web Site Testing –Testing for Software Security.

UNIT V - AUTOMATED TESTING, TEST TOOLS & BUG REPORTING (9 Hours)

Automated Testing and Test Tools: -Benefits-Test Tools-Software Test Automation-Bug Bashes and Beta Testing-Writing and Tracking Test Cases: Goals-Test Case Planning Overview-Bug's Life cycle-Bug Tracking System-Software Quality Assurance-Case study: Usage of open source test tool like Selenium and Sikuli for Functional/Regression testing.

TEXT BOOKS

1. Glenford J. Myers (2008), The Art of Software Testing - John Wiley &Sons, Second Edition, New Delhi (For Unts 1, 2 & 3).
2. Ron Patton (2007), Software Testing – Pearson Education, Second Edition, New Delhi (For Units 1, 4 & 5).

REFERENCES

1. William E Perry (2000), Effective Methods for Software Testing, John Wiley & Sons, Second Edition, New York.
2. Boris Beizer (1995), Black-Box Testing: -Techniques for Functional Testing of Software and Systems, John Wiley & Sons, New York.

Course Nature : Theory with Lab							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Theory Exam**	**Model Practical Exam**	**Attendance**	**Total**
	Marks	5	5	10	5	5	**30**
						End Semester Practical	**20**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18402	ADVANCED JAVA	3	0	3	6	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To import the knowledge on the advanced concept of Java Programming skills	a				
2.	To provide a basic understanding and knowledge of the latest java programming concept		b			
3.	To equip the students in programming skills used to relate with the IT industry		e	f		
4.	To enable the learner for aiming careers such as programmers (Java), Developers and Program analysts			l	g	k

UNIT I - COMPONENTS OF SWING **(9 Hours)**

The Origins of Swing - Components and Containers - Exploring Swing - JLabel and ImageIcon – JtextField - The Swing Buttons – JtabbedPane – JscrollPane – Jlist – JcomboBox – Trees – Jtable.

UNIT II- RMI & BEAN **(9 Hours)**

Remote Method Invocation (RMI) - A Simple Client/Server Application Using RMI - Java Beans - What is a Java Bean? - Advantages of Java Beans – Introspection - Bound and Constrained Properties – Persistence - Customizers - The Java Beans API - A Bean Example.

UNIT III - SERVLETS **(9 Hours)**

Servlets – Background - The Life Cycle of a Servlet - Using Tomcat for Servlet Development - A Simple Servlet - The Servlet API - The javax.servlet Package - Reading Servlet Parameters - The javax.servlet.http Package - Handling HTTP Requests and Responses - Using Cookies - Session Tracking.

UNIT IV - JDBC Concepts **(9 Hours)**

JDBC Objects – JDBC Driver Types – JDBC Packages – A Brief Overview of the JDBC Process – Database Connection – Associating the JDBC/ODBC Bridge with the Database – Statement Objects - .ResultSet – Model Programs – Tables – Inserting Data into Table.

UNIT V- JSP & EJB **(9 Hours)**

Java Server Pages – JSP – JSP Tags – Tomcat – Request String - Enterprise JavaBeans – Deployment Descriptors – Session Java Bean – Entity Java Bean – Message-Driven Bean – The JAR File.

TEXT BOOKS

1. Herbert Schildt (2007), JAVA The Complete Reference – McGraw-Hill, 7th Edition, New Delhi (For Units 1, 2 &3).
2. Jim Keogh (2002), J2EE The Complete Reference, Tata McGraw-Hill Edition, New Delhi (For Units 4 & 5).

REFERENCES

1. HorstmannS, Gary Cornell (2013), Core Java 2 volume 2 - Advanced Features-PRENTICE HALL, 9th Edition, New Delhi.
2. Hans Bergsten (2003), JavaServer Pages, 3rd Edition – O'Reilly.
3. Herbert Schildt (2007), JAVA: The Complete Reference, McGraw-Hill, 8th Edition, New Delhi.

Course Nature : Theory with Lab							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Theory Exam**	**Model Practical Exam**	**Attendance**	**Total**
	Marks	5	5	10	5	5	**30**
						End Semester Practical	**20**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18403	ASP.NET	3	0	3	6	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To learn .NET framework and Life cycle	a				
2.	To understand ASP.NET control and ADO.NET Concepts		b			
3.	To acquire a working knowledge of creating and consuming Web Services		d	e		
4.	To enable the learner for aiming careers in Web Application Development and Micro Soft solution/product development			l	k	j

UNIT I - INTRODUCTION TO .NET AND ASP.NET (9 Hours)

Introduction to .NET & its Benefits – Architecture of .NET Framework – CLR – CTS – Exploring Visual Studio – ASP.NET introduction & Features – Life cycle of ASP.NET – File Types – Exploring ASP.NET web pages – page directives – Application structure – states.

UNIT II - ASP.NET CONTROLS (9 Hours)

Standard controls – Validation controls – Rich web controls – Data controls – Navigation controls – Login controls – Web parts controls – HTML controls – Creating web applications – Deployment.

UNIT III - ADO.NET (9 Hours)

ADO.Net framework – ADO.NET managed providers – Data set – Data source controls – Data binding – Working with: Grid view – Data list – Form View – Repeater control – Designing web application.

UNIT IV - LINQ QUERIES AND SECURITY (9 Hours)

Introduction to LINQ Queries – Standard Query operators – LINQ to objects – LINQ to ADO.NET – LINQ to XML - LINQ Data source control – Lambda Expression – Security in ASP.NET: Login control – Password Recovery – Create User Wizard.

UNIT V - CACHING, CONFIGURATION AND WEB SERVICES (9 Hours)

Caching in ASP.NET – Output caching – Data caching – Globalization – Internationalization – Localization - Authentication-Authorization – Introduction to Web services - Infrastructure of web services – Code model – Properties – creating web services.

TEXT BOOK

1. Kogent (2010), ASP.NET 4.0 Black Book – Platinum Edition, Dreamtech Press,New Delhi(For 1 to 5 units).

REFERENCES

1. Stephen Walther, Kevin Hoffman, Nate Dudek (2011), ASP.NET 4 Unleashed, Pearson, New Delhi.
2. Kogent (2010), ASP.NET 3.5 in Simple Steps, Dreamtech Press,New Delhi.
3. Greg Buczek(2010), ASP.Net Developer's Guide, Tata McGraw Hill publishing Company Ltd., New Delhi.
4. Mathew Mac Donald (2010), ASP.NET Complete Reference , Tata McGraw Hill publishing Company Ltd., New Delhi.

Course Nature : Theory with Lab							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Theory Exam**	**Model Practical Exam**	**Attendance**	**Total**
	Marks	5	5	10	5	5	**30**
						End Semester Practical	**20**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E07	AD HOC WIRELESS NETWORKS	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To impart knowledge about wireless networks, wireless applications and current trends with wireless nodes	**a**				
2.	To learn about the adaptation of routing protocols with ad hoc networking		**c**			
3.	To enable the learner for aiming careers in System / Network administration			**l**	**k**	**j**

UNIT I - INTRODUCTION **(9 Hours)**

Fundamentals of Wireless Communication technology – The Electromagnetic Spectrum – Spectrum Allocation – Radio Propagation Mechanisms – Characteristics of the Wireless Channel - Path loss – Fading – Interference – Doppler Shift – Transmission Rate Constraints – Modulation Techniques – Analog modulation – Digital Modulation – Multiple Access Techniques – Frequency Division Multiple Access – Time Division Multiple Access -Code Division Multiple Access – Space Division Multiple Access – Voice Coding – Pulse Code modulation – Vocoders.

UNIT II - WIRELESS LANS AND PANS **(9 Hours)**

Introduction – Fundamentals of WANs – Technical Issues – Network Architecture – IEEE 802.11 Standard – Physical Layer – Basic MAC layer mechanisms – CSMA/CA Mechanism – other MAC layer Functionalities – other Issues – HYPERLAN Standard – HYPERLAN/1 – HYPERLAN/2 – BlueTooth – BlueTooth Specifications – Transport Protocol Group – Middleware Protocol Group – HomeRF

UNIT III - WIRELESS WANS AND MANS **(9 Hours)**

Introduction- The cellular concept – Capacity Enhancement – Channel Allocation Algorithms – Handoffs – Cellular Architecture – The First Generation Cellular Systems – Advanced Mobile Phone System – The Second Generation Cellular Systems – Global System for Mobile Communications – Data over Voice Channel – GSM Evolution of Data Services – Other 3G Standards – The Third Generation Cellular Systems – 3G Standards – The Problems with 3G Systems – Wireless in

local loop – Generic WLL Architecture – WLL Technologies – Broadband Wireless Access – Wireless ATM.

UNIT IV - AD HOC WIRELESS NETWORKS (9 Hours)

Introduction – cellular and adhoc wireless networks – Applications of Ad hoc wireless networks – Issues in Ad hoc wireless Networks – Medium access Scheme – Routing – Multicasting – Transport layer protocols – Pricing scheme – Quality of Service Provisioning – Self-Organization – Security – Addressing and Service Discovery – Energy Management – Scalability – Deployment Consideration – Ad hoc Wireless Internet

UNIT V - MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS (9 Hours)

Introduction – Issues in Designing a MAC Protocol for Ad hoc Wireless Networks – Design Goals of MAC Protocol for Ad hoc Wireless Networks – Classifications of MAC Protocols – 'Contention-Based' Protocols -Contention- Based Protocols with Reservation Mechanisms - Contention-Based MAC Protocols with Scheduling Mechanisms – MAC Protocols That use Directional.

TEXT BOOK

1. Siva Ram Murthy C and B.S. Manoj (2004), Ad hoc Wireless Networks Architecture and Protocols, Addison Wesley, 2nd Edition, New York

REFERENCE

1. Charles E. Perkins (2004), Ad Hoc Networking, Addison Wesley, 2nd Edition, New York.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
					End Semester Theory Exam		**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E08	PROFESSIONAL ETHICS	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the concepts of computer ethics in work environment	a			g	
2.	To understand the threats in computing environment				g	
3.	To understand the intricacies of accessibility issues			f		h
4.	To ensure safe exits when designing the software projects				k	j

UNIT-I COMPUTER ETHICS INTRODCUTION AND COMPUTER HACKING

(9 Hours)

A general Introduction – Computer ethics: an overview – Identifying an ethical issue – Ethics and law – Ethical theories - Professional Code of conduct – An ethical dilemma – A framework for ethical decision making - Computer hacking – Introduction – definition of hacking – Destructive programs – hacker ethics - Professional constraints – BCS code of conduct – To hack or not to hack? – Ethical positions on hacking

UNIT-II ASPECTS OF COMPUTER CRIME AND INTELLECTUAL PROPERTY RIGHTS **(9 Hours)**

Aspects of computer crime - Introduction - What is computer crime – computer security measures – Professional duties and obligations - Intellectual Property Rights – The nature of Intellectual property – Intellectual Property – Patents, Trademarks, Trade Secrets, Software Issues, Copyright - The extent and nature of software piracy – Ethical and professional issues – free software and open source code

UNIT III REGULATING INTERNET CONTENT, TECHNOLOGY AND SAFETY

(9 Hours)

Introduction – In defence of freedom expression – censorship – laws upholding free speech – Free speech and the Internet - Ethical and professional issues - Internet technologies and privacy – Safety and risk – assessment of safety and risk – risk benefit analysis – reducing risk

UNIT IV COMPUTER TECHNOLOGIES ACCESSIBILITY ISSUES **(9 Hours)**

Introduction – Principle of equal access – Obstacles to access for individuals – professional responsibility - Empowering computers in the workplace –

Introduction – computers and employment – computers and the quality of work – computerized monitoring in the work place – telecommuting – social, legal and professional issues - Use of Software, Computers and Internet-based Tools - Liability for Software errors - Documentation Authentication and Control – Software engineering code of ethics and practices – IEEE-CS – ACM Joint task force

UNIT V SOFTWARE DEVELOPMENT AND SOCIAL NETWORKING (9 Hours)

Software Development – strategies for engineering quality standards – Quality management standards – Social Networking – Company owned social network web site – the use of social networks in the hiring process – Social Networking ethical issues – Cyber bullying – cyber stalking – Online virtual world – Crime in virtual world - digital rights management - Online defamation – Piracy – Fraud

TEXT BOOK

1. Penny Duquenoy, Simon Jones and Barry G Blundell, "Ethical , legal and professional issues in computing", Middlesex University Press, 2008 (Units I to V)

REFERENCES

1. George Reynolds, "Ethics in Information Technology", Cengage Learning, 2011
2. Caroline Whitback," Ethics in Engineering Practice and Research ", Cambridge University Press, 2011
3. Richard Spinello, "Case Studies in Information and Computer Ethics", Prentice Hall, 1997.
4. John Weckert and Douglas Adeney, Computer and Information Ethics, Greenwood Press, 1997.
5. Sara Baase, "A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet",3rd Edition,Prentice Hall, 2008
6. http://www.infosectoday.com/Articles/Intro_Computer_Ethics.htm

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E09	MACHINE LEARNING AND ITS APPLICATIONS	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To introduce students to the basic concepts and techniques of Machine Learning	a				
2.	To have a thorough understanding of the Supervised and Unsupervised learning techniques		b			
3.	To study the various probability based learning techniques		d			
4.	To understand graphical models of machine learning algorithms			e		

UNIT I- INTRODUCTION (9 Hours)

Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search –Candidate Elimination Algorithm – Linear Discriminants

UNIT II - DECISION TREE LEARNING (9 Hours)

Learning with Trees – Decision Tree representation – Basic Decision Tree Algorithm – Hypothesis Space Search – Inductive Bias in decision tree– Unsupervised Learning – K means Algorithms – Issues in Decision tree Learning

UNIT III - ARTIFICIAL NEURAL NETWORK (9 Hours)

Neural Network representation - Perceptron and Multi-layer Perceptron –Back Propagation Algorithm – Convergence and Local minima – Feed Forward Networks – Overview – Deriving Back-Propagation – Radial Basis Functions and Splines – An Illustrative example: Face recognition

UNIT IV - INSTANCE BASED LEARNING AND GENETIC ALGORITHM (9 Hours)

Nearest Neighbor Learning– Locally weighted regression – Radial Basis function – Case based reasoning - Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms – Models of evolution and Learning

UNIT V - MACHINE LEARNING IMPLEMENTATION **(9 Hours)**

Case studies –Tic-tac-toe - Enjoysport - Backpropagation to the task of face recognition- Apply Genetic algorithm - Health care Products – Gaming Industries – CRM Platforms for Sales and Service Industries

TEXT BOOKS:

1. Machine Learning. Tom Mitchell. First Edition, McGraw- Hill, 1997. (Chapters : 1, 2, 3, 4, 8 and 9)
2. Ethem Alpaydin, ―Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)‖, Third Edition, MIT Press, 2014

REFERENCES:

1. Peter Flach, ―Machine Learning: The Art and Science of Algorithms that Make Sense of Data‖, First Edition, Cambridge University Press, 2012.
2. Stephen Marsland, ―Machine Learning –An Algorithmic Perspective‖, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E10	DIGITAL IMAGE PROCESSING WITH MATLAB	2	1	2	5	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To know about image fundamentals and mathematical transforms necessary for image processing	a				
2.	To gather knowledge about image enhancement techniques		B			
3.	To know about image restoration procedures	a				
4.	To learn the image compression procedures	b		e		
5.	To study the image segmentation and representation techniques		c	l		

UNIT I - DIGITAL IMAGE FUNDAMENTALS (9 Hours)

Overview of Digital Image Processing – Fields that use Digital image processing – Fundamental steps in Digital Image Processing – Components of an Image Processing System – Elements of visual perception – Background on MATLAB andthe Image Processing Toolbox - The MATLAB Working Environment

UNIT II - IMAGE REPRESENTATION & TRANSFORMATIONS (9 Hours)

Digital Image Representation - Reading Images - Displaying Images - Writing Images –Image Types - Array Indexing - Intensity Transformations and Spatial Filtering - Intensity Transformation Functions - Histogram Processing and Function Plotting - The 2-D Discrete Fourier Transform - Computing and Visualizing the 2-D DFT in MATLAB - Filtering in the Frequency Domain - Properties of 2D Fourier Transform

UNIT III - IMAGE ENHANCEMENT (9 Hours)

Image Enhancement in spatial domain: Histogram Equalization – Enhancement using Arithmetic / Logic Operations – Spatial Filtering – Smoothing & Sharpening Spatial Filters. Image Enhancement in Frequency domain: Filtering in the frequency domain – Smoothing & Sharpening

UNIT IV - IMAGE COMPRESSION (9 Hours)

Fundamentals – Image Compression models – Lossless Compression: Variable Length Coding – LZW Coding – Bit plane Coding – predictivecoding –Lossy Compression: Transform coding – Wavelet coding – Basics of Image compression Standards – JPEG standards – MPEG standards

UNIT V - IMAGE SEGMENTATION & REPRESENTATION (9 Hours)

Edge Detection – Thresholding – Region based Segmentation – Chain codes – Polynomial approximation – Boundary Segments – Case study using MATLAB.

TEXT BOOKS:

1. Rafael C Gonzalez, Richard E Woods, 2nd Edition - Digital Image Processing – Pearson Education - 2003.
2. Rafael C Gonzalez, Richard E Woods, Steven Eddins , 2nd Edition - Digital Image Processing using MATLAB – Pearson Education - 2003.

Course Nature : Theory with Lab							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Theory Exam**	**Model Practical Exam**	**Attendance**	**Total**
	Marks	5	5	10	5	5	**30**
						End Semester Practical	**20**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E11	ANDROID APPLICATIONS DEVELOPMENT	2	1	2	5	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand mobile application development trends and Android platform	a				
2.	To analyze the need of simple applications, game development, Location map based services		b			
3.	To enable the learner for aspiring careers in Android Mobile application development areas			l	k	j

UNIT I - ANDROID FUNDAMENTALS (9 Hours)

Mobile Application development and trends – Android overview and Versions – Android open stack, features – Setting up Android environment (Eclipse, SDK, AVD)- Simple Android application development – Anatomy of Android applications – Activity and Life cycle – Intents, services and Content Providers

UNIT II - ANDROID USER INTERFACE (9 Hours)

Layouts: Linear, Absolute, Table, Relative, Frame, Scrollview, Resize and reposition - Screen orientation – Views: Textview, EditText, Button, ImageButton, Checkbox, ToggleButton, RadioButton, RadioGroup, ProgressBar, AutocompleteText, Picker, Listviews and Webview– Displaying pictures with views: Gallery and ImageView, ImageSwitcher, Gridview – Displaying Menus: Helper methods, Option and Context

UNIT III - DATA PERSISTENCE (9 Hours)

Shared User preferences – File Handling: File system, Systempartition, SDcard partition, user partition, security, Internal and External Storage – Managing data using SQLite –User defined content providers

UNIT IV - MESSAGING, NETWORKING AND SERVICES (9 Hours)

SMS Messaging: Sending and Receiving – Sending email and networking – Downloading binary and text data files – Access Web services – Developing android services: create your own services, performing long running task in a service-performing repeated task in a service

UNIT V - LOCATION ACCESS AND PUBLISH ANDROID APPLICATION

(9 Hours)

Location based services: Display map, zoom control, view and change, Marking, Geocoding, Get location - Publish Android applications and Deployment

TEXT BOOK

1. WeiMeng Lee (2012), "Beginning Android Application Development", Wrox Publications (John Wiley, New York) (For 1 to 5 units).

REFERENCES

1. Ed Burnette (2010), "Hello Android: Introducing Google's Mobile Development Platform", The Pragmatic Publishers, 3rd edition, North Carolina USA
2. Reto Meier (2012), "Professional Android 4 Application Development", Wrox Publications (John Wiley, New York).
3. ZigurdMednieks, Laird Dornin, Blake Meike G, Masumi Nakamura (2011), "Programming Android: Java Programming for the New Generation of Mobile Devices", OReilly Media, USA

Course Nature : Theory with Lab							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Theory Exam**	**Model Practical Exam**	**Attendance**	**Total**
	Marks	5	5	10	5	5	**30**
						End Semester Practical	**20**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E12	OBJECT ORIENTED ANALYSIS AND DESIGN WITH UML	2	1	2	5	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To ensure quality and reusability while developing software	c				
2.	To analyze and design the problem domain using unified Object approach	b	d			
3.	To identify and categorize business, access and view layer objects of the application		d			
4.	To derive OOA & OOD phases using UML diagrams and CASE tools		e	l		

UNIT I- OO BASICS (9 Hours)

An Overview of OO Systems Development – Introduction, Views, Methodologies, Need, Overview of Unified Approach; Object Basics – Introduction, Philosophy, OO Concepts – Object Relationships, Associations, Aggregations and Object Containment, Advanced Topics and Case Study; OOSD – SD Process, Building HQ S/W, Use Case Driven Approach, Reusability.

UNIT II- METHODOLOGIESM, MODELING AND UML (9 Hours)

Methodologies – Introduction, Rumbaugh, Booch and Jacobson Methodologies; Patterns and Frameworks; Unified Approach; UML – Introduction UML Diagrams - Class, Use-Case, Behavior and Implementation Diagrams - Model Management - UML Extensibility and Meta Model.

UNIT III- OOA: IDENTIFYING USE CASES AND CLASSIFICATION (9 Hours)

Identifying Use Cases -Introduction, Business Object Analysis, Use Case Driven OOA: Unified Approach, Business Process Modeling – Use-Case Model, Developing Effective Documentation – Case Study; OA: Classification – Introduction, Approaches – Noun Phrase, Common Class Patterns, Use Case Driven, CRC; Naming Classes.

UNIT IV- IDENTIFYING ORAM AND OO DESIGN (9 Hours)

Identifying Object Relationships, Attributes and Methods – Introduction, Associations, Super- Sub Class and Part – of Relationships – Case Study. Class and Object

Responsibility, Defining Attributes and Methods for ViaNet bank Objects; OOD Process and Axioms - Introduction, Corollaries, Design Patterns; Designing Classes – Introduction, OOD philosophy, OCL, The Process, Class Visibility, Designing Methods for ViaNet Bank Objects, Packages and Managing Classes.

UNIT V - ACCESS LAYER AND VIEW LAYER (9 Hours)

Access Layer – Introduction, DBMS, Logical and Physical DB Organization and Access Control, Distributed Databases and Client Server Computing, OODBMS, Object Relational Systems, Multi Database Systems, Designing Access Layer Classes; Case study; View Layer – Introduction, Design view layer classes, Macro and Micro Level Process, Purpose of a View Layer Interface, Prototyping the User Interface, Case Study.

TEXT BOOK

1. Ali Bahrami – Object Oriented System Development – Tata McGraw Hill, 2008.

REFERENCE:

1. Grady Booch, Ivar Jacobson, James Rumbaugh - The Unified Modeling Language User Guide - Pearson Education, 2nd edition, 2005.

Course Nature : Theory with Lab							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Theory Exam**	**Model Practical Exam**	**Attendance**	**Total**
	Marks	5	5	10	5	5	**30**
						End Semester Practical	**20**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18404	RESOURCE MANAGEMENT TECHNIQUES	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To apply Operations research methods for decision making process				**a**	
2.	To apply Operations research techniques for solving real life problems.	**a**	**b**			

UNIT – I **(9 Hours)**

Basics of Operations Research (OR): Characteristics of O.R – Importance of O.R in Industry – O.R and Decision making – Role of computers in O.R.

UNIT – II **(9 Hours)**

Linear programming: Formulations and Graphical solution (of 2 variables) canonical & standard form of Linear Programming problem. Algebraic solution: Simplex Method.

UNIT – III **(9 Hours)**

Transportation model: Definition – formulation and solution of transportation models – Initial Basic feasible solution by the methods of North west corner, the row – minima, column – minima, matrix minima and vogel's approximation method – Assignment problem by Hungarian method .

UNIT – IV **(9 Hours)**

Sequencing problem: Processing n jobs through 2 machines – Processing n jobs through 3 machines – Processing n jobs through m machines – Processing 2 jobs through m machines.

UNIT – V **(9 Hours)**

Theory of Games: Characteristics – Pure Strategies – Saddle Point – Value of the game – Mixed Strategies – Rules of Dominance – Two Persons Zero Sum Game – Graphical Solutions of 2 x m and n x 2 game (excluding LPP) – Limitations.

TEXT BOOK:

Sundaresan, V, Ganapahy Subramanian, K.S. and Ganesan,K (2011), "*Resource Management Techniques*", A.R.Publications-Nagapattinam

Treatment as in : Resource Management Techniques by Prof.V.Sundaresan, K.S.Ganapathy Subramanian, K. Ganesan.

Unit I: Chapter 1 (1.1 to 1.8)
Unit II: Chapter 2, Chap 3 (3.1.1 to 3.1.4, 3.2.1)
Unit III: Chapter 7(7.1), Chap 8.
Unit IV: Chapter 14
Unit V: Chapter 16(16.1 to 16.7, except 16.5),

REFERENCES

1. Vittal, . P.R. (2003),"*Operations Research",*Margham Publications, Chennai.
2. Kanti Swarup, Gupta, P.K. and Manmohan (2006),"*Operations Research*",12th Edition-Sultan Chand & Sons, New Delhi.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18405	PERSONALITY DEVELOPMENT - II	2	1	0	3	2

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To improve the ability of the students to solve aptitude problems in Arithmetic and Menstruation	b				
2.	To make them prepare and give professional presentations				j	
3.	To introduce students to the nuances of vocabulary			l		
4.	To enable students the art of writing resumes and give interviews				j	

UNIT I - ARITHMETIC (**9 Hours)**

Averages - Mixtures & Solutions - Time & Work - Pipes & Cisterns - Time, Speed Distances I - Time, Speed & Distances II.

UNIT II - MODERN MATHEMATICS & MENSTRUATION (9 Hours)

Data Sufficiency - Data Interpretation - Cubes - Menstruation – Clocks – Calendars.

UNIT III - PRESENTATION SKILLS (9 Hours)

Extempore - Company Profile/Area of Interest/Recent Developments

UNIT IV - ANALYTICAL READING (9 Hours)

Reading Comprehension & Critical Reasoning - Level 2 - Cloze test – Anagrams

UNIT V - INTERVIEW SKILLS & VOCABULARY BUILDING (9 Hours)

CV Writing - Self Profiling –Mock Interview - One Word Substitution – Homonyms – Idioms - Phrasal Verbs - Odd Word

TEXT BOOKS

1. Dinesh Khattar (2013), Quantitative Aptitude for Competitive Examinations, Pearson Education, 2nd Edition (For 1 to 2 Units)
2. Agrawal, R.S. (2012), Quantitative Aptitude for Competitive Examination, S.chand Publishing, New Delhi (For 1 to 2 Units).

REFERENCES

1. Arun Sharma (2012), Logical Reasoning, Tata McGraw Hill, New Delhi.
2. Edgar Thorpe (2007), Test of Reasoning, Tata McGraw Hill, 4th Edition, New Delhi.
3. Agarwal R.S. (2012), Verbal & Non Verbal Reasoning, S.Chand Publishing, New Delhi.
4. Oxford Dictionary of English Idioms (2010), 3rd edition, Oxford University Press, New York.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
					End Semester Theory Exam		**50**
						Total	**100**

SEMESTER - V

Course Code	Course Title	L	T	P	Total LTP	C
PCA18501	XML AND WEB SERVICES	3	1	3	7	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	Write a XML application using structure and presentation technologies	a				
2.	Apply XML manipulation technologies such as XSLT, XPath, XLink and XQuery		b			
3.	Do Program Manipulation and Dynamic access through DOM architecture	c				
4.	Develop web services and ensure security	c	e			
5.	Understand the need of semantic web		b			

UNIT I **(9 Hours)**

Role of XML, XML language basics, XML Revolution, XML Technology family, Simple XML fie creation, and XML Namespaces

UNIT II **(9 Hours)**

XML document rule, XML structuring, XML presentation technologies, XML Transformation, XSLT, XQUERY, XLINK, XPATH

UNIT III **(9 Hours)**

XML Parsers, XML DOM architecture, Classes of DOM family, Combining XML DOM and XSL, Relational Database and XML

UNIT IV **(9 Hours)**

SOAP protocol, XML-RPC, HTTP, SOAP faults and SOAP attachments, Web services, UDDI, XML security

UNIT V **(9 Hours)**

Semantic web Technology, Layered Architecture, RDF and OWL representation

TEXT BOOK

1. Frank. P. Coyle - XML, Web Services and the data revolution - Pearson Education, 2002

REFERENCES

1. Gavin Powel - Beginning XML Databases - Wrox Press, 2007
2. Ramesh Nagappan, Robert Skoczylas and Rima Patel Sriganesh, - Developing Java Web Services - Wiley Publishing Inc., 2004
3. Grigoris Antoniou and Frank Van Harmelen,-A Semantic Web Primer - The MIT Press, Cambridge, Massachusetts London, England, 2004
4. Sandeep Chatterjee, James Webber, - Developing Enterprise Web Services -, Pearson Education, 2004
5. McGovern, et al., - Java Web Services Architecture -, Morgan Kaufmann Publishers, 2005.

Course Nature : Theory with Lab							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Theory Exam**	**Model Practical Exam**	**Attendance**	**Total**
	Marks	5	5	10	5	5	**30**
						End Semester Practical	**20**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18502	DATA MINING AND DATA WAREHOUSING	3	2	2	7	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To impart knowledge about Data Mining	a				
2.	To know about various techniques used in Data Mining	b				
3.	To design data warehouses for the companies		c			
4.	To enable the learner for aiming careers in Data Warehouse Management			l	g	k

UNIT I - DATA MINING CONCEPTS & ARCHITECTURE (9 Hours)

Introduction – Data Mining Definitions, Tools, Applications - Data Mining - Learning: Definition, Anatomy of Data Mining.Types of Knowledge – Knowledge Discovery Process- introduction, Evaluation,Stages, Operations and Architecture of Data Mining.

UNIT II - DATA MINING TECHNIQUES (9 Hours)

Visualization Techniques – Likelihood & distance-Neural Networks-Decision Tree technique-Constructing decision trees-ID3 algorithm-Genetic algorithms: Crossover & mutation -Clustering: Distance function-K-means algorithm -Hierarchical Clustering - Association rules: Apriori algorithm – Real Time Applications and Future Scope.

UNIT III - DATA WAREHOUSING CONCEPTS & ARCHITECTURE (9 Hours)

Introduction –Goals- Process Architecture- Load Manager-Warehouse Manager-Query Manager - DWH Objects - Fact table & Dimension table –DWH Users - Data Warehouse Schemas: Star schemas-Snowflake Schemas.

UNIT IV - DATA WAREHOUSE PARTITIONING & AGGREGATION (9 Hours)

Horizontal Partitioning-Vertical Partitioning-Hardware Partitioning-Software partitioning Methods-Aggregation-Designing Summary tables-Designing Summary tables

UNIT V - DATA MARTS, META DATA, BACKUP & RECOVERY (9 Hours)

Data Marts: Introduction-Estimating Design – Cost-Meta Data-Backup: Types of backup-Backup the data warehouse – SureWest Online Backup-Recovery: Strategies-various Testing Strategies-Various Recovery models, Disaster Recovery procedure

TEXT BOOKS

1. PrabhuS, Venkatesan N(2006), Data Mining & Warehousing – New Age International – First Edition, New Delhi (For Units 1 & 2).
2. Sam Anahory, Dennis Murray (2004), Data warehousing in real world – Pearson Education, New Delhi (For Units 3, 4 & 5).

REFERENCES

1. Pieter Adriaans, Dolf Zantinge (2005), Data Mining – Pearson education, New Delhi.
2. Alex Berson, Stephen J Smith (2004), Data Warehousing, Data mining & OLAP – Tata McGraw Hill Publications, New Delhi.

Course Nature : Theory with Lab							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Theory Exam**	**Model Practical Exam**	**Attendance**	**Total**
	Marks	5	5	10	5	5	**30**
						End Semester Practical	**20**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18503	OPEN SOURCE TECHNOLOGIES	3	2	2	7	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the basics and advantages of open source	a				
2.	To learn the open source software PHP and PYTHON		b			
3.	To develop the programming skill in PYTHON		c	e		

UNIT I – INTRODUCTION (9 Hours)

Definitions and History – Open source Operating Systems – FreeBSD – Linux -Open Source Server Applications – Apache – other servers -Open Source Desktop Applications - How Open Source Software Is Developed.

UNIT II – PHP PROGRAMMING (9 Hours)

PHP Installation – PHP WebPages – PHP and forms – PHP mysql configuration – PHP mysql functions – connecting mysql with PHP – selecting data from mysql database. Case study: Building mysql enabled application with PHP.

UNIT III – INTRODUCTION TO PYTHON (9 Hours)

The Basic elements of Python- Branching programs –String and Inputs- Iterations- Simple Numerical programs

UNIT IV – FUNCTIONS, SCOPING AND ABSTRACTIONS (9 Hours)

Functions and Scoping – Specifications – Recursions – Global variables – Modules – Files – Tuples – Lists and MutabilityFunction as objects – Dictionaries

UNIT V – TESTING AND DEBUGGING (9 Hours)

Testing – Debugging –Exceptions and Assertions – Classes and Object oriented programming-Case study: creating mysql enables application using Python

TEXTBOOKS:

1. Paul Kavanagh, Open Source Software: Implementation and Management, Elsevier Digital Press, 2004. (UNIT -I)
2. Rasmus Lerdorf & Levin Tatroe,Programming PHP– O'Reilly 2002((UNIT -II)
3. Introduction to Computation Programming using Python (Revised and Expanded Edition – John V Guttag – MIT Press Cambridge London (UNIT III, IV & V)

REFERENCES

1. Rasmus Lerdorf and Levin Tatroe, Programming PHP – O'Reilly 2002
2. Wesley J Chun , Core Python Programming - Prentice Hall 2001
3. Vikram Vaswani, MySQL : The Complete Reference - Tata McGraw-Hill 2009 - 2 nd Ed.,
4. Steve Holzner, PHP : The Complete Reference Tata McGraw-Hill 2009 - 2nd Ed.,

Course Nature : Theory with Lab							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Theory Exam**	**Model Practical Exam**	**Attendance**	**Total**
	Marks	5	5	10	5	5	**30**
						End Semester Practical	**20**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E13	INFORMATION STORAGE AND MANAGEMENT	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To import knowledge on Information Storage and Management Technologies for the recent trends	a				
2.	To provide a variety of solutions for storing, managing, accessing, protecting, securing, sharing and optimizing information		c			
3.	To help the learners to learn the developments that have taken place in the area of information storage and management		c	l		

UNIT I – INTRODUCTION (9 Hours)

Introduction to Storage Technology - information storage, evolution of storage technology and architecture, data center infrastructure, information life cycle; Storage System Environment – storage system environment components, disk drive components, logical components of Host; Data Protection – implementation of RAID, RAID Array components, RAID levels, and performance comparisons.

UNIT II - DAS, SCSI, AND STORAGE NETWORKING (9 Hours)

Direct Addressed Storage – Type of DAS, benefits and limitations, Disk Drive Interfaces, Parallel SCSI; Storage Area Networks – evolution, components of SAN, Fiber Channel(FC) connectivity, FC architecture, FC Topologies; Network Attached Storage – Benefits of NAS, components of NAS, protocols, i/o operations.

UNIT III - IP SAN, CAS AND STORAGE VIRTUALIZATION (9 Hours)

IP SAN-introduction, components of iSCSI, FCIP; Content Addressed Storage(CAS) – fixed content and archives, types of archives, CAS Architecture; Storage Virtualization – forms of virtualization, taxonomy, Storage Virtualization Challenges, types of storage virtualization.

UNIT IV - BUSINESS CONTINUITY (9 Hours)

Introduction - Information Availability, BC terminology, BC planning lifecycle, Business impact analysis- Backup and recovery – purpose and considerations, topology ,

technologies; local replication - Uses of Local Replicas, Data Consistency, Replication Technologies.

UNIT V - STORAGE SECURITY AND MANAGEMENT (9 Hours)

Storage Security - Storage security framework, Risk Triad, Storage securitydomains, security implementations in storage Networking; Managing the Storage Infrastructure - Monitoring the Storage Infrastructure, Storage Management Activities, Storage Infrastructure Management Challenges.

TEXT BOOK

1. EMC Corporation, Information Storage and Management, Wiley India, New

REFERENCES

1. Robert Spalding (2003), Storage Networks: The Complete Reference, Tata McGraw Hill, New Delhi.
2. Meeta Gupta (2002), Storage Area Network Fundamentals, Pearson Education Limited, New Delhi.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E14	ORGANIZATIONAL BEHAVIOR	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To identify their personality type and behavioral pattern	a				
2.	To identify the basic skills of leadership				f	
3.	To apply the principles of conflict resolution and learn about group behavior		b			
4.	To adapt to the organization culture, structure and dynamics					h

UNIT-I - INTRODUCTION **(9 Hours)**

What Is Organizational Behavior? – The importance of interpersonal skills- What managers Do- Organizational behavior- Complementing intuitions with systematic study- Disciplines that contribute to the OB field- Challenges and opportunities for OB- Developing an OB model- ETHICAL DILEMMA Jekyll and Hyde

UNIT-II- DIVERSITY IN ORGANIZATIONS **(9 Hours)**

Diversity- Biographical Characteristics-Ability- Implementing Diversity Management Strategies- ETHICAL DILEMMA- Board Quotas- Case incidents

UNIT-III ATTITUDES AND JOB SATISFACTION- EMOTION AND MOODS **(9 Hours)**

Attitudes-Job Satisfaction- ETHICAL DILEMMA Bounty Hunters- CASE INCIDENT 1 Long Hours, Hundreds of E-Mails, and No Sleep- CASE INCIDENT Crafting a Better Job-Emotion and Moods-Emotional labor-Affective events theory- Emotional Intelligence-OB applications of emotions and moods- ETHICAL DILEMMA Happiness Coaches for Employees

UNIT-IV PERSONALITY AND **(9 Hours)**

Personality-Values-International Values- ETHICAL DILEMMA Freedom or Lack of Commitment?- CASE INCIDENT : Is There a Price for Being Too Nice? -CASE INCIDENT 2 Leadership from an Introvert's Perspective

UNIT-V-MOTIVATION CONCEPTS **(9 Hours)**

Defining Motivation- Early Theories of Motivation- Contemporary Theories of Motivation- Integrating Contemporary Theories of Motivation- Motivating by Job Design: The Job Characteristics Model- Employee Involvement- Using Rewards to Motivate Employee.

TEXT BOOK:

1. Stephen P. Robbins, Timothy A. Judge, "Organizational Behavior", 14th Edition, Pearson Education,2012. (Units I to V)

REFERENCES:

1. Robert Kreitner, Angelo Kinicki, "Organizational Behavior", 8th Edition, McGrawHill,2007.
2. Fred Luthans, "Organizational Behavior", McGraw Hill, 1997.
3. Keith Davis, "Human behavior at work: Human relations and Organizational Behavior", Tata McGraw Hill, 1982.
4. Rudrabasavaraj M.N. "Dynamic personnel Administration", 3rdEdition,Himalaya Publishing House, 2011

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
					End Semester Theory Exam		**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E15	ENTERPRISE RESOURCE PLANNING	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To comprehend the technical aspects of ERP systems	a				
2.	Demonstrate a good understanding of basic issues in Enterprise Systems		b			
3.	To understand concepts of re-engineering and how they relate to ERP system implementations		a			
4.	To be able to identify and describe typical functionality in an ERP system			k		
5.	Effectively describe problems typical of ERP implementation projects and translate this information				d	

UNIT I - INTRODUCTION TO ERP **(9 Hours)**

Overview – Benefits of ERP – ERP and Related Technologies – Business Process Reengineering – Data Warehousing – Data Mining – On–line Analytical Processing – Supply Chain Management.

UNIT II - ERP IMPLEMENTATION **(9 Hours)**

Implementation Life Cycle – Implementation Methodology – Hidden Costs – Organizing Implementation – Vendors, Consultants and Users – Contracts – Project Management and Monitoring.

UNIT III - BUSINESS MODULES **(9 Hours)**

Business Modules in an ERP Package – Finance – Manufacturing – Human Resource – Plant Maintanance – Materials Management – Quality Management – Sales and Distribution.

UNIT IV - ERP MARKET **(9 Hours)**

ERP Market Place – SAP AG – PeopleSoft – Baan Company – JD Edwards World Solutions Company – Oracle Corporation – QAD – System Software Associates.

UNIT V - ERP – PRESENT AND FUTURE **(9 Hours)**

Turbo Charge the ERP System – EIA – ERP and E–Commerce – ERP and Internet – Future Directions in ERP.

TEXT BOOK

1. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, 1999. (Units I to V)

REFERENCES

1. Joseph A. Brady, Ellen F. Monk, Bret J. Wangner, “Concepts in Enterprise Resource Planning” , Thomson Learning, 2001.
2. Vinod Kumar Garg and N.K .Venkata Krishnan, “Enterprise Resource Planning - concepts and Planning”, Prentice Hall, 1998.
3. Jose Antonio Fernandz, “ The SAP R /3 Hand book”, Tata McGraw Hill

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
					End Semester Theory Exam		**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E16	CLOUD COMPUTING	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the need of cloud computing in the IT sector	**a**				
2.	To know the cloud service providers and the kind of services offered by them		**g**			
3.	To analyze the benefits of cloud in business continuity by applying cloud services, security and virtualization features		**b**			
4.	To enable the learner for aspiring careers in Cloud / Software Product development areas			**l**	**k**	**j**

UNIT I - CLOUD FUNDAMENTALS **(9 Hours)**

Cloud computing Definition – Cloud Models such as NIST, Cube, Private, Public, Hybrid and Community clouds – Cloud Characteristics – Benefits, Disadvantages, Challenges and obstacles of Cloud Computing – Cloud Cost Measurement, Capital expenditure, Total cost and SLA – Cloud Architecture – Types of Cloud Services (IaaS, PaaS, SaaS, IdaaS).

UNIT II - CLOUD PLATFORMS **(9 Hours)**

Abstraction – Load balancing and virtualization : case study Google cloud – Hypervisors : Case study VMware vSphere - Machine Imaging – Capacity Planning with baseline metrics, measurement, load testing, network capacity and scaling – PaaS services : Case study Force.com – PaaS Frameworks: Case study Drupal, Eccenbtex AppBase Spuarespace ,WaveMaker and Wolf.

UNIT III - CLOUD SERVICE PROVIDERS **(9 Hours)**

Google Web Services : Explore and survey Google Application, Google analytics, Google Translate, Google Toolkit, APIs and Google App Engine - Amazon Web services: Components, Elastic Compute Cloud (EC2), Amazon Storage Systems, Amazon Elastic Block Store, and Amazon Database Services – Microsoft Cloud Services : Windows Azure platform and Windows Live.

UNIT IV - CLOUD INFRASTRUCTURE AND SECURITY **(9 Hours)**

Cloud Management: Responsibilities, Lifecycle, Management Products and Standards -Cloud security: CSA Cloud Reference Model – Implement Cloud security

for Infrastructure, Data, Network, Storage and Host - Disaster recovery and management.

UNIT V - SOA, STORAGE AND BACKUP (9 Hours)

Network service model infrastructure, Communication and Management of SOA – Moving applications to cloud, Service attributes and Cloud bursting – Cloud storage, provisioning, unmanaged and managed storage – Cloud backup, types and features and storage interoperability – Cloud Mail services.

TEXT BOOKS

1. Barrie Sosinsky (2011), "Cloud Computing Bible", Wiley Publishing Inc., New York
2. Kris Jamsa (2012), "Cloud Computing: SaaS, PaaS,IaaS, Virtualization, Business Models, Security and More", Jones and Bartlett Learning LLC, Boston, USA

REFERENCES

1. George Reese (2009), "Cloud Application Architectures: Building Applications and Infrastructures in the cloud" ,O'Reilly Media Inc. Cambridge,USA
2. Anthony T Velte, Toby J Velte, Robert Elsenpeter (2010), "Cloud Computing: A practical approach" , McGrawHill, New Delhi.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
					End Semester Theory Exam		**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E17	SOCIAL NETWORK ANALYSIS	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the concept of semantic web and related applications	a				
2.	To learn knowledge representation using ontology		b			
3.	To understand human behavior in social web and related communities			**h**	**g**	
4.	To learn visualization of social networks			**I**		

UNIT I - INTRODUCTION **(9 Hours)**

Introduction to Semantic Web: Limitations of current Web – Development of Semantic Web -Emergence of the Social Web – Social Network analysis: Development of Social Network Analysis -Key concepts and measures in network analysis – Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities – Web-based networks – Applications of Social Network Analysis.

UNIT II - MODELLING, AGGREGATING AND NOWLEDGE REPRESENTATION **(9 Hours)**

Ontology and their role in the Semantic Web: Ontology-based knowledge Representation – Ontology languages for the Semantic Web: Resource Description Framework – Web Ontology Language - Modeling and aggregating social network data: State-of-the-art in network data representation - Ontological representation of social individuals – Ontological representation of social relationships - Aggregating and reasoning with social network data – Advanced representations.

UNIT III - EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL NETWORKS **(9 Hours)**

Extracting evolution of Web Community from a Series of Web Archive – Detecting communities in social networks – Definition of community – Evaluating communities – Methods for community detection and mining – Applications of community mining algorithms – Tools for detecting communities social network infrastructures and communities – Decentralized online social networks – Multi – Relational characterization of dynamic social network communities.

UNIT IV - PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES (9 Hours)

Understanding and predicting human behavior for social communities – User data management - Inference and Distribution – Enabling new human experiences – Reality mining – Context – Awareness - Privacy in online social networks – Trust in online environment – Trust models based on subjective logic – Trust network analysis – Trust transitivity analysis – Combining trust and reputation – Trust derivation based on trust comparisons – Attack spectrum and countermeasures.

UNIT V - VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS (9 Hours)

Graph theory – Centrality – Clustering – Node-Edge Diagrams – Matrix representation – Visualizing online social networks, Visualizing social networks with matrix-based representations – Matrix and Node-Link Diagrams – Hybrid representations – Applications – Cover networks – Community welfare -Collaboration networks – Co-Citation networks.

TEXT BOOKS

1. Peter Mika, "Social Networks and the Semantic Web", First Edition, Springer 2007.
2. Borko Furht, "Handbook of Social Network Technologies and Applications", 1st Edition, Springer, 2010.

REFERENCES

1. Guandong Xu,Yanchun Zhang and Lin Li, "Web Mining and Social Networking – Techniques and applications", First Edition Springer, 2011.
2. Dion Goh and Schubert Foo, "Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively", IGI Global Snippet, 2008.
3. Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, "Collaborative and Social Information Retrieval and Access: Techniques for Improved user Modelling", IGI Global Snippet, 2009.
4. John G Breslin, Alexander Passant and Stefan Decker, "The Social Semantic Web", Springer, 2009.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E18	NEURAL NETWORKS	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the basics of ANN and comparing with Human Brain		b			
2.	To distinguish the various architectures of building an ANN		d			
3.	To describe the Pattern classification in Neural Networks	c		l		

UNIT I - INTRODUCTION TO CELL AND THEIR STRUCTURES (9 Hours)

Action potential,dendrites, synapse and axon Biological Neural Network Vs Artificial Neural Network History and Applications of ANN. Different Architectures of ANN-Different Learning algorithms of ANN-Common activation functions Development process of ANN, Setting of weights, simple OR function simulation McCullosh and Pitts model MP model simulation of OR,AND,NOT functions.

UNIT II - SIMPLE NEURAL NETS FOR PATTERN CLASSIFICATION (9 Hours)

Learning algorithms, Supervised and Unsupervised - Hebbian network architecture - Hebbian network algorithm and Application -Perceptron network architecture and its limitations -XOR problem and its solution -Perceptron applications -Adaline architecture and learning -Back propagation network, BP Algorithm Derivation of weight adjustment terms

UNIT III - PATTERN ASSOCIATION (9 Hours)

Pattern Association preliminaries-Pattern associator properties Associative memories and networks -Auto associative net, algorithm and weight setting-Hetero associative net, algorithm and weight setting Problems related to Associative memories - Bidirectional associative memories, weight setting and algorithms -BAM and its various forms -Problems related to BAM.

UNIT IV - NEURAL NETS BASED ON COMPETITION (9 Hours)

Competitive networks -Lateral inhibition nets, Maxnet, Mexican Hat etc.- Kohonen SOM architecture -SOM learning algorithm-Advantages of SOM and its applications - Learning Vector Quantization-LVQ advantages and disadvantages -Counter-propagation networks Architecture-CPN algorithm and applications

UNIT V - ADAPTIVE RESONANCE THEORY AND NEOCOGNITRON (9 Hours)

ART-1 architecture and operation -ART-1 algorithm and applications -ART-II architecture and operation-ART-II algorithm and applications -Probabilistic Neural Network,Architecture and algorithm-Cascade Correlation Network and itsAdvantages -Cascade Correlation learning algorithm -Neocognitron architecture -Neocognitron learning algorithm

TEXT BOOKS

1. Laurene Fausett - Fundamentals Of Neural Networks-Architectures, Algorithms and Applications - Pearson Education, 2004
2. James A.Freeman and David.M.Skapura - Neural Networks Algorithms, Applications and Programming Techniques - Pearson Education , 2002.

REFERENCES

1. Yegnanarayana B. - Artificial Neural Networks - Prentice - Hall, of India, 2001.
2. Simon Haykin - Neural Networks - A Comprehensive Foundation - Pearson Ed. – 2001.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
						End Semester Theory Exam	**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E19	BIG DATA AND ITS APPLICATIONS	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the nature of data & carry out intelligent data analytics	**a**				
2.	To know various modern data analysis tools & trends in data analysis		**e**			
3.	To gain knowledge in Hadoop Distributed File Systems and Applications of Big Data using Pig and Hive services			**I**		

UNIT I - INTRODUCTION TO BIG DATA **(9 Hours)**

Introduction to BigData Platform – Challenges of Conventional Systems - Intelligent data analysis Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

UNIT II - MINING DATA STREAMS **(9 Hours)**

Introduction To Streams Concepts – Stream Data Model and Architecture – Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

UNIT III – HADOOP **(9 Hours)**

History of Hadoop- The Hadoop Distributed File System – Components of HadoopAnalyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFSJava interfaces to HDFS- Basics-Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce Features

UNIT IV - HADOOP ENVIRONMENT **(9 Hours)**

Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance-Hadoop benchmarks- Hadoop in the cloud

UNIT V – FRAMEWORKS **(9 Hours)**

Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper –SQOOP

TEXT BOOKS

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007 (Unit 1).
2. Tom White " Hadoop: The Definitive Guide" Third Edition, O'reilly Media, 2012 (Units 3, 4 & 5).
3. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge Press, 2012. (Unit 2).

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
					End Semester Theory Exam		**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E20	INTERNET OF THINGS(IoT)	3	1	0	4	3

	INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:	Student Outcomes				
1	Demonstrate the design, communication model and enabling technologies for IoT.		c	e		
2	Explore the system management and domain for various applications of IoT.	a			i	
3	Categorize the various protocols that are used for developing IoT applications.		c	e		
4	Deploy an IoT application and connect to the cloud.		e			
5	Develop IoT application for real time scenario				k	

UNIT I - INTRODUCTION, DESIGN AND TECHNOLOGIES (9 Hours)

Introduction- Definition & Characteristics of IoT –Physical design of IoT-Things in IoT and IoT protocols logical Design of IoT- IoT Functional Blocks-IoT Communication Model and IoT Communication APIs - IoT Enabling Technologies - Wireless Sensor Networks -Cloud Computing- Big Data Analytics - Communication Protocols-Embedded Systems- IoT Levels & Deployment Templates.

UNIT II - DOMAIN, M2M AND SYSTEM MANAGEMENT (9 Hours)

Introduction- Home Automation – Cities - Industry- Health & Lifestyle- M2M-SDN and NFV for IoT - Software Defined Networking - Network Function Virtualization- IoT System Management- Need for IoT Systems Management -Simple Network Management Protocol -Limitations of SNMP - Network Operator-Requirements

UNIT III – PROTOCOLS (9 Hours)

Infrastructure - 6LowPAN- IPv6, Identification - EPC-uCode-URIs,Comms / Transport - Wifi, Bluetooth- LPWAN,Discovery- Physical Web- mDNS-DNS-SD,Data Protocols – MQTT-CoAP- AMQP- Websocket- Node,Device Management ,Semantic -JSON-LD.

UNIT IV- DEVELOPING INTERNET OF THINGS (9 Hours)

IoT Platforms Design Methodology - IoT System for Weather Monitoring – IoT System for Agriculture. Introduction to Cloud Storage Models & Communication APIs -WAMP - AutoBahn for IoT-Xively Cloud for IoT -Python Web Application Framework - Django Architecture -Starting Development with Django Toolkit-arduino-rasberry pi.

UNIT V- CLOUD SERVICES FOR IOT **(9 Hours)**

Designing a RESTful Web API -Amazon Web Services for IoT –EC2-Autoscaling-S3-RDSDynamoDB-Kinesis-SkyNet IoT Messaging Platform. Case studies – Environment- IoT systems for weather Reporting Bot- Air Pollution Monitoring System-Forest Fire Detection-IoT system for Energy-Smart grid-Renewable Energy Systems.

TEXT BOOKS

1. ArshdeepBahga and Vijay Madisetti, “Internet of Things - A Hands-on Approach”, Universities Press, 2015

REFERENCES

1. Dieter Uckelmann et.al, “Architecting the Internet of Things”, Springer, 2011.
2. CunoPfister, “Getting Started with the Internet of Things”, O’Reilly, 2011.
3. Adrian McEwen, Hakim Cassimally, “Designing the Internet of Things”, Wiley, 2014.
4. Honbo Zhou , “The Internet of Things in the Cloud: A Middleware Perspective “, CRC Press , 2012
5. Olivier Hersent, David Boswarthick, Omar Elloumi, “The Internet of Things – Key applications and Protocols”, Wiley, 2012.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
					End Semester Theory Exam		**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E21	WIRELESS APPLICATION PROTOCOLS	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To impart knowledge on Wireless Technology, WML Script functions, Wireless Application Protocol and its application areas	a	b			
2.	To enable the learner for aspiring careers in WAP related specialized software field			l		k

UNIT I - MOBILE INTERNET STANDARD (9 Hours)

Key services: Productivity Applications – Information and transactional services – Life Enhancing management – Characteristics of the mobile Internet – Current web Technologies – Origins of WAP – WAP architecture – Components of WAP standard – Network Infrastructure services – Design principle – other standards.

UNIT II - WML (9 Hours)

Introduction to WML – Document model – WML Authoring – URL Identify – Markup Basics – Basic content – Events , tasks & Bindings – Variables – Images, tables and links - controls – miscellaneous markup – Application security.

UNIT III - WML SCRIPT AND WTAI (9 Hours)

WML Script overview – Language Basics : Variables – operators – statements – Functions – Pragmas – standard libraries – WTAI overview – WML Script development – Binary WML script.

UNIT IV - USER INTERFACE DESIGN (9 Hours)

Web site design – structure usability methods – design guidelines – selected WML elements – navigation and user input – Appearance and presentation – standard HTTP Header – CC/PP document – End to End communication – profile composition.

UNIT V - PUSH MESSAGING AND WTA (9 Hours)

Push messaging: overview – Access protocol – Addressing – MIME media types – Proxy gateway – WTA: Architecture – Client Framework – WTA server and security – Design consideration – Application creation.

TEXT BOOK

1. Singhal SBridgman T, Suryanarayana L, MauneyD, Alvinen J, Bevis D, Chan J, Hild S (2011), WAP- The Wireless Application Protocol, Pearson publications, New Delhi

REFERENCE

1. Steve Mann & Scott Sbihli(2000), Wireless Application Protocols, Wiley Computer Publishing, New York.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Surprise Test**	**Attendance**	**Total**
	Marks	10	10	20	5	5	**50**
					End Semester Theory Exam		**50**
						Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
PCA18504	MINI PROJECT - ADVANCED	1	1	2	4	3

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the concepts of project definition, life cycle, and systems approach	**a**				
2.	Ability to learn and implement new concepts in multidisciplinary area		**b**			
3.	To understand, design and development of experimental procedures			**c**		
4.	Capable of understanding, analyzing and presenting technical documents	**a**				**j**

Course Nature : PROJECT						
Assessment Method (Max.Marks: 100)						
In Semester	**Assessment Tool**	**Review 1 (Abstract)**	**Review 2**	**Review 3**	**Thesis submission**	**Total**
	Marks	10	10	20	10	50
End Semester	**Assessment Tool**	**Report Evaluation**		**Presentation**	**Viva-Voce**	**Total**
	Marks	15		15	20	50
					Total	100

Course Code	Course Title	L	T	P	Total LTP	C
PCA18505	CORPORATE INTERNSHIP	-	-	-	-	2

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To gain experience from training and sharpen the business acumen of the students and open the doors of better employment prospects.	a		l		
2.	To groom students to the latest technology trends and industry requirements.	a				
3.	To helps the students in becoming employable by gaining industry specific skills in a specific technology.		b		k	
4.	To improve the 'personal attitude', 'Communication skills' , Leadership, teamwork, spirit and 'Work attitude of students to ascertain a better career			l	j	

Students can choose a company of their own interest for internship for a period of minimum four weeks to learn about the application of IT in real time environment. In the first week of July, all the students have to give a presentation about their observations made by them in internship. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

Course Nature : Internship						
Assessment Method (Max.Marks : 100)						
In Semester	**Assessment Tool**	**Review 1 (Abstract)**	**Review 2**	**Internship Report Submission**		**Total**
	Marks	10	20	20		50
End Semester	**Assessment Tools**	**Report Evaluation**		**Presentation**	**Viva-Voce**	**Total**
	Marks	20		15	15	50
					Total	**100**

SEMESTER - VI

Course Code	Course Title	L	T	P	Total LTP	C
PCA18601	PROJECT WORK	0	0	30	30	17

	INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:	Student Outcomes				
1.	To Undertake problem identification, formulation and solution and to Demonstrate a depth of knowledge in their selected topic/area	a	b			
2.	Analyze complex engineering problems and apply appropriate techniques /methodologies and design project using appropriate languages and other tools		b	e		
3.	Develop creative solutions to problems and conceive innovative approaches in developing and designing of the project.			d		
4.	Students will acquire the skills to communicate effectively and to present ideas clearly and coherently to specific audience in both the written and oral forms					j
5.	Demonstrate an ability to present and defend their project work to a panel of experts				k	

Course Nature : PROJECT						
Assessment Method (Max.Marks: 100)						
Internal Evaluation	**Assessment Tool**	**Review 1 (Abstract)**	**Review 2**	**Review 3**	**Thesis submission**	**Total**
	Marks	10	10	20	10	50
End Semester	**Assessment Tools**	**Report Evaluation**	**Presentation**		**Viva-Voce**	**Total**
	Marks	**20**	**15**		**15**	**50**
					Total	**100**

NON-MAJOR (OPEN) ELECTIVE COURSES OFFERED BY MCA DEPARTMENT

SEMESTER - III

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E81	Database Management Systems	0	1	1	2	2
PCA18E82	Web Technology	0	1	1	2	2

SEMESTER - IV

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E83	Programming In Java	0	1	1	2	2
PCA18E84	Content Management Systems	0	1	1	2	2

NON-MAJOR (OPEN) ELECTIVE COURSES

SEMESTER III

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E81	DATABASE MANAGEMENT SYSTEMS	0	1	1	2	2

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the concepts of database security and reliability	a				
2.	To enable the learner to become a Database application programmer			l	k	

UNIT I -INTRODUCTION AND CONCEPTUAL MODELING (6 Hours)

Purpose of database system - Advantages of DBMS over file processing System-View of data-Data abstraction-Data Independence - Data models - Database users - Database Administrator - DBMS system structure.

UNIT II - SQL (6 Hours)

Data Definition Language Statements – Data manipulation language statements – Transaction Control Language Statements - Data Control Language statements

UNIT III - FUNCTIONS (6 Hours)

scalar functions – Group functions – Set operators – Joins. PL/SQL: Basics – Trigger – Exception Handling.

UNIT IV - RELATIONAL MODEL AND NORMALIZATION (6 Hours)

Entity Relationship model basic concepts – Relational model - Decomposition – Functional Dependency – Normalization: 1NF - 2NF-3NF - BCNF- Multi value dependency and 4NF - 5NF.

UNIT V - DATA STORAGE (6 Hours)

Data Storage: Physical Storage media – Magnetic Disks – File and Record organization. Indexing: Primary index – Secondary indices. Hashing: Static hashing – Dynamic hashing.

TEXT BOOK

1. Abraham Silberschatz, Henry F. Korth, Sudarshan, S (2005), Database System concepts, Fourth Edition, McGraw Hill, New Delhi (For 1 to 5 units).

REFERENCES

1. Kevin Loney, Gerorge Koch (2002), Oraclei The Complete Reference, McGraw Hill, New Delhi.
2. Ragu Ramakrishnan (1998), Database management Systems, WCB / Mc Graw Hill, New Delhi.
3. Alexis Leon, Mathews Leon (1999), Database Management Systems, Vikas Publishing House Pvt. Ltd., New Delhi.
4. Date C.J (2003), An Introduction to database, version 2, Addison Wesley, New York.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	Assessment Tools	Observation Note Book	Output Result in time	Model Examination	Regularity and Discipline	Total
	Marks	10	10	20	10	50
End Semester	Assessment Tools	Record Note Book	Program Writing	Debugging	Result / Output	Total
	Marks	10	10	15	15	50
Total						100

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E82	WEB TECHNOLOGY	0	1	1	2	2

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To provide knowledge on Internet and its related concepts	a	c			
2.	To enrich the knowledge of scripting languages		a			
3.	To introduce advance HTML tags			l		
4.	To enable the learner to become a Web Designer				f	i

UNIT I - INTRODUCTION TO INTERNET AND WORLD WIDE WEB (6 Hours)

History of the Internet, Email concepts, Sending and Receiving files by E-mail, Intranet, Domain Name System, Web Browsers, Web Pages.

UNIT II - HYPERTEXT MARKUP LANGUAGE (6 Hours)

Basics of HTML, HTML Document display, Formatting Text, Link, Lists, Images, Tables, Forms, and Frames.

UNIT III - USAGE OF CASCADING STYLE SHEET (6 Hours)

Syntax of CSS, Style sheets types, Properties and Text attributes Padding, List properties, List Properties, Positioning, Margins, Colors, Properties and Table attributes

UNIT IV - FUNDAMENTALS OF JAVA SCRIPT (6 Hours)

Introduction to JavaScript, JavaScript Elements, Variables, Operators, Control Statements, Arrays, Functions.

UNIT V - SERVER-SIDE PROGRAMMING (6 Hours)

Client-Side Scripting and Server-Side Scripting, Servlets – Definition, Active Server Pages –Comparison of ASP over JSP.

TEXT BOOK

1. Deven N. Shah (2012), A Complete Guide to Internet and Web Programming, DreamTech Press, New Delhi

REFERENCES

1. Raj Kamal (2002), Internet and Web Technologies, TataMcGraw Hill, New Delhi.
2. Margaret Levine Young (2002), Internet the Complete Reference, TataMcGraw Hill, Second Edition, New Delhi.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	Assessment Tools	Observation Note Book	Output Result in time	Model Examination	Regularity and Discipline	Total
	Marks	10	10	20	10	50
End Semester	Assessment Tools	Record Note Book	Program Writing	Debugging	Result / Output	Total
	Marks	10	10	15	15	50
Total						100

SEMESTER IV

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E83	PROGRAMMING IN JAVA	0	1	1	2	2

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To understand the principles and concepts of object programming	a				
2.	To learn multithreading concepts		a			
3.	To enable the learner to pursue careers in Java solution Architect/Java Programmer		e	l		k

UNIT I - INTRODUCTION TO JAVA (6 Hours)

The Creation of Java- The Java Buzzwords- An Overview of Java- Data Types,- Variables-Arrays- Operators- Control Statements.

UNIT II - OBJECT ORIENTED CONCEPTS (6 Hours)

Introducing Classes- Overloading Methods- Introducing Access Control- Introducing final- Inheritance Basics- Method Overriding- Using Abstract Classes- The String Constructors- Special String Operations- String Comparison- String Buffer.

UNIT III - PACKAGES INTERFERENCE EXCEPTION HANDLING AND MULTITHREADING (6 Hours)

Packages – Interfaces - Exception Handling - The Java Thread Model - The Main Thread - Creating a Thread - Thread Priorities – Synchronization - Interthread Communication.

UNIT IV - APPLET, AWT AND EVENT HANDLING (6 Hours)

Applet Basics - Applet Architecture - An Applet Skeleton - Simple Applet Display Methods - Requesting Repainting - The HTML APPLET Tag - AWT Classes - Window Fundamentals - Working with Graphics - Event Handling - The Delegation Event Model - Event Classes - Event Listener Interfaces.

UNIT V - JAVA CONSOLE INPUT AND OUTPUT AND FILE (6 Hours)

Enumerations - I/O Basics - Reading Console Input - Writing Console Output - The PrintWriter Class - Reading and Writing Files - Collections Overview - The Java I/O

Classes and Interfaces – File - The Stream Classes - The Byte Streams - The Character Streams.

TEXT BOOK

1. Herbert Schildt (2007), Java: The Complete Reference, The McGraw-Hill, Seventh Edition, New Delhi (For 1 to 5 units).

REFERENCES

1. Horstmann S, Gray Cornell (2001), Core Java 2 Volume In, Fundamentals, Addition Wesley, New York.
2. Amold and Gosling, J. (2000), The Java Programming Language, Addition Wesley, 2nd Edition, New Delhi.
3. Art Gittleman (2002), Ultimate Java Programming, Wiley Publications, New York.
4. Herbert Schildt (2007), Java: The Complete Reference, the McGraw-Hill, Eight Edition, New Delhi.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	Assessment Tools	Observation Note Book	Output Result in time	Model Examination	Regularity and Discipline	Total
	Marks	10	10	20	10	50
End Semester	Assessment Tools	Record Note Book	Program Writing	Debugging	Result / Output	Total
	Marks	10	10	15	15	50
Total						100

Course Code	Course Title	L	T	P	Total LTP	C
PCA18E84	CONTENT MANAGEMENT SYSTEMS	0	1	1	2	2

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		Student Outcomes				
1.	To acquire basic knowledge about CM	a				
2.	To gather extensive knowledge in designing skills in CMS		d			
3.	To learn about various types of CMS		b			

UNIT I - CONTENT **(6 Hours)**

Defining Data, Information, and Content - Content Format - Content Structure - Content Functionality - What Is Content Really?

UNIT II - CONTENT MANAGEMENT **(6 Hours)**

Understanding Content Management - Major Parts of a CMS - The Branches of Content Management - The Roots of Content Management.

UNIT III - DOING CONTENT MANAGEMENT PROJECTS **(6 Hours)**

Doing CM Projects Simply - Staffing a CMS - Getting Ready for a CMS - Doing Requirements Gathering - Doing Logical Design - Selecting Hardware and Software - Implementing the System.

UNIT IV -DESIGNING A CMS **(6 Hours)**

Designing a CMS Simply - The Wheel of Content Management - Working with Metadata - Cataloguing - Designing Publications - Designing Content Types - Designing Content Access - Designing Workflow and Staffing Models.

UNIT V - BUILDING A CMS & CASE STUDY **(6 Hours)**

Building a CMS Simply - Building Collection Systems - Building Publishing Systems. Case Tools – Joomla.

TEXT BOOK

1. Bob Boiko – Content Management Bible, 2nd Edition - Wiley Publishing, Inc.- 2005

REFERENCES

1. Eric Tiggeler - Joomla! 3 Beginner's Guide - PACKT Publishing – 2013.
2. Sofia Hauschildt - CMS Made Simple 1.6 Beginners Guide – PACKT Publishing – 2010.
3. Ishai Sagi – SharePoint 2010 How To – Pearson Education – SAMS 2011.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	**Assessment Tools**	**Observation Note Book**	**Output Result in time**	**Model Examination**	**Regularity and Discipline**	**Total**
	Marks	10	10	20	10	50
End Semester	Assessment Tools	Record Note Book	Program Writing	Debugging	Result / Output	Total
	Marks	10	10	15	15	50
Total						100