GURU NANAK COLLEGE (AUTONOMOUS)

(Affiliated to University of Madras and Re-Accredited at 'A' Grade by NAAC)

Guru Nanak Salai, Velachery, Chennai – 600042.

Master of Computer Applications - MCA

(SEMESTER PATTERN WITH CHOICE BASED CREDIT SYSTEM)

Syllabus

(For the candidates admitted in the Academic year 2018-19 and thereafter)

VISION:

To impart essential knowledge in Information technology to the students, and enhance their ability to apply the knowledge gained and be successful in their professional and social life, contribute to their progress and thereby get involved in the upliftment of the society.

MISSION:

Equip the students with global technological skills in Information Technology that enhance them to be innovative, have lateral thinking, and good at problem-solving.

Increase Industry - Institute Interaction to enlighten the students about the required skills to be successful in their careers.

Train and develop the students as IT Professionals with Confidence, Competence, Commitment, and Character.

PROGRAMME OUTCOMES

PO 1: Identify, formulate and Analyse the current real world requirements of Clients and handle the constraints and challenges in Software Development and Construct the Software efficiently.

PO 2: Implement   knowledge gained in Information Technology to find and propose the solution for Novel Real-world problems that dynamically change in an efficient manner.

PO 3: Design appropriate architecture and build Applications that meet the requirements of the Clients as expected by them.

PO4: Employ apt tools and Integrated Development Environments efficiently and accordingly learn and apply new techniques and tools for the software development.

PO 5: Implement ethical principles and commit to professional ethics and responsibilities and norms of Software Development practices and work effectively as an individual, at different levels in diverse teams.

PROGRAMME SPECIFIC OUTCOMES

PSO 1 : Identify, Explain and Deploy current technologies in the IT industry. Employ the requisite knowledge gained in Networking, System Software, Application Software and Database Management Systems, and be suitable for the global Industrial need.

PSO2 : Investigate the dynamically changing real world scenario and requirements , learn continuously and be Persistent in the face of challenges and succeed in career .

COURSE STRUCTURE
MCA (MASTER OF COMPUTER APPLICATIONS)
2018-21 Batch onwards

Semester	Part	Course	Subject Code	Title	Credits	Hours	Internal	External	Total
Semester - I	III	Core Paper-1	17PMCAC01	Problem Solving and Programming in C	4	5	50	50	100
	III	Core Paper-2	**17PMCAC02**	Digital Computer Fundamentals	4	5	50	50	100
	III	Core Paper-3	**17PMCAC03**	Open Source Technologies	4	5	50	50	100
	III	Elective-1	**17PMCAC04P**	Practical - I : Programming in C	2	4	50	50	100
	III	Core Paper-4	**17PMCAC05P**	Practical - II : Open Source Technology Lab	2	4	50	50	100
	III	Core Paper-5	**17PMCAE01**	Mathematics and Statistical Methods for Computer Science	5	6	50	50	100
	IV	Soft Skill-1	**16PGSLS01**	Language and Communication Skill	2	1	50	50	100
				Total Credits : 23 / Total Hours per week : 30					
Semester - II	III	Core-6	**16PMCAC06**	C++ and Data Structures	4	5	50	50	100
	III	Core-7	**16PMCAC07**	Advanced Internet Technologies	4	5	50	50	100
	III	Core-8	**16PMCAC08**	Operating Systems	4	5	50	50	100
	III	Core-9	**16PMCAC09P**	Practical - III : C++ and Data Structures Lab	2	4	50	50	100
	III	Core-10	**16PMCAC10P**	Practical - IV : Advanced Internet Technologies Lab	2	4	50	50	100
	III	Extra-Disciplinary	**17PMCAE02**	Accounting and Financial Management	4	6	50	50	100
	IV	Soft Skill-2	**16PGSLS02**	Presentation Skill	2	1	50	50	100
				Total Credits : 22 / Total Hours per week : 30					

Semester - III	III	Core-11	**16PMCAC11**	Java Programming	4	4	50	50	100
	III	Core-12	**16PMCAC12**	Computer Communication and Networking	3	4	50	50	100
	III	Core-13	**16PMCAC13**	Web Development using PHP and MySQL	3	4	50	50	100
	III	Core-14	**16PMCAC14**	Software Engineering and Project Management	3	4	50	50	100
	III	Core-15	**16PMCAC15**	Computer Graphics	3	4	50	50	100
	III	Core-16	**16PMCAC16P**	Practical - V : Programming In Java Lab	2	4	50	50	100
	III	Core-17	**16PMCAC17P**	Practical - VI : PHP and MySQL Lab	2	4	50	50	100
	IV	Soft Skill-3	**16PGSLS03**	Managerial Skill	2	2	50	50	100

Total Credits : 24 / Total Hours per week : 30

Semester - IV	III	Core – 18	**16PMCAC18**	Advanced Java Programming (J2EE)	4	4	50	50	100
	III	Core – 19	**16PMCAC20**	Python Programming	4	5	50	50	100
	III	Core – 20	**17PMCAC22**	Advanced Database Management System	4	4	50	50	100
	III	Core – 21	**16PMCAC23**	Software Testing and Quality Assurance	4	4	50	50	100
	III	Elective -1	**16PMCAE03**	Cloud computing	3	4	50	50	100
	III	Core – 22	**17PMCAC19P**	Practical - VII : J2EE Lab	2	4	50	50	100
	III	Core – 23	**16PMCAC21P**	Practical - VIII : Python Programming Lab	2	4	50	50	100
	IV	Soft Skill-4	**16PGSLS04**	Quantitative Aptitude	2	1	50	50	100

Total Credits : 25 / Total Hours per week : 30

Semester-V	III	Core – 24	**16PMCAC24**	.NET Technologies	4	5	50	50	100
	III	Elective-2	**16PMCAE04**	Elective - II	4	5	50	50	100
	III	Elective-3	**16PMCAE05**	Elective - III	3	5	50	50	100
	III	Elective-4	**16PMCAE06**	Elective - IV	3	5	50	50	100
	III	Core – 25	**16PMCAC25P**	Practical - IX : .NET Lab	2	4	50	50	100
	III	Core - 26	**16PMCAC26P**	Practical - X : Mini Project	2	5	50	50	100
	IV	Soft Skill-5	**16PGSLS06**	Group Discussion	2	1	50	50	100
	III	Internship	**16PINT401**	During Summer Vacation of IV Sem 6 to 8 Weeks	3	-	-	100	100

Total Credits : 23 / Total Hours per week : 30

Semester-VI	IV	Soft Skill-6	**16PGSLS07**	Content Writing	2	5	50	50	100
	III	Project	**16PMCAC27**	Project and Viva-Voce	18	25	20	60+20	100

Total Credits : 20 / Total Hours per week : 30

Grand Total Credits : 135 / Total Hours per week : 180

ELECTIVES

Course	Subject Code	Title
Elective - I	16PMCAE03	Cloud Computing
	16PMCAE16	Mobile Computing
	16PMCAE17	Parallel Computing
Elective - II	16PMCAE07	Data Mining and Warehousing
	16PMCAE04	Big Data Analytics
	16PMCAE08	Wireless Communication
Elective - III	16PMCAE09	Latest Technology - I
	16PMCAE10	MATLAB Programming
	16PMCAE05	Object Oriented Analysis and Design
Elective - IV	16PMCAE11	Design and Analysis of Algorithm
	16PMCAE12	Latest Technology - II
	16PMCAE06	Information Security
	16PMCAE15	Human Resource Management

CORE – I

PROBLEM SOLVING AND PROGRMMING IN C

SUBJECT CODE : 17PMCAC01	THEORY	MARKS : 100
SEMESTER : I	CREDITS : 4	Total No of Hours : 75

COURSE OBJECTIVES:
- To introduce basic programming concepts and fundamentals of C programming.
- At the end of this course students would be comfortable in C programming.

UNIT-I : **(15 Hours)**
Introduction – The Problem Solving aspect- Top down design- Algorithm- Flow Chart-System software, application software, compiler, interpreter, Loader, Linker, utility program, programming languages.

UNIT-II : **(15 Hours)**
Basics of 'C', Input / Output & Control Statements, C character set, Identifiers– Keywords - Variables – Constants – I/O Statements, Operators - operators hierarchy & associativity, Data input/output, Type conversion.

UNIT-III : **(15 Hours)**
Control statements, Arrays and Functions Sequencing, Selection: if and switch statement; Repetition: For, While, and Do-While loop; Break, Continue, Goto. Array-One Dimension and Multidimensional Array - Structure and Union.

UNIT-IV : **(15 Hours)**
User Defined and Built in Functions : Definition, prototypes, passing parameters, recursion, Passing Array to function- passing Structure to function. String - Declaration -Initialization and String Manipulation Functions.

UNIT-V : **(15 Hours)**
Pointers - pointer operators - arrays and pointers - Dynamic memory allocation - File Management in C - Files and Streams - File handling functions - Command Line Arguments.

PRESCRIBED BOOKS :
1. E. Balaguruswami, "Programming in ANSI C", Tata Mcgraw Hill, 2012.
2. D.M.Dhamdhere,1999,Systems Programming and Operating Systems, Second Revised Edition, Tata McGraw –Hill, New Delhi.

REFERENCE BOOKS :
1. Brian W. Kernighan, Dennis M. Ritchie, "The C Programming Language", 2nd Ed., Prentice Hall of India.
2. Rema Thareja, "Programming in C", Oxford University Press.
3. Yashwant Kanetker, "Let us C", BPB Publications, 2008.

QUESTION PAPER PATTERN

Section	Question Component	Numbers	Marks	Total
Section - A	**Definition / Principle** Answer ALL questions (Each in 50 words)	1-10	2	20
Section - B	**Short Answer** Answer any 5 out of 7 questions (Each in 300 words)	11-17	7	35
Section - C	**Essay** Answer any 3 out of 5 questions (Each in 1200 words)	18-22	15	45

DISTRIBUTION OF QUESTIONS

Sections	Units	No. of Questions	
		Theory	**Problems**
Section A	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

CORE– II

DIGITAL COMPUTER FUNDAMENTALS

SUBJECT CODE : 17PMCAC02	THEORY	MARKS : 100
SEMESTER : I	CREDITS : 4	Total No of Hours : 75

COURSE OBJECTIVES:
- Digital electronics enables the students to learn about the number system, different gates and flip flops.
- Computer organization helps the students to learn different architecture and Processors that are used in the computers.

UNIT-I: (15 Hours)

Number System – Converting numbers from one base to another – Complements – Binary Codes – Integrated Circuits – Boolean algebra – Properties of Boolean algebra – Boolean functions – Canonical and Standard forms – Logical Operations – Logic gates – Karnaugh Map up to 4 variables – Don't Care Condition – Sum of Products and Products of Sum simplification – Tabulation Method.

UNIT-II : (15 Hours)

Adder – Subtractor – Code Converter – Analyzing a combinational Circuit – Multilevel NAND and NOR circuits – Properties of XOR and equivalence functions – Binary Parallel Adder – Decimal Adder – Magnitude Comparator – Decoders – Multiplexers – ROM – PLA.

UNIT-III : (15 Hours)

Flip Flops – Triggering of flip-flops – Analyzing a sequential circuit – State reduction – excitation tables – Design of sequential circuits – Counters – Design with state equation – Registers – Shift Registers – Ripple and synchronous Counters.

UNIT-IV: (15 Hours)

Memory Unit – Processor Organization - Bus Organization – Scratch Pad memory – ALU – Design of ALU – Status Register – Effects of Output carry – Design of Shifter – Processor Unit – Microprogramming – Design of specific Arithmetic Circuits

UNIT-V: (15 Hours)

Accumulator – Design of Accumulator – Computer Design – System of Configuration – Instruction and Data formats – Instruction sets – Timing and Control – Execution of Instruction – Design of Computer – Hardwired control – PLA Control and Microprogram control.

Recommended Texts:
1. M. Morris Mano, 2011, Digital Logic and Computer Design, Thirteenth Impression, Pearson Education, Delhi

Reference Books:
1. M. M. Mano and C.R.Kime, 2001, Logic and Computer Design Fundamentals, 2nd Edition, Pearson Education, Delhi.
2. Givone, 2002, Digital Principles Design, Tata McGraw Hill, New Delhi.
3. C.H.Roth,Jr,2005,Fundamentals of Logic Design, 5th Edition, Thomson Learning.

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	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

CORE - III
OPEN SOURCE TECHNOLOGIES

SUBJECT CODE : 17PMCAC03	THEORY	MARKS : 100
SEMESTER : I	CREDITS : 4	Total No of Hours : 75

COURSE OBJECTIVES:
- To understand basic idea of Open source licensing aspects and basic Linux commands.
- After completion students are able to work in the open source technologies – Linux Platform.

UNIT-I: (15 Hours)
Introduction to Unix – Unix Components – Commands in Unix – Command Substitution – File and File Organization : Unix files – categories of files- file system – directory commands File related commands.

UNIT-II: (15 Hours)
File Attributes and Permission – Standard I/O- Redirection , pipes and filters – Sample database file – Handling Columns and Fields –The Sort and unique command-Vi editor.

UNIT-III: (15 Hours)
Shell Programming : Shell variables – export commands – positional parameters – branching control structures – loop control structures – real arithmetic initial programs – debugging scripts.

UNIT-IV: (15 Hours)
Regular Expressions –The Grep family – The stream edition(sed) – The process- Parent and child process- types of process – foreground and background process- internal and external commands.

UNIT-V: (15 Hours)
Structure of an AWK script- variables, Records, Field and special variables- patterns , operators-awk control structures.

PRESCRIBED BOOKS :
1. M.G.Venkateshmurthy,"Introduction to Unix and shell programming ", Pearson Education India, New Delhi , 2009.

REFERENCE BOOKS :
1. R. Stones, N. Mattew, 2011, Beginning Linux Programming, 4th Edition, Wiley India Pvt. Ltd.-New Delhi.
2. Andrew M. St. Laurent, "Understanding Open Source and Free Software Licensing Guide to Navigating Licensing Issues in Existing & New Software", O'Reilly Media

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	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
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	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

CORE - IV

PRACTICAL - I : PROGRAMMING IN C

SUBJECT CODE 17PMCAC04P	PRACTICAL	MARKS : 100
SEMESTER : I	CREDITS : 2	Total No of Hours : 60

COURSE OBJECTIVES:
- Students are given practical training in C programming.
- After completion students are able to write C program for application under the windows environment.

EXERCISES:
1. Determining a given number is prime or not.
2. Determine a given Number is Armstrong Number or Not.
3. Pascal's triangle
4. Quadratic Equation.
5. Program for $SIN(X) = X-X3/3!+X5/5!-X7/7!+......XN/N!$
6. Program for $exp(x) = 1+x+x.x/2!+x.x.x/3!......$
7. Program for nPr and nCr.
8. C program to delete the specified integer from the Array.
9. Matrix Multiplication
10. Transpose of a Matrix
11. Program to count No. of Vowels, Consonants, Words and Spaces in a String
12. String Manipulation
13. File Processing
14. Write a program to accept 10 numbers and display its sum using pointer
15. Program for Payroll Processing using Structure
16. Program to draw a circle using C graphics
17. Program to draw a Line using C Graphics
18. Write a C program to draw a Triangle
19. Program for printing Text in Graphics Using Outtextxy Function.
20. Program to change Background and Foreground Color using C Graphics.

CORE - V

PRACTICAL - II : OPEN SOURCE TECHNOLOGY LAB

SUBJECT CODE :17PMCAC05P	PRACTICAL	MARKS : 100
SEMESTER : I	CREDITS : 2	Total No of Hours : 60

COURSE OBJECTIVES:
- To understand the basic idea of open source technologies and basic UNIX commands.
- After completion students are able to work in UNIX platform

1. Use an if/then/else constructs to find the smallest of given three numbers.
2. Generate Fibonacci series for n numbers.
3. Find the factorial of n numbers.
4. Check whether a given number is Armstrong or not.
5. Accept any number of arguments and print them in reverse order.
6. Write a script that does the following :
   a) Display the name of the script being executed.
   b) Display the first, third and fifth arguments given to the script.
   c) Display the total number of arguments passed to the script.
   d) Print the number of arguments.

7. Design a menu driven program for rename, remove and copy commands.
8. To check file permission (read/write/execute) and file type(File/Directory)
9. Write a program to get two user inputs (File name and Column number). List the nth column from a file.
10. Remove duplicate words from a List or File.
11. To Process electricity billing using awk command.

NON MAJOR ELECTIVE

MATHEMATICS AND STATISTICAL METHODS FOR COMPUTER SCIENCE

SUBJECT CODE : 17PMCAE01	THEORY	MARKS : 100
SEMESTER : I	CREDITS : 5	Total No of Hours : 90

COURSE OBJECTIVES:
- To understand the basic mathematical concepts and Numerical methods for computing related applications. Also it introduces the basic Statistical Methods for computing related applications.
- After completion students are able to work in complex mathematical and statistical real time problems.

UNIT-I: (18 Hours)
Mathematical Logic: Statement Calculus – Connectives – normal forms – Predicate Calculus – Theory of inference for statement Calculus – Predicate Calculus including theory of inference.

UNIT-II: (18 Hours)
Set Theory: Basic concepts of set theory – relations and ordering – functions –recursion.
Algebraic Structures: Semigroups – monoids– groups and subgroups.

UNIT-III: (18 Hours)
Probability : Basic concepts - Baye's formula - Random Variables (Discrete and Continuous) and Distribution functions - Expectation and variance - moment generation function.
Distributions: Conditional and Marginal Distributions - Binomial, Poisson and Normal Distribution.

UNIT-IV: (18 Hours)
Correlation and Regression: Correlation Coefficient- Rank Correlation-Linear Regression. Sampling : Basic Concepts - Methods of sampling - Sampling Distribution and standard error - Tests of Hypotheses - Critical Region - two types of Errors.

UNIT-V: (18 Hours)
Level of significance - Large sample tests for mean and proportion - Exact tests based on Normal, t, F and Chi-square distributions.

PRESCRIBED BOOKS :
1. J.P. Tremblay and R. Manohar, 2007, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw-Hill, New Delhi
2. Mood, A.M., Graybill, F. and Boes, 1974, "Introduction to Mathematical Statistics", Tata McGraw-Hill.
3. Trivedi, K.S, 1994, Probability and Statistics with Reliability, Queuing and Computer Science Applications. Prentice Hall India, New Delhi.
4. P.R.Vittal and V.Malini, Statistical and Numerical Methods, Margham Publications, Chennai.

REFERENCE BOOKS :
1. J. Truss, 1999, Discrete Mathematics for Computer Scientists, 2nd Edn., Addison Wesley, Boston.
2. Kolman, Busby and Ross, 2005, Discrete mathematical structures, 5th edition, PHI, NewDelhi.

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	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
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	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
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	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

SOFT SKILL – 1

LANGUAGE AND COMMUNICATION SKILL

SUBJECT CODE : 16PGSLS01	SOFT SKILL	MARKS : 100
SEMESTER : I	CREDITS : 2	Total No of Hours : 15

COURSE OBJECTIVES:
- Students are trained in basic communication skills and this helps them to have command over the language.
- After these training students are able to communicate well and this will help them to grow in corporate.

UNIT-I :   **(3 Hours)**
Twinning Functions of Listening and Speaking.

UNIT-II: **(3 Hours)**
Twinning Functions of Reading and Writing.

UNIT-III :   **(3 Hours)**
Individual Communication.

UNIT-IV: **(3 Hours)**
Intermediary Communication.

UNIT-V: **(3 Hours)**
Social Communication.

PRESCRIBED BOOKS :
1. Windshuttle, Keith and Elizabeth Elliot, 1999, Writing, Researching and Communicating: Communication Skills for the Information Age, 3rd Reprint. Tata McGraw-Hill Australia.
2. Dignen, Flinders and Sweeney, English 365, Cambridge University Press.
3. Goleman, Daniel, 1998, Working with Emotional intelligence, Bantam Books, New York.

REFERENCE BOOKS :
1. Jones, Leo and Richard Alexander, 2003, New International Business English. Cambridge University Press.

WEBSITES :
1. www.tatamcgrawhill.com/sites/0070600988

CORE - VI
C++ AND DATA STRUCTURES

SUBJECT CODE : 16PMCAC06	THEORY	MARKS : 100
SEMESTER : II	CREDITS : 4	Total No of Hours : 75

COURSE OBJECTIVES:
- To understand C++ programming concepts and data structures for computing related applications.
- At the end of this training student will be able to write C++ programs using data structures concepts.

UNIT-I : **(15 Hours)**

Introduction to OOP – Overview of C++ - Classes – Structures – Union –Arrays-Functions-function overloading –Friend Functions- – Inline functions- Scope Resolution Operator- Dynamic memory Allocation- Static Members.

UNIT-II : **(15 Hours)**

Class- Objects- Constructor - Overloading Constructors –Destructor – Operator Overloading – Member Operator Function- Friend Operator Function, Exception Handling.

UNIT-III : **(15 Hours)**

Inheritance – Types of Inheritance – Protected members – Virtual base Class – Polymorphism – Virtual functions – Pure virtual functions, Streams- File I/O.

UNIT-IV : **(15 Hours)**

Abstract data types - asymptotic notations – complexity analysis – Arrays- operations on arrays- Linked lists: Singly linked list- circular linked lists - doubly linked lists – stacks -queues - circular queues – Evaluation of expressions.

UNIT-V : **(15 Hours)**

Trees – Binary Trees – Binary Tree Traversals – Binary Tree Representations – Binary Search Trees- Representation of Graphs – Graph Implementation – Graph Traversals- Minimum Cost Spanning Trees.

PRESCRIBED BOOKS :
1. H. Schildt, 2003, C++ The Complete Reference, 4th Edition, Tata McGraw-Hill, New Delhi
2. E.Horowitz, S. Sahni and Mehta, 1999, Fundamentals of Data Structures in C++, Galgotia, New Delhi

REFERENCE BOOKS :
1. Johnston, 2002, C++ programming today, PHI, New Delhi.
2. A. N Kanthane, 2005, Object Oriented Programming with ANSI & Turbo C++, Pearson Education, New Delhi.
3. G. L. Heileman, 1996, Data Structures, Algorithms and Object Oriented Programming, Tata McGraw-Hill, New Delhi.
4. A.V.Aho, J.D. Ullman, J.E. Hopcraft, 1983, Data Structures and Algorithms, Addison Wesley, Boston.

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	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

CORE - VII
ADVANCED INTERNET TECHNOLOGIES

SUBJECT CODE : 16PMCAC07	THEORY	MARKS : 100
SEMESTER : II	CREDITS : 4	No. OF HOURS PER WEEK : 5

COURSE OBJECTIVES:
- Students are trained to develop web page, manage them and maintenance. They learn the concepts of developing advanced HTML pages with the help of frames, scripting languages, and evolving technologies.
- At the end of the session students are capable of working in web Technologies like HTML, CSS.

UNIT-I : **(15 Hours)**
Getting started with HTML5 and CSS3 - An overview of HTML and CSS on Web, Meeting the structure and component of HTML, Creating and viewing a webpage.HTML document and Structure – using Text and List – Tip Top tables in HTML, working with forms in HTML, getting with text in HTML, Working with IMAGES, managing media in HTML.

UNIT-II: **(15 Hours)**
Advantages of Style sheet, CSS structure and Syntax, using different kinds of style sheets, managing layout and positioning, building with boxes, buttons, borders and background, using colors – web typography – CSS3 text effects – animating and multimedia with CSS.

UNIT-III : **(15 Hours)**
Java Script overview – variables and operators in java script-enabling java script in browsers-Loops – If..Else, Switch..Case, while... Loop, for... loop , break and continue statements, Functions in java script, different Event type, Cookies , page redirection , Dialog boxes, objects, number, Boolean, string, array, Date, math etc.

UNIT-IV : **(15 Hours)**
VB Script overview – syntax, enabling browsers – variables, constants, operators-Loops, for loop , for.. each loop, while.. wend loop, do..while, do..until- event – cookies – Numbers-string-arrays – date – procedures- dialog boxes- object oriented- Reg expression- error handling.

UNIT-V : **(15 Hours)**
 Internet basics – internet, intranet overview , internet reference models – Domain name systems - internet services – connectivity – Email protocols – Email working, operations – Email Etiquettes – security – Email providers – website type – website development – phishing.

PRESCRIBED BOOKS :
1. Beginning HTML5 and CSS3, Ed Tittel and Chris Minnick-Wiley Publications.
2. Ivan Bayross " Web Enabled Commercial Application Development using HTML, DHTML, Javascript, Perl CGI.

REFERENCE BOOKS :
1. Jon Duckett "Beginning HTML, XHTML, CSS and Javascript", Wrox Publication.
2. Richard York "Beginning Javascript and CSS Development", Wrox Publication.

QUESTION PAPER PATTERN

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	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
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	Unit - 4	1	
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	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

CORE – VIII

OPERATING SYSTEMS

SUBJECT CODE : 16PMCAC08	THEORY	MARKS : 100
SEMESTER : II	CREDITS : 4	Total No of Hours : 75

COURSE OBJECTIVES:

- Operating systems enables the students to study the basic concepts of memory management, storage management and the file systems.
- At the end of session students will have depth of knowledge in core concepts of operating systems.

UNIT-I: **(15 Hours)**

Introduction – Multiprogramming - Time sharing - Distributed system - Real-Time systems - I/O structure - Dual-mode operation - Hardware protection _ General system architecture - Operating system services - System calls - System programs - System design and implementation. Process Management: Process concept - Concurrent process - Scheduling concepts - CPU scheduling - Scheduling algorithms, Multiple processor Scheduling.

UNIT-II : **(15 Hours)**

Process Management: Process Synchronization - Critical section - Synchronization hardware - Semaphores, classical problem of synchronization, Interprocess communication. Deadlocks: Characterization, Prevention, Avoidance, and Detection.

UNIT-III : **(15 Hours)**

Storage management - Swapping, single and multiple partition allocation - paging - segmentation - paged segmentation, virtual memory - demand paging - page replacement and algorithms, thrashing. Secondary storage management - disk structure - free space management - allocation methods – disk scheduling - performance and reliability improvements - storage hierarchy.

UNIT-IV : **(15 Hours)**

Files and protection - file system organization - file operations - access methods - consistency semantics - directory structure organization - file protection - implementation issues - security – encryption.

UNIT-V : **(15 Hours)**

Protection and security – goals of protection – domain of protection – Access matrix – security problems – user authentication – program, system threads – intrusion detection – cryptography.

PRESCRIBED BOOKS :

1. A. Silberschatz P.B. Galvin, Gange, 2002, Operating System Concepts, 6th Edn., Addison-Wesley Publishing Co., Boston.

REFERENCE BOOKS :

1. H.M. Deitel, 1990, An Introduction to Operating Systems, Addison Wesley Publishing Co., Boston
2. D.M. Dhamdhare , 2002, Operating System, Tata McGraw-Hill, New Delhi.

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	Unit - 5	1	
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	Unit - 4	1	
	Unit - 5	1	

PRACTICAL - III : C++ AND DATA STRUCTURES LAB

SUBJECT CODE :16PMCAC09P	PRACTICAL	MARKS : 100
SEMESTER : II	CREDITS : 2	Total No of Hours : 60

COURSE OBJECTIVES:
- This practical session helps the students to learn data structures concepts using C++.
- At the end of this session students are able to write programs in C++ code for data structures.

C++

1. Implementation of Class and Object
2. Implementation of function overloading.
3. Implementation of Constructor overloading.
4. Add two private data members using friend function.
5. Implementation of Inheritance.
6. Program for File Operations.

Data Structures

7. Implementation of Arrays(Single and Multidimensional)
8. Implementation of Stack
9. Implementation of Queue
10. Evaluation of Expressions- ITP (Infix to Prefix).
11. Implementation of Singly Linked List
12. Binary Tree Traversals using recursion.

CORE -X

PRACTICAL - IV : ADVANCED INTERNET TECHNOLOGIES LAB

SUBJECT CODE : 16PMCAC10P	PRACTICAL	MARKS : 100
SEMESTER : II	CREDITS : 2	Total No of Hours : 60

COURSE OBJECTIVES:
- This practical session aims to impart the students with concepts of internet programming like HTML5, CSS3 and different aspects of web technology.
- At the end of this practical session students are able to develop dynamic web applications.

1. Create a web page using html5 to create forms to accept values from the users.
2. Generate a dynamic web page using css3 to have coloring features.
3. Write a HTML code that enables CSS design to create blocks and inline function.
4. Write a program using java script for sorting numbers and strings.
5. Generate a java script to calculate the hit ratio of a web page.
6. Generate a java script to validate an Email ID
7. Write a VB script to display a digital clock.
8. Write a program using java script to demonstrate the mouse events.
9. Write a program using java script to design an employee database.
10. Generate a program using css3 for 2D and 3D transformation.

EXTRA DISCIPLINARY

ACCOUNTING AND FINANCIAL MANAGEMENT

SUBJECT CODE : 17PMCAE02	THEORY	MARKS : 100
SEMESTER : II	CREDITS : 4	Total No of Hours : 90

COURSE OBJECTIVES:
- The objective of this paper is to teach them basic concepts of accounting and financial management.
- After completion, student should be able work and analyze financial statements of a business process.

UNIT-I : **(18 Hours)**
Principles of Accounting: Principles of double entry -Assets and Liabilities - Accounting records and systems - Trial balance and preparation of financial statements - Trading, Manufacturing, Profit and Loss accounts, Balance Sheet including adjustments (Simple Problems).

UNIT-II: **(18 Hours)**
Analysis and Interpreting Accounts and Financial Statements: Ratio analysis - Use of ratios in interpreting the final accounts (trading accounts , profit and loss a/c and balance sheet) - final accounts to ratios as well as ratios to final accounts (Simple Problems).

UNIT-III : **(18 Hours)**
Break-even analysis and Marginal Costing: Meaning of variable cost and fixed cost - Cost-Volume-Profit analysis – calculation of breakeven point, Profit Volume Ratio , Margin of Safety (Simple Problems).

UNIT-IV: **(18 Hours)**
Budget/Forecasting: preparation of and Characteristics of functional budgets, Production, sales, Purchases, cash and flexible budgets.

UNIT-V : **(18 Hours)**
Project Appraisal: Method of capital investment decision making: Payback method , ARR method - Discounted cash flows - Net Present values – Profitability Index - Internal rate of return.

PRESCRIBED BOOKS :
1. Shukla M.C. & T.S. Grewal, 1991, Advanced Accounts, S.Chand & Co. New Delhi.
2. Gupta R.L. & M. Radhaswamy, 1991, Advanced Accounts Vol. II, Sultan Chand & Sons, New Delhi.
3. Man Mohan & S.N. Goyal, 1987, Principles of Management Accounting, Arya Sahithya Bhawan.
4. Kuchhal, S.C., 1980, Financial Management, Chaitanya, Allahabad.
5. Hingorani, N.L. & Ramanthan, A.R, 1992, Management Accounting, 5th edition, Sultan Chand, New Delhi.
6. "T.S Reddy & Y.H Reddy" ,Financial Management Accounting, MARGHAM Publications.

REFERENCE BOOKS :
1. S.K. Gupta & R.K. Sharma- Practical Problems in Management Accounting (Recent edition)
2. Khan and Jain "Financial Management" Tata McGraw Hill (Recent Edition).

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	Unit - 5	1	

SOFT SKILL - II

PRESENTATION SKILL

SUBJECT CODE : 16PGSLS02	SOFT SKILL	MARKS : 100
SEMESTER : II	CREDITS : 2	Total No of Hours : 15

COURSE OBJECTIVES:
- Students are inculcated the significance of Soft-skills both for personal and professional Success.
- After completion students will have positive attitude and they become confident in effective verbal and non-verbal Communication.
-

UNIT-I :   **(3 Hours)**
Soft-Skills Introduction - What are Soft Skills? Significance of Soft-Skills – Soft-Skills Vs. Hard Skills – Selling Soft- Skills – Components of Soft Skills – Identifying and Exhibiting Soft-Skills – Soft- Skills Orientation – Top 60 Soft-Skills – Practicing Soft-Skills.

UNIT-II :   **(3 Hours)**
Developing Positive Attitude - Introduction – Meaning – Features of Attitudes – Attitudes and Behavior – Formation of Attitudes – Change of Attitudes – Ways of changing Attitudes – Attitudes in Workplace- The power of positive Attitude- Developing Positive Attitude – Obstacles in developing Positive Attitude.

UNIT-III :   **(3 Hours)**
Active Listening and Effective Public Speaking - Differences between Listening and Hearing – Critical Listening – Barriers to Active Listening – Improving Listening – Ethical Listening – Effective Public Speaking – Selecting the topic for public speaking – Understanding the audience – Evidence and Research – Organizing the main ideas – Language and Style choice in the speech – Delivering the speech.

UNIT-IV: **(3 Hours)**
Persuasive Writing - Introduction – Importance of writing – Creative Writing – Writing Tips – Writing Powerful   email communication – Using appropriate salutations – Making subject matter Significant –Anticipating, Empathizing, and understanding others while sending emails – Do and Don'ts in email communication.

UNIT-V: **(3 Hours)**
Effective Body Language - Introduction – Voluntary and Involuntary Body Language – Forms of Body Language, Parts of Body Language – Forms of Body Language – Uses of Body Language in Building the Interpersonal relationship – Types of Body Language – Gender Differences – Interpreting Body Language.

PRESCRIBED BOOKS :
1. Dr. K. Alex, "Soft Skills Know yourself & Know the World", Edition 2009, S.Chand Publications.

REFERENCE BOOKS :
1. Barun K. Mitra, "Personality Development and Soft Skills", Sixth Impression, 2012, Oxford university Press.

CORE - XI

JAVA PROGRAMMING

SUBJECT CODE : 16PMCAC11	THEORY	MARKS : 100
SEMESTER : III	CREDITS : 4	Total No of Hours : 75

COURSE OBJECTIVES:
- To understand basic aspects of Java technologies including designing the forms using java swings and the connectivity that needs to be established with the data base.
- At the end of this session students are able to write programs in Java.

UNIT-I :   **(15 Hours)**
Introduction to Java - Features of Java - Object Oriented Concepts - Lexical Issues - Data Types - Variables - Arrays - Operators - Control Statements. Classes - Objects - Constructors - Overloading method - Access Control - Static and fixed methods – Nested Classes-Inner Classes - String Class.

UNIT-II: **(15 Hours)**
Inheritance -Overriding methods - Using super-Abstract class- Packages - Access Protection - Importing Packages - Interfaces - Exception Handling - Throw and Throws – Multithreaded Programming-Thread Model- Thread Priorities- Synchronization - Messaging -Runnable Interface - Inter thread Communication - Deadlock - Suspending, Resuming and stopping threads using Multithreading.

UNIT-III :   **(15 Hours)**
I/O Streams – Byte and character streams – Reading Console Input - Writing Console Output- String Handling- String Buffer- Simple Type Wrappers- Java Utilities.

UNIT-IV: **(15 Hours)**
Applets – Event Handling – Working with Windows, Graphics and Text using AWT Classes – AWT Controls – Layout Managers – Menus – User Interface Components with Swings: Controls, Menus, Dialog Boxes

UNIT-V: **(15 Hours)**
JDBC Overview – JDBC implementation – Connection class – Statements - Catching Database Results, handling database Queries. Networks basics -InetAddress class – URL class.

PRESCRIBED BOOKS :
1. Patrick Naughton and Herbertz Schidt, "Java –2 The Complete Reference", Fifth edition
2. Head First Java –Bert bates, Kathy sierra, Publishers: O'Reilly Media

REFERENCE BOOKS :
1. Ivor Horton "Beginning Java", Wrox publication.
2. Antonio Goncalves "Beginning Java EE 6 with GlassFish2, 2nd Edition", Apress publication

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CORE - XII

COMPUTER COMMUNICATION AND NETWORKING

SUBJECT CODE : 16PMCAC12	THEORY	MARKS : 100
SEMESTER : III	CREDITS : 3	Total No of Hours : 60

COURSE OBJECTIVES:
- To understand the basic aspects of Networking and different protocols that are used in establishing Network communication.
- At the end of the session students will be able independently build infrastructures using systems.

UNIT-I: (12 Hours)

Computer Networks - Applications - Line configuration - Topology - Transmission Modes - Categories of Network: LAN, MAN, WAN - OSI Layer. Physical Layer: Signals - spectrum - bandwidth of analog/digital signals .

UNIT-II: (12 Hours)

Data Link Layer: Error Detection - Error correction- Line discipline Flow Control: stop - wait protocol and sliding window protocol Error control: ARQ, Go-back-n ARQ, selective - repeat ARQ. Data Link Protocols: Asynchronous protocols – synchronous protocol: .

UNIT-III: (12 Hours)

Network Layer: Circuit switching - packet switching- message switching - Connection oriented and connectionless services. Routing Algorithms – congestion control Algorithms - internetworking - Routers and Switches- Introduction to firewalls.

UNIT-IV: (12 Hours)

LAN Protocols: Ethernet - Token Ring - Token Bus - FDDI - Addressing and Frame format – Bridges - LAN Security: Types of threats - Levels of security Case Study: Novell Netware - Wireless LAN: need - components - Receiving Devices - advantages &disadvantages.

UNIT-V: (12 Hours)

TCP/IP Networking : TCE/IP Architecture - Structural overview – Internetworking model - Protocol evolution - Division of functions - Network characteristics - implementation characteristics - Network addressing and Routing: Datagram Header - IP address space.

PRESCRIBED BOOKS :
1. Data Communication and Networking, Behruz A. Ferouzon, Tata McGraw, 2004.

REFERENCE BOOKS :
1. Computer Networks - III edition - Andrew S. Tanenbaum - Pearson Edun. 1998.
2. Data and Computer Communication – William Stallings, Pearson Education, 5th Edition, September 2000.
3. Data and Computer Communication – William Stallings, Pearson Education, 5th Edition, September 2000

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CORE - XIII

WEB DEVELOPMENT USING PHP AND MYSQL

SUBJECT CODE : 16PMCAC13	THEORY	MARKS : 100
SEMESTER : III	CREDITS : 3	Total No of Hours : 60

COURSE OBJECTIVES:
- To introduce the basic concepts of PHP, JQuery and MY SQL database.
- At the end of the session should be able to write PHP programs and My SQL database and deploy them in servers.

UNIT-I: **(12 Hours)**
Brief Introduction to Apache, MySQL, PHP, and Open Source -Overview of PHP Structure and Syntax-How PHP Fits with HTML -The Rules of PHP Syntax-Integrating HTML with PHP-Overview of Constants -Overview of Variables-Passing Information with Forms-: Introduction to PHP and MySQL: Evaluation of Php -Basic Syntax -Defining variable and constant.

UNIT-II: **(12 Hours)**
Php Data type -Operator and Expression-Decision Making-Loops-Php Functions - built in functions (print(), include(), header(), phpinfo()), PHP server Variables, working with date and time , performing mathematical operations , working with string functions . System Variable (GET, POST, Cookies & Session, Forums).

UNIT-III: **(12 Hours)**
Working with PHP and Arrays of Data: foreach Using Tables to Display Data. Multidimensional Arrays,, File Handling.

UNIT-IV: **(12 Hours)**
Form Elements-FORM Element:INPUT Element-Processing the Form-One Form, Multiple Processing-Radio INPUT Element-Multiple Submit Buttons. Adding Links to the Table.

UNIT-V: **(12 Hours)**
MySQL Server Start and Stop, Defining a Database- Creating Tables and Fields in MYSQL, Adding new Records- Viewing individual rows- Delete- Edit and Search data-Handling and Avoiding Errors.

PRESCRIBED BOOKS :
1. Timothy Boronczyk, Elizabeth Naramore, Jason Gerner "Beginning PHP6, Apache, MySQL web Development", Wrox Publication.
2. Kevin Yank "Build your own Database Driven Website using PHP and MySQL"

REFERENCE BOOKS :
1. Vikram Vasvani "How to do everything with Php & MySQL", Mc-Graw Hill.

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CORE - XIV

SOFTWARE ENGINEERING AND PROJECT MANAGEMENT

SUBJECT CODE : 16PMCAC14	THEORY	MARKS : 100
SEMESTER : III	CREDITS : 3	Total No of Hours : 60

COURSE OBJECTIVES:
- Software engineering concepts helps the students to understand and handle software projects.
- At the end students are able to work in software development and maintenance project.

UNIT-I: **(12 Hours)**
The Software Product and Software Process : Software Product and Process Characteristics, Software Process Models: Linear Sequential Model, Prototyping Model, RAD Model, Evolutionary Process Models like Incremental Model, Spiral Model, Component Assembly Model, RUP and Agile processes. Software Process customization and improvement, CMM, Product and Process Metrics.

UNIT-II: **(12 Hours)**
Requirement Elicitation, Analysis, and Specification : Functional and Non-functional requirements, Requirement Sources and Elicitation Techniques, Analysis Modeling for Function-oriented and Object-oriented software development, Use case Modeling, System and Software Requirement Specifications, Requirement Validation, Traceability.

UNIT-III: **(12 Hours)**
Software Design :
The Software Design Process, Design Concepts and Principles, Software Modeling and UML, Architectural Design, Architectural Views and Styles, User Interface Design, Function-oriented Design, SA/SD Component Based Design, Design Metrics.

UNIT-IV: **(12 Hours)**
Software Analysis and Testing : Software Static and Dynamic analysis, Code inspections, Software Testing Fundamentals, Software Test Process, Testing Levels, Test Criteria, Test Case Design, Test Oracles, Test Techniques, Black-Box Testing, White-Box Unit Testing and Unit Testing Frameworks, Integration Testing, System Testing and other Specialized Testing, Test Plan, Test Metrics.

UNIT-V: **(12 Hours)**
Software Maintenance & Software Project Measurement : Need and Types of Maintenance, Software Configuration Management (SCM), Software Change Management, Version Control, Change control and Reporting, Program Comprehension Techniques, Re-engineering, Reverse Engineering, Tool Support. Project Management Concepts, Feasibility Analysis, Project and Process Planning, Resources Allocations, Software efforts, Schedule, and Cost estimations, Project Scheduling and Tracking, Risk Assessment and Mitigation, Software Quality Assurance (SQA), Project Plan, Project Metrics.

PRESCRIBED BOOKS :
1. Sommerville,"Software Enginerring",Pearson Education.
2. Richard H.Thayer,"Software Enginerring & Project Managements",Willey India
3. Roger S. Pressman, "Software Engineering – A practitioner's Approach", Sixth Edition, McGraw-Hill International Edition, 2005.

REFERENCE BOOKS :
1. Pankaj Jalote ,"An Integrated Approach to Software Engineering", Narosa Pub, 2005
2. Rajib Mall, "Fundamentals of Software Engineering" Second Edition, PHI Learning .

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CORE - XV

COMPUTER GRAPHICS

SUBJECT CODE : 16PMCAC15	THEORY	MARKS : 100
SEMESTER : III	CREDITS : 3	Total No of Hours : 60

COURSE OBJECTIVES:
- This paper introduces the basic concepts of Computer Graphics which shall be useful for virtual modeling and enables the students to have knowledge in multimedia using graphics.
- At the end the session students are able to work in multimedia technologies.

UNIT-I: **(12 Hours)**
Introduction to computer graphics : Brief Survey of Computer Graphics – Graphics Systems: Video Display Devices – Types – Raster-Scan Systems and Random-Scan Systems.

UNIT-II: **(12 Hours)**
Output primitives and their attributes line-Drawing (DDA and Bresenham's) Algorithms – Circle-Generating (Midpoint) Algorithm – Ellipse-Generating (Midpoint) Algorithms- Area-Filling (Boundary-Fill and Flood-Fill) Algorithms.

UNIT-III: **(12 Hours)**
Line Attributes - Color and Grayscale Levels – Character Attributes – Inquiry Functions. Two-dimensional transformations and viewing : Basic Transformations - Matrix Representations and Homogeneous Coordinates – Composite Transformations – Other Transformations –Reflection-shear-Window-to- Viewport Coordinate Transformation – Clipping Algorithms: Cohen-Sutherland Line Clipping -Polygon Clipping.

UNIT-IV: **(12 Hours)**
Interactive Input Methods: Logical Classification of Input Devices – Interactive Picture-Construction Techniques-Three-dimensional concepts and viewing: Three-Dimensional Display Methods: Parallel and Perspective Projections – Depth Cueing - Visible Line and Surface Identification.

UNIT-V: **(12 Hours)**
Three-Dimensional Transformations: Basic, Other and Composite Transformations- Viewing Pipeline and Coordinates- Transformation from World to Viewing Coordinates- Hidden Surface and Hidden Line Elimination Methods: Back-Face Detection , Depth-Buffer(Z Buffer).

PRESCRIBED BOOKS :
1. D. Hearn and M.P.Baker, 2007, Computer Graphics, 2nd Edition, Pearson Education, Prentice Hall, 19th Reprint.

REFERENCE BOOKS :
1. S. Harrington, Computer Graphics , 2nd Edition , McGraw-Hill Book Co. ,1994.

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	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

CORE - XVI

PRACTICAL - V : PROGRAMMING IN JAVA LAB

SUBJECT CODE : 16PMCAC16P	PRACTICAL	MARKS : 100
SEMESTER : III	CREDITS : 2	Total No of Hours : 60

COURSE OBJECTIVES:
- Students are trained to develop basic Java programs using different concepts of java.
- At the end of the session students are capable of developing Java programs

APPLICATION
1. Program to find the average and sum of the N numbers Using Command line argument.
2. Program to Test the Prime number.
3. Determining the order of numbers generated randomly using Random Class.
4. Usage of Calendar Class and manipulation.
5. String Manipulation using Char Array.
6. Database Creation for storing e-mail addresses and manipulation.
7. Usage of Vector Classes.
8. Implementing Thread based applications & Exception Handling.

APPLETS
9. Program to draw a picture using line, Rectangle, oval, text of graphics method.
10. Program to implement Font and Color class.
11. Working with Dialogs and Menus using Frames.
12. Working with Panel and Layout in Swing.
13. Program to create JFrame that display the student information.
14. MultiUser chat Application using Socket Class.

APPLICATION FOR EVENTS HANDLING
15. Application Using JDBC Connectivity

CORE - XVII

PRACTICAL - VI : PHP AND MYSQL LAB

SUBJECT CODE : 16PMCAC17P	PRACTICAL	MARKS : 100
SEMESTER : III	CREDITS : 2	Total No of Hours : 60

COURSE OBJECTIVES:

- Students are trained in PHP, designing web pages using PHP the connectivity that needs to be established with the data base is done through My SQL.
- At the end of session students should be able to write and deploy a PHP program in Server.

1. Design a webpage that should compute one's age on a given date using PHP.
2. Design a webpage to generate multiplication table for a given number.
3. Design an authentication web page in PHP with MySQL to check user name and password.
4. 4.Design a program using session
5. Develop a program using cookie and session
6. Write PHP code to implement Querystring (passing variables using URL) concept.
7. Write PHP code to develop E-mail registration form and store all the submitted data in database table.
8. Write a program to develop student registration form and display all the submitted data on another page.
9. Write a program to read customer information like Cust_no, Cust_name, Item_purchased and Mob_no from Customer table and display all these information in table format on output screen.
10. Write a program that keeps track of how many times a visitor has loaded the page.
11. Write a program for editing and deleting a particular record from database.
12. Write a php program to calculate the bonus of an employee

SOFT SKILL – III
MANAGERIAL SKILL

SUBJECT CODE : 16PGSLS03	SOFT SKILL	MARKS : 100
SEMESTER : III	CREDITS : 2	Total No of Hours : 15

COURSE OBJECTIVES:
- To help students to understand the mechanism of stress particularly negative emotions such as anxiety, anger and depression for effective management.
- To give inputs on some of the important interpersonal skills such as group decision-making, negotiation and leadership skills.

UNIT-I: (3 Hours)

Stress management
- Definitions and Manifestations of stress.
- Stress coping ability and stress inoculation training.
- Management of various forms of fear (examination fear, stage fear or public speaking anxiety), depression and anger.

UNIT-II: (3 Hours)

Conflict Management skills
- Types of conflict (intrapersonal, Intra group and inter group conflicts).
- Basic concepts, cues, signals, symbols and secrets of body language.
- Significance of body language in communication and assertiveness training.
- Conflict stimulation and conflict resolution techniques for effective management.

UNIT-III: (3 Hours)

Interpersonal Skills
- Group decision making (strengths and weaknesses).
- Developing characteristics of charismatic and transformational leadership.
- Emotional intelligence and leadership effectiveness- self-awareness, self-management, self-motivation, empathy and social skills.
- Negotiation skills- preparation and planning, definition of ground rules, clarification and justification, bargaining and problem solving, closure and implementation.

UNIT-IV: (3 Hours)

Time Management
- Time management personality profile.
- Time management tips and strategies.
- Advantages of time management.

UNIT-V: (3 Hours)

Towards Empowerment
- Network culture.
- Managerial empowerment and entrepreneurship.
- Prevention of moral dwarfism especially terrorism.
- Altruism (prosocial behavior/helping behavior).

Recommended Texts:
1. Swaminathan. V.D & Kaliappan. K.V. (2001). Psychology for Effective Living. Chennai.
2. Robbins, S.B. (2005). Organizational Behavior. New Delhi: Prentice Hall of India.
3. Smith, B. (2004). Body Language. Delhi: Rohan Book Company.
4. Hurlock, E.B. (2006). Personality Development, 28th Reprint. New Delhi: Tata McGraw Hill

CORE – XVIII

ADVANCED JAVA PROGRAMMING (J2EE)

SUBJECT CODE : 16PMCAC18	THEORY	MARKS : 100
SEMESTER : IV	CREDITS : 4	Total No of Hours : 60

COURSE OBJECTIVES:
- Students are imparted the knowledge of developing enterprise application in advanced java platform.
- At the end of the session they should be able to develop J2EE applications and deploy them in web servers and application servers.

UNIT-I :   **(12 Hours)**
Servlet overview – the Java web server – your first servlet – servlet chaining – server side includes-Session management – security – HTML forms – using JDBC in servlets – applet to servlet communication

UNIT-II :   **(12 Hours)**
JSP –Introduction JSP-Examining MVC and JSP -JSP scripting elements & directives-Working with variables scopes-Error Pages - using Java Beans in JSP Working with Java Mail-Understanding Protocols in Java mail-Components-Java mail API-Integrating into J2EE-Understanding Java Messaging Services-Transactions.

UNIT-III: **(12 Hours)**
 RMI – Overview – Developing applications with RMI: Declaring & Implementing remote interfaces-stubs & skeletons, Registering remote objects, writing RMI clients –Pushing data from RMI Servlet – RMI over Inter-ORB Protocol.

UNIT-IV: **(12 Hours)**
 EJB overview – Environment – creating application – stateless, stateful beans , message driven beans – persistence – annotations – call back, timer service – JNDI binding – query language – access database – exception handling.

UNIT- V :   **(12 Hours)**
Spring framework – Architecture – environment setup – simple programs – IOC containers – Bean definition, scope and life cycle - dependency injections- injecting inner beans, injecting collection - Hibernate overview – architecture – configuration – session – persistence class – mapping files – O/R mapping – Annotation, query language.

PRESCRIBED BOOKS :
1. Introducing spring frame work – Felipee guttee, A press
2. Begging hibernate – Jelf Linwood, Second edition , A press

REFERENCE BOOKS :
1. J2ee 1.4 Bible, Wiley publications.

QUESTION PAPER PATTERN

Section	Question Component	Numbers	Marks	Total
Section - A	**Definition / Principle** Answer ALL questions (Each in 50 words)	1-10	2	20
Section - B	**Short Answer** Answer any 5 out of 7 questions (Each in 300 words)	11-17	7	35
Section - C	**Essay** Answer any 3 out of 5 questions (Each in 1200 words)	18-22	15	45

DISTRIBUTION OF QUESTIONS

Sections	Units	No. of Questions	
		Theory	**Problems**
Section A	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

CORE– XIX

PYTHON PROGRAMMING

SUBJECT CODE : 16PMCAC20	THEORY	MARKS : 100
SEMESTER :IV	CREDITS : 4	Total No of Hours : 75

COURSE OBJECTIVES:
- To introduce the students to Python Application Development and Deployment
- To impart skills for developing desktop and windows applications using Python.

UNIT-I: (15 Hours)

Introducing the Python Interpreter - Program Execution-Execution Model Variations - Introducing Python Object Types- Python's Core Data Types –Numbers, Strings , Lists –Dictionaries , Tuples , Files. Numeric Type Basics - Numeric Extensions - Shared References

UNIT-II : (15 Hours)

String Fundamentals : String Basics ,String Literals ,Strings in Action, String Methods, String Formatting Expressions, String Formatting Method Calls, General Type Categories. Lists and Dictionaries**:** Lists, Dictionaries, Tuples, Files, Built-in Type Gotchas - Assignments, Expressions, and Prints : Assignment Statements - Expression Statements - Print Operations

UNIT-III : (15 Hours)

if Statements Truth Values and Boolean Tests - if/else Ternary Expression - while and for Loops - while Loops -break, continue, pass, and the Loop else - for Loops- Loop Coding Techniques - Iterations and Comprehensions - New Iterables in Python 3.X - Other Iteration Topics - Functions and Generators

UNIT-IV : (15 Hours)

Function Basics - Coding Functions - Scopes - Python Scope Basics-The global Statement- Scopes and Nested Functions -The nonlocal Statement in 3.X - Function Design Concepts – python and OOPS. Advanced Function Topics - Recursive Functions - Function Objects: Attributes and Annotations

UNIT-V : (15 Hours)

Anonymous Functions: lambda - Functional Programming Tools - Timing Iteration Alternatives - Modules and Packages - Python Program Architecture - Module Coding Basics : Module Creation- Module Usage - Module Namespaces -Reloading Modules – Module design Concepts – Data Hiding in Modules- Exception Basic – Exception Objects – Meta classes.

PRESCRIBED BOOKS :
1. Mark Lutz , "Learning Python, Powerful Object-Oriented Programming", 5th Edition O'Reilly Media.

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	Unit - 2	2	
	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

CORE - XX

ADVANCED DATABASE MANAGEMENT SYSTEMS

SUBJECT CODE : 17PMCAC22	THEORY	MARKS : 100
SEMESTER : IV	CREDITS : 4	Total No of Hours : 60

COURSE OBJECTIVES:
- Advanced database management systems enable the students to have clear understanding of SQL queries, storage aspects of the Database in oracle and SQL MS Server.
- At the end of the session students are able to work in databases and write SQL queries.

UNIT-I : **(12 Hours)**
Introduction : Definition of Data, Data base and DBMS – Need for database –Advantages of database Systems - File based database systems – Disadvantages –Record based database systems - Data base characteristics -Database terms : Concurrency, Consistency, Data Availability, Reliability, Transparency Data Integrity.

UNIT-II : **(12 Hours)**
Relational data structure: Relation – Domains & Attributes – Keys – Extensions – Intensions – Data structures – Tables – Data Integrity – Manipulation views – managing data concurrency in a multi–user system - Data Security – Data Availability.

UNIT-III : **(12 Hours)**
Table Columns, Rows, Primary Key, Secondary Key, Foreign key- E-R model: Entities and attributes – Relationships – One to one –One to many - Many to one – Many to Many relationships – Normalizing the model. Normalization: Introduction - 1NF - 2NF – 3NF.

UNIT-IV : **(12 Hours)**
Database Administration : DBA Tasks – DBA Tools – User Privileges - Data Definition Language: Statements - Data Manipulation Language – statements - Retrieval operations - SQL Commands : Selecting Columns from a table, Selecting Rows from a table – Update Operations.

UNIT-V : **(12 Hours)**
Simple query – where clause – group by – order by clauses -sub queries – correlated sub-queries. Constraints: Alter table – table-level constraints. Join – types – simple – Equi-join, Non-equi- join, self join, creating a view, querying a view of more than one table. Commit, rollback, save point- PL / SQL Basics - tables and records manipulations – control statements – Triggers - Cursor - exceptions – subprograms.

PRESCRIBED BOOKS :
1. Database Management System - Post, Gerald V ,Tata McGraw-Hill, 2004
2. Database Management System - Date ,C.J., Galgotia Publications
3. Fundamentals of Database System - Elmasri, R.A.,Navathe, Shyam B. Narosa Publishing House.
4. An introduction to Database Systems - Bipin C Desai Galgotia Publications Ltd., 2005

REFERENCE BOOKS :
1. Database Management Systems - Raghu Ramakrishnan Mc Graw Hill Publishing Company Limited, 2004.

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	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

CORE – XXI

SOFTWARE TESTING AND QUALITY ASSURANCE

SUBJECT CODE : 16PMCAC23	THEORY	MARKS : 100
SEMESTER : IV	CREDITS : 4	Total No of Hours : 60

COURSE OBJECTIVES:
- To understand different types of testing that includes manual and Tool based testing and the quality aspects that needs to be followed in the software development process.
- At the end of the session students should be able to carry out effective testing and maintain the quality Assurance processes.

UNIT-I : (12 Hours)
Software Verification & Validation Activities : Verification & Validation Concepts - Verification & Validation Planning - Software inspections - Software Testing Fundamentals : Definition & Objectives - Types of software bugs - Bug life cycle - Testing lifecycle - Test Plan - Test Cases Definition, Test Case Designing.

UNIT-II : (12 Hours)
Black Box & White Box Testing : Functional Testing (Black Box) Equivalence partitioning, BVA - Syntax testing - Structural Testing (White Box) -Coverage testing : Statement coverage, Branch & decision coverage, Path coverage - Domain Testing - Black box vs. White Box.

UNIT-III (12 Hours)
Different types of Testing : Unit Testing - Integration Testing - System Testing–Performance, Load, Stress, Security, Recoverability - Regression Testing - Acceptance Testing-Alpha testing & Beta testing - Manual vs. Automatic testing.

UNIT-IV : (12 Hours)
Reviews :Introduction - Review types: Informal Review, Technical or peer review, Walkthrough and Review Meeting - Review Reporting & Record keeping, Review guidelines - Data flow analysis.

UNIT-V : (12 Hours)
Software Quality Assurance Fundamentals : Definitions of Quality – SQA Planning & Standards - SQA Activities – Building blocks of SQA – Quality factors – Software Quality Metrics Case Study : WINRUNNER, SILK TEST.

PRESCRIBED BOOKS :
1. Software Engineering R. Pressmen – TMH, 7th Edition.
2. Software Engineering Sommerville, Pearson, 8th Edition.
3. Software Testing in Real World Edward Kit, Pearson Pub.
4. Software Testing Techniques Boris Beizer, dreamTech pub, 2nd Edition.

REFERENCE BOOKS :
1. Software Testing Techniques Boris Beizer, dreamTech pub, 2nd Edition.

QUESTION PAPER PATTERN

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Section - A	**Definition / Principle** Answer ALL questions (Each in 50 words)	1-10	2	20
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		Theory	**Problems**
Section A	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

ELECTIVE - I

CLOUD COMPUTING

SUBJECT CODE : 16PMCAE03	THEORY	MARKS : 100
SEMESTER : IV	CREDITS : 3	Total No of Hours : 60

COURSE OBJECTIVES:
- To understand the basics knowledge of Cloud Computing that gives an insight into various aspects of Cloud Computing.
- At the end of the session students should be able to work different technologies in cloud environment.

UNIT-I : **(12 Hours)**
Understanding Cloud Computing: Cloud Computing –History of Cloud Computing – Cloud Architecture –Cloud Storage –Why Cloud Computing Matters –Advantages of Cloud Computing – Disadvantages of Cloud Computing –Companies in the Cloud Today – Cloud Services.

UNIT-II : **(12 Hours)**
Developing Cloud Services: Web-Based Application –Pros and Cons of Cloud Service Development –Types of Cloud Service Development –Software as a Service –Platform as a Service-Infrastructure as a service –Web Services –On-Demand Computing –Discovering Cloud Services Development Services and Tools –Amazon Ec2 –Google App Engine –IBM Clouds.

UNIT-III : **(12 Hours)**
Cloud Computing For Everyone: Centralizing Email Communications –Collaborating on Schedules –Collaborating on To-Do Lists –Collaborating Contact Lists –Cloud Computing for the Community –Collaborating on Group Projects and Events –Cloud Computing for the Corporation.

UNIT-IV : **(12 Hours)**
Using Cloud Services: Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications –Exploring Online Planning and Task Management–Collaborating on Event Management –Collaborating on Contact Management –Collaborating on Project Management –Collaborating on Word Processing -Collaborating on Databases –Storing and Sharing Files.

UNIT-V : **(12 Hours)**
Other Ways To Collaborate Online: Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services –Evaluating Web Conference Tools –Collaborating via Social Networks and Groupware –Collaborating via Blogs and Wikis.

PRESCRIBED BOOKS :
1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
2. Kumar Saurabh, "Cloud Computing –Insights into New Era Infrastructure", Wiley Indian Edition, 2011.
3. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

QUESTION PAPER PATTERN

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Section - A	**Definition / Principle** Answer ALL questions (Each in 50 words)	1-10	2	20
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DISTRIBUTION OF QUESTIONS

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Section A	Unit - 1	2	
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	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

ELECTIVE - I

MOBILE COMPUTING

SUBJECT CODE : 16PMCAE16	THEORY	MARKS : 100
SEMESTER : IV	CREDITS : 3	Total No of Hours : 60

COURSE OBJECTIVES:
- To understand the technology that allows transmission of data via computer without having connected to fixed physical link.
- At the end of the session students should have knowledge in mobile technologies

UNIT-I :   **(12 Hours)**
Introduction - Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing –Wireless Transmissions –Multiplexing – Spread Spectrum and Cellular Systems- Medium Access Control – Comparisons.

UNIT-II :   **(12 Hours)**
Telecommunication Systems – GSM – Architecture – Sessions – Protocols – Hand Over and Security – UMTS and IMT – 2000 – Satellite Systems.

UNIT-III :   **(12 Hours)**
Wireless Lan - IEEE S02.11 – Hiper LAN – Bluetooth – Security and Link Management.

UNIT-IV :
Mobile network layer - Mobile IP – Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies.

UNIT-V :   **(12 Hours)**
Mobile transport layer - Congestion Control – Implication of TCP Improvement – Mobility – Indirect – Snooping – Mobile – Transaction oriented TCP - TCP over wireless – Performance.

PRESCRIBED BOOKS :
1. J. Schiller, 2003, Mobile Communications,2nd edition, Pearson Education, Delhi.

REFERENCE BOOKS :
1. Hansmann, Merk, Nicklous, Stober, 2004, Principles of Mobile Computing, 2nd Edition, Springer (India).
2. Pahlavan, Krishnamurthy, 2003(2002), Principle of wireless Networks: A unified Approach, Pearson Education, Delhi.
3. Martyn Mallick, 2004, Mobile and Wireless Design Essentials, Wiley Dreamtech India Pvt. Ltd., NewDelhi.
4. W.Stallings, 2004, Wireless Communications and Networks, 2nd Edition, Pearson Education, Delhi.

Website and e-Learning Source
1. http://csbdu.in/pdf/mobile%20communication.pdf

QUESTION PAPER PATTERN

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	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

PARALLEL COMPUTING

SUBJECT CODE : 16PMCAE17	THEORY	MARKS : 100
SEMESTER : IV	CREDITS : 3	Total No of Hours : 60

COURSE OBJECTIVES:
- To understand the architecture in which several processors execute an application simultaneously.
- At the end of the session students should have knowledge in parallel Computing.

UNIT-I : (12 Hours)
Introduction To Parallel Computing- History of Parallel Computers - Problem Solving in Parallel - Performance Evaluation - Elementary Concepts -The Need of Parallel Computation - Levels of Parallel Processing - Dataflow Computing - Applications of Parallel Processing.

UNIT-II : (12 Hours)
Introduction to Classification Of Parallel Computers -Types of Classification - Flynn's Classification -Handler's Classification -Structural Classification - Classification Based on Grain Size.

UNIT-III : (12 Hours)
Introduction to Interconnection Networks - Network Properties- Design issues of Interconnection Network- Various Interconnection Networks-Concept of Permutation Network -Performance Metrics.

UNIT-IV : (12 Hours)
Introduction to Parallel Computer Architecture - Pipeline Processing - Vector Processing - Array Processing - Superscalar Processors - VLIW Architecture - Multi-threaded Processors. **Introduction to Operating System For Parallel Computer** - Parallel Programming Environment Characteristics- Synchronisation Principles- MultiTasking Environment.

UNIT-V : (12 Hours)
Introduction Performance Evaluations - Metrics for Performance Evaluation - Factors Causing Parallel Overheads- Laws For Measuring Speedup Performance - Tools For Performance Measurement -Performance Analysis- Performance Instrumentations. **Introduction to Recent Trends In Parallel Computing** - Recent Parallel Programming Models - Parallel Virtual Machine.

PRESCRIBED BOOKS :
1. Rajaraman V. and Siva Ram Murthy C. *Parallel Computers - Architecture and Programming*, Second Edition, Prentice Hall of India, 2002.
2. Selim G.Akl *Parallel Computation, Models and Methods*: Prentice Hall of India.
3. Kai Hwang: *Advanced Computer Architecture*: Parallelism, Scalability, Programmability (2001), Tata McGraw Hill, 2001.

REFERENCE BOOKS :
1. Henessy J. L. and Patterson D. A. *Computer Architecture*: A Qualititative Approach, Morgan Kaufman (1990)
2. Thomas L. Casavant, Pavel Tvrdik, Frantisck Plasil, *Parallel Computers: Theory and Practice*, IEEE

QUESTION PAPER PATTERN

Section	Question Component	Numbers	Marks	Total
Section - A	**Definition / Principle** Answer ALL questions (Each in 50 words)	1-10	2	20
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DISTRIBUTION OF QUESTIONS

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	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

ELECTIVE - 1

DISTRIBUTED COMPUTING

SUBJECT CODE : 16PMCAE18	THEORY	MARKS : 100
SEMESTER : IV	CREDITS : 3	Total No of Hours : 60

COURSE OBJECTIVES:
- To understand how the computation problems can be solved using computers in remote locations.
- At the end of the session students should have knowledge in distributed computing technologies

UNIT-I : (12 Hours)

Fundamentals : Evolution of Distributed Computing Systems, System models, issues in design of Distributed Systems, Distributed computing environment, web based distributed model, computer networks related to distributed systems and web based protocols. Message Passing : Inter process Communication, Desirable Features of Good Message-Passing Systems, Issues in IPC by Message, Synchronization, Buffering, Multi datagram Messages, Encoding and Decoding of Message Data, Process Addressing, Failure Handling, Group Communication.

UNIT-II : (12 Hours)

Remote Procedure Calls : The RPC Model, Transparency of RPC, Implementing RPC Mechanism, Stub Generation, RPC Messages, Marshaling Arguments and Results, Server Management, Communication Protocols for RPCs, Complicated RPCs, Client-Server Binding, Exception Handling, Security, Some Special Types of RPCs, Lightweight RPC, Optimization for Better Performance.

UNIT-III : (12 Hours)

Distributed Shared Memory: Design and Implementation issues of DSM, Granularity, Structure of Shared memory Space, Consistency Models, replacement Strategy, Thrashing, Other Approaches to DSM, Advantages of DSM.Synchronization : Clock Synchronization, Event Ordering, Mutual Exclusion, Election Algorithms.

UNIT-IV : (12 Hours)

Resource and Process Management - Desirable Features of a good global scheduling algorithm, Task assignment approach, Load Balancing approach, Load Sharing Approach, Process Migration, Threads, Processor allocation, Real time distributed Systems.

UNIT-V : (12 Hours)

Distributed File Systems-Desirable Features of a good Distributed File Systems, FileModels, File Accessing Models, File-shearing Semantics, Filecaching Schemes, File Replication, Fault Tolerance, Design Principles, Sun's network file system, Andrews file system, comparison of NFS and AFS.Naming- Desirable Features of a Good Naming System, Fundamental Terminologies and Concepts, Systems-Oriented Names, Name caches, Naming & security, DCE directory services.

PRESCRIBED BOOKS :
1. Distributed OS by Pradeep K. Sinha (PHI)
2. Tanenbaum S.: Distributed Operating Systems, Pearson Education
3. Tanenbaum S. Maarten V.S.: Distributed Systems Principles and Paradigms, (Pearson Education).

REFERENCE BOOKS :
1. George Coulouris, Jean Dollimore. Tim Kindberg: Distributed Systems concepts and design.

QUESTION PAPER PATTERN

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	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

CORE - XXII

PRACTICAL - VII : J2EE LAB

SUBJECT CODE : 17PMCAC19P	PRACTICAL	MARKS : 100
SEMESTER : IV	CREDITS : 2	Total No of Hours : 60

COURSE OBJECTIVES:
- Students are imparted the practical knowledge of developing enterprise application in advanced java platform.
- At the end of the session they should be able to develop and deploy J2EE applications using web servers and application servers.

1. HTML to Servlet Applications.
2. Applet to Servlet Communication.
3. Designing online applications with JSP.
4. Creating JSP program using JavaBeans.
5. Working with Enterprise JavaBeans.
6. Performing Java Database Connectivity.
7. Creating Web services with RMI.
8. Creating and Sending Email with Java.
9. Building web applications.

CORE - XXIII

PRACTICAL -VIII : PYTHON PROGRAMMING LAB

SUBJECT CODE : 16PMCAC21P	PRACTICAL	MARKS : 100
SEMESTER : IV	CREDITS : 2	Total No of Hours : 60

COURSE OBJECTIVES:
- Students are given practical training in Python programming.
- After completion students are able to create Python application.

EXERCISES:
1. Write a Python program to get the Python version you are using and print the date and time details.
2. Write a Python program which accepts the user's first and last name and print them in reverse order with a space between them.
3. Write a Python program which accepts a sequence of comma-separated numbers from user and generate a list and a tuple with those numbers.
4. Write a Python program to display the examination schedule.
5. Write a Python program to print the calendar of a given month and year.
6. Write a python program to demonstrate the use of list.
7. Write a python program to demonstrate the use of Dictionaries.
8. Write a python program to demonstrate the use of Tuples.
9. Write a python program to demonstrate the use of Sets.
10. Data Structure concepts using Python.
11. Python file input and output operations.

SOFT SKILL - IV

QUANTITATIVE APTITUDE

SUBJECT CODE : 16PGSLS04	SOFT SKILL	MARKS : 100
SEMESTER : IV	CREDITS : 2	Total No of Hours : 15

COURSE OBJECTIVES:
- Students are trained in Aptitude which include numerical problems .
- At the end of the session they should be able to clear aptitude test.

UNIT- I : (3 Hours)
Numbers, HCF, LCM, Decimal Fractions, Simplification, Square Roots, Cube roots, Averages.

UNIT- II : (3 Hours)
Problems in numbers and ages, Surds, Indices, Percentages, Profit and Loss, Ratio and Proportion, Partnership, Chain Rule.

UNIT- III : (3 Hours)
Time and Work, Pipes and Distances. Time and distance, Problems on Trains.

UNIT- IV : (3 Hours)
Boats and Streams, Alligation, Simple Interest, Compound Interest, Logarithms, Area, Volume and Surface Area.

UNIT- V: (3 Hours)
Races and Games of Skill, Calendar, Clocks, Stocks and Shares, Permutation and Combination, Probability, True discount, Banker's Discount, Height and Distances, Old man out and Series, Tabulation, Bar graphs, Pie charts, Line Graphs.

PRESCRIBED BOOKS :
1. R.S. Aggarwal, "Quantitative Aptitude for Competitive Examinations", Seventh Revised Edition, S. Chand and Co.Ltd., New Delhi, 2005.

REFERENCE BOOKS :
1. Barron's Guide for GMAT, Galgotia Publications, New Delhi, 2006.

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CORE PAPER – XXIV

PAPER TITLE : .NET TECHNOLOGIES

</div>

SUBJECT CODE : 16PMCAC24	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 4	Total No of Hours : 75

COURSE OBJECTIVES:
- To introduce the students to .NET Framework and Visual Studio IDE for Application Development and Deployment
- To impart skills for developing desktop and windows applications using VB.NET
- To train the students on deploying ADO.NET connectivity for windows and web applications

UNIT-I: (15 Hours)
Introduction to .NET Technologies : Introduction to Internet and Web Technologies-HTML Basics - Scripts- Client-side Vs Server- side Scripts - Sample Programs – Advantages and Disadvantages of Client-side and Server-side Scripts - Client-side Technologies Overview - Server-side Technologies Overview History of the Platform of .NET - .NET Framework Components Overview with Focus on CLR, CTS.

UNIT-II : (15 Hours)
VB.NET Building Blocks : Introduction VB.NET – VB Vs VB.NET – VB.NET -Integrated Development Environment – Creating a short-cut to Start VB.NET - Maneuvering the Toolbar – Auto-hide, Docking and Undocking, Placing and Resizing the Windows – Working with Forms – Properties Window and Solution Explorer - Setting the Startup Object - Writing and Event Procedure – Execution - Basic Keywords – Data Types – VB.NET statements – Conditionals - If Else – Select Case – Switch and Choose – Operators - Loops – Do – For Next – For Each Next – While – Arrays.

UNIT-III : (15 Hours)
Application Development in VB.NET :
Windows Forms – Working with Controls – Timer, Picture-box, Group-box, Combo-box, Horizontal and Vertical Scrollbar, Numeric-up-down, Track-bar, and Progress-bar – Menus Dialog-boxes – Pop-Menus - Developing MDI – Multithreaded Programming – Code Modularization – Subroutines and Functions VB.NET Built-in Functions – Mathematical Functions, Strings, Date and Time, Data Type Inspection, Data Type Conversion, Financial and Miscellaneous Functions

UNIT-IV : (15 Hours)
OOPs deployment in VB.NET : Classes, Objects, Methods – Methods Overloading – Events - Delegates – Inheritance – Interfaces – Encapsulation – Polymorphism – Classes Vs Components – Advanced Techniques – Drawing, and Printing – Debugging – Exception Handling – Introduction to Web Application Development using VB.

UNIT-V : (15 Hours)
ADO.NET Connectivity : Introduction to ADO.NET – ADO Vs ADO.NET – Connected ADO.NET Architecture – Disconnected ADO.NET Architecture – Data Reader - Data Adapter – ADO.NET Classes – ADO.NET - Namespaces – Interfacing VB.NET Applications with ADO.NET

PRESCRIBED BOOKS :
1. Shirish Chavan, "Visual Basic.NET", Edition 2009, Pearson Education.
2. Matt J. Crouch , "ASP.NET and VB.NET Web Programming", Edition 2012, Pearson Education.
3. Michael Otey and Denielle Otey, "ADO.NET Complete Reference", Tata Macraw Hill Publication.

REFERENCE BOOKS :
1. Kogent Learning Solutions, ".NET Framework 4.0 in Simple Steps", Edition 2011, Dreamtech Press.
2. Steven Holzner, "Visual Basic.NET Programming – Black Book", Edition 2005, Paraglyph Press
3. Fred Barwell , "Professional VB.NET" 2nd Edition, Wrox Publication.

QUESTION PAPER PATTERN

Section	Question Component	Numbers	Marks	Total
Section - A	**Definition / Principle** Answer ALL questions (Each in 50 words)	1-10	2	20
Section - B	**Short Answer** Answer any 5 out of 7 questions (Each in 300 words)	11-17	7	35
Section - C	**Essay** Answer any 3 out of 5 questions (Each in 1200 words)	18-22	15	45

DISTRIBUTION OF QUESTIONS

Sections	Units	No. of Questions	
		Theory	**Problems**
Section A	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

ELECTIVE - 2

DATA MINING AND WAREHOUSING

SUBJECT CODE : 16PMCAE07	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 4	Total No of Hours : 75

COURSE OBJECTIVES:
- To understand the concepts of Data mining, ways of Data handling mechanism.
- At the end of the session students should be able to work in environment where huge volumes of data are used.

UNIT-I :   **(15 Hours)**
Introduction: Data Mining tasks – Data Mining versus Knowledge Discovery in Data bases – Relational databases – Data warehouses – Transactional databases – Object oriented databases – Spatial databases – Temporal databases – Text and Multimedia databases – Heterogeneous databases - Mining Issues – Metrics – Social implications of Data mining.

UNIT-II :   **(15 Hours)**
Data Preprocessing: Why Preprocess the data – Data cleaning – Data Integration – Data Transformation – Data Reduction – Data Discretization.

UNIT-III :   **(15 Hours)**
Data Mining Techniques: Association Rule Mining – The Apriori Algorithm – Multilevel Association Rules – Multidimensional Association Rules – Constraint Based Association Mining.

UNIT-IV :   **(15 Hours)**
Classification and Prediction: Issues regarding Classification and Prediction – Decision Tree induction – Bayesian Classification – Back Propagation – Classification Methods – Prediction – Classifiers accuracy.

UNIT-V :   **(15 Hours)**
Clustering   Techniques: cluster Analysis – Clustering Methods – Hierarchical Methods – Density Based Methods – Outlier Analysis – Introduction to Advanced Topics: Web Mining , Spatial Mining and Temporal Mining.

PRESCRIBED BOOKS :
1. J.Han and M. Kamber , 2001, Data Mining: Concepts and Techniques, Morgan Kaufmann, New Delhi

REFERENCE BOOKS :
1. M. H.Dunham, 2003, Data Mining : Introductory and Advanced Topics , Pearson Education, Delhi.
2. Paulraj Ponnaiah, 2001, Data Warehousing Fundamentals, Wiley Publishers.
3. S.N. Sivananda and S. Sumathi, 2006, Data Mining, Thomsan Learning, Chennai.

QUESTION PAPER PATTERN

Section	Question Component	Numbers	Marks	Total
Section - A	**Definition / Principle** Answer ALL questions (Each in 50 words)	1-10	2	20
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	Unit - 2	2	
	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

ELECTIVE – II

BIG DATA ANALYTICS

SUBJECT CODE :16PMCAE04	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 4	Total No of Hours : 75

COURSE OBJECTIVES:
- To understand the concepts of Big Data Analytics, usage of R for implementing machine learning algorithms
- At the end of the session students should be able to work with data analytics tools.

UNIT-I :   **(15 Hours)**
Understanding the features of R language - Using R packages - Performing data operations - Installing Hadoop - Installing Hadoop on Linux, Ubuntu flavour, single node cluster, Multimode cluster - Understanding HDFS - characteristics of HDFS.

UNIT-II :   **(15 Hours)**
Map Reduce - Understanding the HDFS architecture, HDFS components, Map Reduce architecture, Map Reduce components - Learning Data Analytics with R and Hadoop - Understanding the data analytics project life cycle, Identifying the problem, Designing data requirement, Pre processing data, Performing analytics over data - Visualizing data.

UNIT-III :   **(15 Hours)**
 Understanding data analytics problems -Exploring web pages categorization - Computing the frequency of stock market change - Importing and Exporting Data from Various DBs - Learning about data files as database - Understanding different types of files - Installing R packages.

UNIT-IV :   **(15 Hours)**
Importing the data into R - Exporting the data from R - Understanding Mongo DB - Installing Mongo DB - Mapping SQL to Mongo DB - Mapping SQL to Mongo QL - Installing rmongo db - Importing the data into R - Understanding Big Data Analysis with Machine Learning - Introduction to machine learning - Types of machine-learning algorithms.

UNIT-V :   **(15 Hours)**
Supervised machine-learning algorithms - Linear regression - Linear regression with R - Linear regression with R and Hadoop - Logistic regression - Logistic regression with R - Logistic regression with R and Hadoop - Unsupervised machine learning algorithm - Clustering - Clustering with R - Performing clustering with R and Hadoop - Recommendation algorithms.

PRESCRIBED BOOKS :
   1. "Big Data Analytics with R and Hadoop", Vignesh prajapati, Packt publication
REFERENCE BOOKS :
   1. Big data for dummies, Judith Hurwitz, Alan Nugent, A Wiley Brand.

QUESTION PAPER PATTERN

Section	Question Component	Numbers	Marks	Total
Section - A	**Definition / Principle** Answer ALL questions (Each in 50 words)	1-10	2	20
Section - B	**Short Answer** Answer any 5 out of 7 questions (Each in 300 words)	11-17	7	35
Section - C	**Essay** Answer any 3 out of 5 questions (Each in 1200 words)	18-22	15	45

DISTRIBUTION OF QUESTIONS

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	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

ELECTIVE - II

WIRELESS COMMUNICATION

SUBJECT CODE : 16PMCAE08	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 4	Total No of Hours : 75

COURSE OBJECTIVES:

- To understand basics of Wireless Communications and various means of the communication systems involved in wireless communication.
- At the end of the session students should have depth knowledge in wireless applications.

UNIT-I : (15 Hours)
Services And Technical Challenges - Types of Services, Requirements for the services, Multipath propagation, Spectrum Limitations, Noise and Interference limited systems, Principles of Cellular networks, Multiple Access Schemes.

UNIT-II : (15 Hours)
Wireless Propagation Channels - Propagation Mechanisms (Qualitative treatment), Propagation effects with mobile radio, Channel Classification, Link calculations, Narrowband and Wideband models.

UNIT-III : (15 Hours)
Wireless Transceivers - Structure of a wireless communication link, Modulation and demodulation – Quadrature Phase Shift Keying, /4-Differential Quadrature Phase Shift Keying, Offset-Quadrature Phase Shift Keying, Binary Frequency Shift Keying, Minimum Shift Keying, Gaussian Minimum Shift Keying, Power spectrum and Error performance in fading channels.

UNIT-IV : (15 Hours)
Signal Processing In Wireless Systems – Principle of diversity, Macro diversity, Signal Combining Techniques, Transmit diversity, Equalizers – linear and decision feedback equalizers, Review of channel coding and speech coding techniques.

UNIT-V : (15 Hours)
Advanced Transceiver Schemes - Spread Spectrum Systems- Cellular Code Division Multiple Access Systems- Principle, Power control, Effects of multipath propagation on Code Division Multiple Access, Orthogonal Frequency Division Multiplexing – Principle, Cyclic Prefix, Transceiver implementation, Second Generation(GSM, IS–95) and Third Generation Wireless Networks and Standards.

PRESCRIBED BOOKS :
1. Andreas.F. Molisch, "Wireless Communications", John Wiley – India, 2006.
2. Simon Haykin & Michael Moher, "Modern Wireless Communications", Pearson Education, 2007

REFERENCE BOOKS :
1. Rappaport. T.S., "Wireless communications", Pearson Education, 2003.
2. Gordon L. Stuber, "Principles of Mobile Communication", Springer International Ltd., 2001.
3. Andrea Goldsmith, Wireless Communications, Cambridge University Press, 2007.

QUESTION PAPER PATTERN

Section	Question Component	Numbers	Marks	Total
Section - A	**Definition / Principle** Answer ALL questions (Each in 50 words)	1-10	2	20
Section - B	**Short Answer** Answer any 5 out of 7 questions (Each in 300 words)	11-17	7	35
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DISTRIBUTION OF QUESTIONS

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	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

DATA SCIENCE & BIG DATA ANALYTICS
(LATEST TECHNOLOGY - I)

SUBJECT CODE : 16PMCAE09	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 4	Total No of Hours : 75

COURSE OBJECTIVES:
- To understand the concepts of Big Data Analytics, usage of R for implementing machine learning algorithms
- At the end of the session students should be able to work with data analytics tools.

Unit I: **(15 Hours)**
Introduction to big data analytics-Big data overview, Data structures –analyst perspective on data repositories,- State of the Practice in analytics- BI vs Data science- current Analytical Architecture-Drivers of Big data- emerging Big data eco system and a new approach to analytics.

Unit II : **(15 Hours)**
Key roles for the new Big data Ecosystem-examples of big data analytics-Data analytics lifecycle-overview-discovery-Data preparation-Model planning-Model building-Communicate results.

Unit III : **(15 Hours)**
Introduction to r-Attributes and data types in R: Numeric, Character and Logical data types, vectors, arrays and Matrices, Data frames, List, Factors, contingency Tables-R Graphical User Interfaces.

Unit IV : **(15 Hours)**
Data Import and Export-descriptive statistics: Mean, Median, Mode- Exploratory data analysis: visualization before analysis, Dirty data, visualizing a single Variable, Examining multiple variables.

Unit V: **(15 Hours)**
Statistical methods for evaluation: Hypothesis testing, difference of Means: Student's T test-ANOVA-Overview of clustering-K Means-Linear regression-Logistic regression.

PRESCRIBED BOOKS :
1. Data Science & Big data analytics: Discovering, Analyzing, Visualizing and presenting Data , Published by John wiley & sons, Inc., 2015 Edition.

QUESTION PAPER PATTERN

Section	Question Component	Numbers	Marks	Total
Section - A	**Definition / Principle** Answer ALL questions (Each in 50 words)	1-10	2	20
Section - B	**Short Answer** Answer any 5 out of 7 questions (Each in 300 words)	11-17	7	35
Section - C	**Essay** Answer any 3 out of 5 questions (Each in 1200 words)	18-22	15	45

DISTRIBUTION OF QUESTIONS

Sections	Units	No. of Questions	
		Theory	**Problems**
Section A	Unit - 1	2	
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	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

ELECTIVE - III
MATLAB PROGRAMMING

SUBJECT CODE : 16PMCAE10	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 3	Total No of Hours : 75

COURSE OBJECTIVES:
- To understand the basic aspects of MATLAB and working principles in MATLAB IDE.
- At the end of the session students should be able to work in MATLABprojects.

UNIT-I : **(15 Hours)**
Introduction to MATLAB- Programming Environment- Matlab IDE- Manipulating Windows- Variables- Expressions, Constants –Control Flow Commands.

UNIT-II : **(15 Hours)**
Variable workspace-Number functions. Writing Simple Mat lab Script- Solving Simple Equations- Strings-String functions.

UNIT-III : **(15 Hours)**
Vector- Creating Vector- Operations on Vector- Statistical functions Matrices- Matrix Operations- Built-in functions- user defined functions-M files- Creating and Running Script files.

UNIT-IV : **(15 Hours)**
Data import and Data Output-Matlab Plotting- Graphing with ezplot- Modifying Graphs- Graphing with plot- Adding Title, Labels, Grid Lines and Scaling on the Graph –Setting Colors on Graph.

UNIT-V : **(15 Hours)**
Two Dimensional Plots: Bar Graph and Histogram-Building Graphical User Interface- User Interface Controls- Building a Graphical User Interface.

PRESCRIBED BOOKS :
1. Brian R.Hunt, Ronald L. Pipsman, Jonathan M.Rosenberg " A Guide to Matlab for Beginners and Experienced Users", Cambridge.
2. Craig S.Lent "Learn to Program with Matlab".

REFERENCE BOOKS :
1. MATLAB: A Practical Introduction to Programming and Problem Solving , 3rd edition, Stormy Attaway, Elsevier, 2013.

QUESTION PAPER PATTERN

Section	Question Component	Numbers	Marks	Total
Section - A	**Definition / Principle** Answer ALL questions (Each in 50 words)	1-10	2	20
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DISTRIBUTION OF QUESTIONS

Sections	Units	No. of Questions Theory	No. of Questions Problems
Section A	Unit - 1	2	
	Unit - 2	2	
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	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

ELECTIVE - III

OBJECT ORIENTED ANALYSIS AND DESIGN

SUBJECT CODE : 16PMCAE05	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 3	Total No of Hours : 75

COURSE OBJECTIVES:
- To understand the object oriented analysis and UML concepts
- At the end of the session students should be able to design using UML in IDE environment.

UNIT-I : **(15 Hours)**
System Development - Object Basics - Development Life Cycle - Methodologies - Patterns - Frameworks - Unified Approach – UML.

UNIT-II : **(15 Hours)**
Use-Case Models - Object Analysis - Object relations - Attributes - Methods – Class and Object responsibilities - Case Studies.

UNIT-III : **(15 Hours)**
Design Processes - Design Axioms - Class Design - Object Storage - Object Interoperability - Case Studies.

UNIT-IV : **(15 Hours)**
User Interface Design - View layer Classes - Micro-Level Processes - View Layer Interface - Case Studies.

UNIT-V : **(15 Hours)**
Quality Assurance Tests - Testing Strategies - Object orientation on testing - Test Cases - test Plans -Continuous testing - Debugging Principles - System Usability - Measuring User Satisfaction - Case Studies – STAR UML.

PRESCRIBED BOOKS :
1. Ali Bahrami, Reprint 2009, Object Oriented Systems Development, Tata McGraw Hill International Edition.

REFERENCE BOOKS :
1. G. Booch, 1999, Object Oriented Analysis and design, 2nd Edition, Addison Wesley, Boston.
2. R. S.Pressman, 2010, Software Engineering A Practitioner‟s approach, Seventh Edition, TataMcGraw Hill, New Delhi.
3. Rumbaugh, Blaha, Premerlani, Eddy, Lorensen, 2003, Object Oriented Modeling And design , Pearson education, Delhi.

QUESTION PAPER PATTERN

Section	Question Component	Numbers	Marks	Total
Section - A	**Definition / Principle** Answer ALL questions (Each in 50 words)	1-10	2	20
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Section A	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
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	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

ELECTIVE - III

DESIGN AND ANALYSIS OF ALGORITHM

SUBJECT CODE : 16PMCAE11	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 4	Total No of Hours : 75

COURSE OBJECTIVES:
- To introduce basic concepts of design and analysis for selected problems.
- At the end of this course students would be comfortable in developing algorithms.

UNIT-I :   **(15 Hours)**
Introduction – Definition of Algorithm – pseudocode conventions – recursive algorithms – time and space complexity –big-"oh" notation – practical complexities – randomized algorithms – repeated element – primality testing **-** Divide and Conquer: General Method - Finding maximum and minimum.

UNIT-II :   **(15 Hours)**
Divide and conquer contd - merge sort - Quicksort, Selection, Strassen's matrix multiplication – Greedy Method: General Method –knapsack problem - Tree vertex splitting

UNIT-III :   **(15 Hours)**
Job sequencing with dead lines – optimal storage on tapes , Dynamic Programming: General Method - multistage graphs – all pairs shortest paths – single source shortest paths

UNIT-IV :   **(15 Hours)**
String Editing – 0/1 knapsack. Search techniques for graphs –   DFS-BFS-connected components – biconnected components.

UNIT-V :   **(15 Hours)**
Back Tracking: General Method – 8-queens - Sum of subsets - Graph Coloring – Hamiltonian cycles. Branch and Bound: General Method - Traveling Salesperson problem.

PRESCRIBED BOOKS :
1. E. Horowitz, S. Sahni and S. Rajasekaran, 1999, Computer Algorithms, Galgotia, New Delhi.

REFERENCE BOOKS :
1. G. Brassard and P. Bratley, 1997, Fundamentals of Algorithms, PHI, New Delhi.
2. A.V. Aho, J.E. Hopcroft, J.D. Ullmann, !974, The design and analysis of Computer Algorithms, Addison Wesley, Boston.
3. S.E.Goodman and S.T.Hedetniemi, 1977, Introduction to the Design and Analysis of algorithms, Tata McGraw Hill Int. Edn, New Delhi.

WEBSITE, E-LEARNING RESOURCES
1. http://www.cise.ufl.edu/~raj/BOOK.html

QUESTION PAPER PATTERN

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	Unit - 5	2	
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	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

ELECTIVE - III

(LATEST TECHNOLOGY - II)

SUBJECT CODE : 16PMCAE12	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 3	Total No of Hours : 75

COURSE OBJECTIVES:
- To introduce the latest technology during that academic year.

ELECTIVE - 4

INFORMATION SECURITY

SUBJECT CODE : 16PMCAE06	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 3	Total No of Hours : 75

COURSE OBJECTIVES:
- Understand different areas where data is processes and the security aspects of the data.
- After completion one can work in fields where huge volume of data is to be handled.

UNIT-I : **(15 Hours)**
Introduction: Security- Attacks- Computer criminals- Method of defense Program Security: Secure programs- Non-malicious program errors- Viruses and other malicious code- Targeted malicious code-Controls against program threats.

UNIT-II: **(15 Hours)**
Operating System Security: Protected objects and methods of protection- Memory address protection- Control of access to general objects- File protection mechanism- Authentication: Authentication basics- Password- Challenge-response- Biometrics.

UNIT-III : **(15 Hours)**
Database Security: Security requirements- Reliability and integrity- Sensitive data- Interface- Multilevel database- Proposals for multilevel security.

UNIT-IV : **(15 Hours)**
Security in Networks: Threats in networks- Network security control- Firewalls- Intrusion detection systems- Secure e-mail- Networks and cryptography- Example protocols: PEM- SSL- Ipsec.

UNIT-V : **(15 Hours)**
Administrating Security: Security planning- Risk analysis- Organizational security policies- Physical security -   Legal- Privacy- and Ethical Issues in Computer Security - Protecting programs and data-Information and law- Rights of employees and employers- Software failures- Computer crime- Privacy-Ethical issues in computer society- Case studies of ethics.

PRESCRIBED BOOKS:
1. C.P.Pfleeger, and S.L.Pfleeger, Security in Computing, Pearson Education,4th Edition, 2003
2. Matt Bishop, Computer Security: Art and Science, Pearson Education, 2003.

REFERENCE BOOKS :
1. Stallings, Cryptography & N/w Security: Principles and practice, 4th Edition, 2006.
2. Kaufman, Perlman, Spincer, Network Security, Prentice Hall, 2nd Edition, 2003
3. Eric Maiwald, Network Security : A Beginners Guide, TMH, 1999
4. Macro Pistoia, Java Network Security, Pearson Education, 2nd Edition, 1999
5. Whitman, Mattord, Principles of Information Security, Thomson, 2nd Edition, 2005

Website and e-Learning Source
1. http://www.cs.gsu.edu/~cscyqz/courses/ai/aiLectures.html
2. http://www.eecs.qmul.ac.uk/~mmh/AINotes/

QUESTION PAPER PATTERN

Section	Question Component	Numbers	Marks	Total
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	Unit - 2	2	
	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

ENTERPRISE RESOURCE PLANNING

SUBJECT CODE : 16PMCAE13	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 3	Total No of Hours : 75

COURSE OBJECTIVES:
- To understand the basics of Enterprise Resource planning, managing ERP project, supply chain management, planning and essentials of customer relationship management
- At the end of the session students should be able to carry out effective resource planning.

UNIT-I : (15 Hours)
A Foundation for Understanding Enterprise Resource Planning systems – Re-engineering and Enterprise Resource Planning Systems – Planning, Design ,and Implementation of Enterprise Resource Planning Systems – ERP Systems: Sales and Marketing – ERP Systems: Accounting and finance ERP Systems :Production and Materials Management ERP Systems: Human Resources.

UNIT-II : (15 Hours)
Managing an ERP Project – Supply chain Management and the marketplace – Rules of the game – Winning as a team.

UNIT-III : (15 Hours)
Solutions - Supply chains as Systems - Modeling the Supply Chain – Supply Chain Software - Operations – Meeting Demand – Maintaining Supply – Measuring Performance.

UNIT-IV : (15 Hours)
Planning – Forecasting Demand – Scheduling Supply – Improving performance – Mastering Demand – Designing the Chain – Maximizing Performance.

UNIT-V : (15 Hours)
Essentials of Customer relationship management – Designing CRM application – Various modules of CRM application - Advantages of CRM.

PRESCRIBED BOOKS :
1. Sumner Mary, Enterprise Resource Planning, First edition, Pearson education, 2006
2. Taylor David A., Supply Chains (A managers guide), Pearson education, 2004
3. Tiwana, Essential guide to knowledge management : The e-business and CRM applications, Pearson education

REFERENCE BOOKS :
1. ALTEKAR Rahul V., Enterprise wide resource planning (Theory and practice), Prentice Hall of India, 2005.
2. Garg Vinod K & Venkatakrishnan N.K, Enterprise resource planning, Second edition, Prentice Hall of India, 2006.
3. Handfield R. B & Nichols. Ernest L., Introduction to supply chain management, Prentice Hall of India, 2006.

QUESTION PAPER PATTERN

Section	Question Component	Numbers	Marks	Total
Section - A	**Definition / Principle** Answer ALL questions (Each in 50 words)	1-10	2	20
Section - B	**Short Answer** Answer any 5 out of 7 questions (Each in 300 words)	11-17	7	35
Section - C	**Essay** Answer any 3 out of 5 questions (Each in 1200 words)	18-22	15	45

DISTRIBUTION OF QUESTIONS

Sections	Units	No. of Questions Theory	No. of Questions Problems
Section A	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

ELECTIVE - 4

E-COMMERCE

SUBJECT CODE : 16PMCAE14	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 3	Total No of Hours : 75

COURSE OBJECTIVES:
- Understand the basic aspects of Ecommerce.
- After completions students can develop their own Ecommerce sites.

UNIT-I : (15 Hours)

Introduction to Electronic Commerce: Electronic Commerce Framework – Electronic Commerce and Media Convergence – The Anatomy of E-Commerce Applications – Electronic Commerce Consumer Applications – Electronic Commerce Organization Applications. The Network Infrastructure for Electronic Commerce: Components of the I way – Network Access Equipment – Global information Distribution Networks.

UNIT-II : (15 Hours)

The Internet as a Network Infrastructure: The Internet Terminology – NSFNET: Architecture and Components – National Research and Education Network – Globalization of the Academic Internet - Internet Governance – An overview of Internet Applications. The Business of Internet Commercialization: Telco/Cable/On-Line Companies - National Independent ISPs – Regional Level ISPs – Local –level ISPs – Service Provider Connectivity - Internet Connectivity options.

UNIT-III : (15 Hours)

Network Security and Firewalls: Client Server Network Security and Threats. Electronic Commerce and the World Wide Web: Architectural Framework for Electronic commerce – World Wide Web (WWW) as the Architecture – Hypertext Publishing - Technology behind the Web – Security and the Web. Consumer-Oriented Electronic Commerce: Consumer-Oriented Applications – Mercantile process models – Mercantile Models from the Consumers and the Merchant' Perspective.

UNIT-IV : (15 Hours)

Electronic Payment Systems: Types of Electronic Payment Systems – Digital Token based Electronic Payment Systems – Smart Cards and Credit Card – Based Electronic Payment Systems – Risk and Electronic Payment Systems – Designing Electronic Payment Systems. Inter-organizational Commerce and EDI: Electronic Data Interchange –Applications in Business –Legal, Security and Privacy issues - Internet – Based EDI.

UNIT-V : (15 Hours)

Advertising and the Marketing on the Internet: The New Age of Information based marketing and Advertising on the Internet – Consumer Search and Resource Discovery Paradigms and Retrieval -Electronic Commerce Catalogs or Directories – Information filtering – Consumer – Data Interface : Emerging Tools. On Demand Education and Digital Copyrights: Computer based Education and Training – Technological Components of Education on demand. Software Agents: Characteristics and Properties – The Technology behind – Applets, Browsers and Software Agents- Software Agents in Action.

Recommended Text:
1. Ravi Kalakota and Andrew B. Whinston, Eleventh Impression, 2011, Frontiers of Electronic Commerce, Pearson Education Inc., Delhi.

Reference Books:
1. Daniel Minoli, and Emma Minoli, Seventh Reprint 2003, Web commerce Technology Handbook, Tata McGraw Hill, New Delhi.

QUESTION PAPER PATTERN

Section	Question Component	Numbers	Marks	Total
Section - A	**Definition / Principle** Answer ALL questions (Each in 50 words)	1-10	2	20
Section - B	**Short Answer** Answer any 5 out of 7 questions (Each in 300 words)	11-17	7	35
Section - C	**Essay** Answer any 3 out of 5 questions (Each in 1200 words)	18-22	15	45

DISTRIBUTION OF QUESTIONS

Sections	Units	No. of Questions	
		Theory	**Problems**
Section A	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	2	
	Unit - 4	2	
	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

ELECTIVE - IV

HUMAN RESOURCE MANAGEMENT

SUBJECT CODE : 16PMCAE15	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 3	Total No of Hours : 75

COURSE OBJECTIVES:
- To understand the perspectives and basic concepts of Human Resource management. It also introduces essential concepts about training and executive development, sustaining employee interest, Control process and Performance Evaluation.
- At the end of the session students should be able to clear with the HR activities.

UNIT-I :   **(15 Hours)**
Perspectives In Human Resource Management-Evolution Of Human Resource Management – The Importance Of The Human factor – objectives of human resource management – role of human resource manager – human resource policies – computer applications in human resource management.

UNIT-II :   **(15 Hours)**
The Concept Of Best Fit Employee - Importance of human resource planning – forecasting human resource requirement – internal and external sources. Selection process-screening – tests - validation – interview - medical examination – recruitment introduction – importance – practices – socialization benefits.

UNIT-III :   **(15 Hours)**
Training And Executive Development - Types of training, methods, purpose, benefits and resistance. Executive development programmes – common practices - benefits – self development – knowledge management.

UNIT-IV :   **(15 Hours)**
Sustaining Employee Interest - Compensation plan – reward – motivation – theories of motivation – career management – development, mentor – protege relationships.

UNIT-V :   **(15 Hours)**
Performance Evaluation And Control Process - Method of performance evaluation – feedback – industry practices. Promotion, demotion, transfer and separation – implication of job change. The control process – importance – methods – requirement of effective control systems grievances – causes – implications – redressal methods.

PRESCRIBED BOOKS :
1. Decenzo and Robbins, Human Resource Management, Wilsey, 6th edition, 2001.
2. Biswajeet Pattanayak, Human Resource Management, Prentice Hall of India, 2001.

REFERENCE BOOKS :
1. Human Resource Management, Eugence Mckenna and Nic Beach, Pearson Education Limited, 2002.
2. Dessler Human Resource Management, Pearson Education Limited, 2002.
3. Mamoria C.B. and Mamoria S.Personnel Management, Himalaya Publishing Company, 1997.
4. Wayne Cascio, Managing Human Resource, McGraw Hill, 1998.
5. Ivancevich, Human Resource Management, McGraw Hill 2002.

QUESTION PAPER PATTERN

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	Unit - 5	2	
Section B	Unit - 1	2	
	Unit - 2	2	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	
Section C	Unit - 1	1	
	Unit - 2	1	
	Unit - 3	1	
	Unit - 4	1	
	Unit - 5	1	

CORE – XXV

PRACTICAL – IX : .NET LAB

SUBJECT CODE : 16PMCAC25P	PRACTICAL	MARKS : 100
SEMESTER : V	CREDITS : 2	Total No of Hours : 60

COURSE OBJECTIVES:
- Students are given practical training in .NET programming.
- After completion students are able to write .NET program for application under the windows environment.

1. Demonstrate the conditional statements in VB.NET using a console application
2. Demonstrate the looping statements in VB.NET using a console application
3. Develop an application that demonstrates the windows controls
4. Develop a windows application with Menus and Dialog Boxes
5. Demonstrate Multithreaded Programming
6. Demonstrate subroutines and functions
7. Develop an application for deploying various built-in functions in VB.NET
8. Develop an MDI application for Employee Pay-roll transactions
9. Construct a console application to demonstrate the OOP Concepts
10. Demonstrate Events, Delegates, and Interfaces
11. Develop a Windows applications with database connectivity for core-banking transactions
    12. Develop a web application for dynamic Login Processing

CORE – XXVI

PRACTICAL – X : MINI PROJECT

SUBJECT CODE : 16PMCAC26P	PRACTICAL	MARKS : 100
SEMESTER : V	CREDITS : 2	Total No of Hours : 75

COURSE OBJECTIVES:
- To help students in developing small projects that should be useful for small scale industries.
- At the end of the session students should be confident of working in projects.

SOFT SKILL - V

GROUP DISCUSSION

SUBJECT CODE : 16PGSLS06	SOFT SKILL	MARKS : 100
SEMESTER : V	CREDITS : 2	Total No of Hours : 15

COURSE OBJECTIVES:
- To impart the skills of solving problems quickly, efficiently and to give practice of facing Aptitude Test conducted by IT industry confidently.

1. FDI in higher education: a boon or bane?
2. Is Wikileaks release of US diplomatic cables good for democracy and transparency?
3. Does India need a super regulatory body for higher education?
4. Role of government in monitoring the economy in relation to recession
5. Will a caste census help in bringing better development of depressed classes?
6. Is a little corruption acceptable in developing countries?
7. Your opinion on Women reservation bill
8. Weather developing countries should control the emission of carbon?

INTERNSHIP

SUBJECT CODE : 16PINT401	INTERNSHIP	MARKS : 100
SEMESTER : V	CREDITS : 3	DURATION: 6 to 8 Weeks (During Summer Vacation IV Sem)

COURSE OBJECTIVES:
- Students are advised to go a corporate environment to understand the working aspects and important features.
- At the end of the session students should be aware of the practices that are followed in the corporate environment.

Summer Training Program :

During summer vacation of second year each student should undergo training in software or software related industry for 30 working days and they have to present their learning soon after the college is reopened.

SOFT SKILL - VI

CONTENT WRITING

SUBJECT CODE : 16PGSLS07	SOFT SKILL	MARKS : 100
SEMESTER : VI	CREDITS : 2	Total No of Hours : 75

COURSE OBJECTIVES:
- Content writing enables the students to write documents in the software project and preparing the report of work done. Content Writing gives a brief summary of unique ideas used to solve the given problem.

UNIT-I :   **(5 Hours)**
Introduction, Problem Analysis **.**

UNIT-II :   **(5 Hours)**
Design, Filter Module

UNIT-III :   **(5 Hours)**
Stemming Module, Parser Module

UNIT-IV :   **(5 Hours)**
Testing Documentation

UNIT-V :   **(5 Hours)**
Conclusion

PRESCRIBED BOOKS :
1. Thomas Jund, Andrew Mustun , Laurent Cohn, "Quaneko, Find the Stuff on your Local Harddisc".

PROJECT

PROJECT AND VIVA-VOCE

SUBJECT CODE : 16PMCAC27	PROJECT	MARKS : 100
SEMESTER : VI	CREDITS : 18	Total No of Hours : 28

COURSE OBJECTIVES:
- Students are expected to work in real time projects. The project work is to be carried out either in a software industry or in an academic institution for the entire semester.
- Project work shall be carried out individually in an R&D section of any Industry or University or in the Institute in which the candidate is studying. The Project Work/Dissertation report shall be submitted through the guides/supervisors to the Head of the Department.