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 2019-20 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.

PO 4: 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.

PSO 2: 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)
2019-20 Batch onwards

Semester	Part	Course	Subject Code	Title	Credits	Hours	Internal	External	Total
Semester - I	III	Core Paper-1	**19PMCA301**	Problem Solving and Programming using C	4	5	50	50	100
	III	Core Paper-2	**19PMCA302**	Computer Communication and Networking	4	5	50	50	100
	III	Core Paper-3	**19PMCA303**	Open Source Technologies	4	5	50	50	100
	III	Core Paper-4	**19PMCA304**	Software Engineering	4	5	50	50	100
	III	Core Paper-5	**19PMCA305P**	Practical - I : Programming in C Lab	2	4	50	50	100
	III	Core Paper-6	**19PMCA306P**	Practical - II : Open Source Technology Lab	2	4	50	50	100
	IV	Soft Skill-1	**19PGSL401C**	Language and Communication Skill	2	2	50	50	100
Total Credits : 22 / Total Hours per week : 30									
Semester - II	III	Core Paper-7	**19PMCA307**	Data Structures and Algorithms	4	5	50	50	100
	III	Core Paper-8	**19PMCA308**	Advanced Internet Technologies	4	5	50	50	100
	III	Core Paper-9	**19PMCA309**	Operating Systems	4	5	50	50	100
	III	Core Paper-10	**19PMCA310**	Advanced Java Programming	4	5	50	50	100
	III	Core Paper-11	**19PMCA311P**	Practical - III : Advanced Internet Technologies Lab	2	4	50	50	100
	III	Core Paper-12	**19PMCA312P**	Practical - IV : Advanced Java Programming Lab	2	4	50	50	100
	IV	Soft Skill-2	**19PGSL402F**	Presentation Skill	2	2	50	50	100
Total Credits : 22 / Total Hours per week : 30									

COURSE STRUCTURE
MCA (MASTER OF COMPUTER APPLICATIONS)
2019-20 Batch onwards

Semester - III	III	Core Paper-13	**19PMCA313**	Web Development using PHP and MySQL	4	4	50	50	100
	III	Extra-Disciplinary	**19PMCA314**	Accounting and Financial Management	4	5	50	50	100
	III	Core Paper-14	**19PMCA314**	Data Analysis using Python	4	4	50	50	100
	III	Core Paper-15	**19PMCA316**	Artificial Intelligence	3	4	50	50	100
	III	Non-Major Elective	**19PMCA317**	Essential Statistics For Analytics	4	4	50	50	100
	III	Core Paper-16	**19PMCA318P**	Practical - V : PHP and MySQL Lab	2	4	50	50	100
	III	Core Paper-17	**19PMCA319P**	Practical - VI : Data Analysis using Python Lab	2	4	50	50	100
	IV	Soft Skill-3	**19PGSL403J**	Managerial Skill	2	1	50	50	100
Total Credits : 25 / Total Hours per week : 30									
Semester - IV	III	Core Paper – 18	**19PMCA320**	Machine Learning using R	3	4	50	50	100
	III	Core Paper – 19	**19PMCA321**	User Interface Design and Development	3	4	50	50	100
	III	Core Paper – 20	**19PMCA322**	Advanced Database Management System	4	4	50	50	100
	III	Core Paper – 21	**19PMCA323**	Cloud Computing and Virtualization	4	4	50	50	100
	III	Elective -1	**19PMCA324**	Elective - I (LATEST TECHNOLOGY)	3	4	50	50	100
	III	Core Paper – 22	**19PMCA325P**	Practical - VII : UI Design and Development Lab	2	4	50	50	100
	III	Core Paper – 23	**19PMCA326P**	Practical - VIII : Advanced DBMS Lab	2	4	50	50	100
	IV	Soft Skill-4	**19PGSL407L**	Quantitative Aptitude	2	2	50	50	100
Total Credits : 23 / Total Hours per week : 30									

COURSE STRUCTURE
MCA (MASTER OF COMPUTER APPLICATIONS)
2019-20 Batch onwards

Semester - V	III	Core Paper – 24	**19PMCA327**	Robotic Process Automation	4	5	50	50	100
	III	Elective-2	**19PMCA328**	Elective – II	4	5	50	50	100
	III	Elective-3	**19PMCA329**	Elective – III	3	5	50	50	100
	III	Elective-4	**19PMCA330**	Elective – IV	3	5	50	50	100
	III	Core Paper – 25	**19PMCA331P**	Practical - IX : Robotic Process Automation Lab	2	4	50	50	100
	III	Core Paper - 26	**19PMCA332P**	Practical - X : Mini Project	2	5	50	50	100
	IV	Soft Skill-5	**19PGSL408M**	Group Discussion	2	1	50	50	100
	III	Internship	**19PINT401**	During Summer Vacation of IV Semester 6 to 8 Weeks	3	-	50	50	100
Total Credits : 23 / Total Hours per week : 30									
Semester - VI	IV	Soft Skill-6	**19PGSL409N**	Content Writing	2	2	50	50	100
	III	Project	**19PMCA333**	Project and Viva-Voce	18	28	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 - II	**19PMCA334**	Data Mining and Warehousing
	19PMCA335	Hadoop Big Data
	19PMCA328	Data Science And Big Data Analytics
Elective - III	**19PMCA336**	MATLAB Programming
	19PMCA329	Object Oriented Analysis, Design and UML
	19PMCA337	Design and Analysis of Algorithm
Elective - IV	**19PMCA330**	Information Security and Cyber Laws
	19PMCA338	Enterprise Resource Planning
	19PMCA339	e-Commerce
	19PMCA340	Human Resource Management

CORE– I
PROBLEM SOLVING AND PROGRMMING USING C

SUBJECT CODE : 19PMCA301	**THEORY**	**MARKS : 100**
SEMESTER : I	**CREDITS : 4**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To introduce problem solving and basic programming concepts in C.
- At the end of this course students will be able to solve problems and program efficiently in C.

UNIT-I : **(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-II: **(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-III: **(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-IV: **(15 Hours)**

Pointers - pointer operators - arrays and pointers - Dynamic memory allocation - File Management in C - Files and Streams - File handling functions - Command Line Arguments.

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

Introduction to Graphics in C, Drawing objects in C - line, circle, rectangle, ellipse- Changing Foreground and Background color, filling objects with colors.

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	
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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	
	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
COMPUTER COMMUNICATION AND NETWORKING

SUBJECT CODE : 19PMCA302	**THEORY**	**MARKS : 100**
SEMESTER : I	**CREDITS : 4**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand the basic aspects of Computer Communication and Networking.
- At the end of this course students will have a good understanding about computer communication and networking.

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

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

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

TCP/IP Networking : TCP/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. Behruz A. Ferouzon, " Data Communication and Networking", Tata McGraw, 2004.

REFERENCE BOOKS :

1. Andrew S.Tanenbaum ,"Computer Networks ", III edition - Pearson Education, 1998.
2. William Stallings , "Data and Computer Communication " , Pearson Education, 5th Edition, September 2000.

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 - III
OPEN SOURCE TECHNOLOGIES

SUBJECT CODE : 19PMCA303	**THEORY**	**MARKS : 100**
SEMESTER : I	**CREDITS : 4**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand about Open source technologies and working with Linux commands.
- At the end of this course students will be able to work in Linux Environment.

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 editor(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

Question Paper Pattern

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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
SOFTWARE ENGINEERING

SUBJECT CODE : 19PMCA304	**THEORY**	**MARKS : 100**
SEMESTER : I	**CREDITS : 4**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand about software engineering in detail.
- At the end of this course students will be able to understand the software engineering progress and its intricacies.

UNIT-I : **(15 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.

UNIT-II : **(15 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, Requirement Validation.

UNIT-III: **(15 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, Component Based Design, Design Metrics.

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

Software Testing : Purpose- – Testing Vs Debugging - Bugs – Types of Bugs -Levels of Testing – Testing Approaches – Types of Testing – Test Cases - Test Plan- Flow/Graphs and Path Testing – Achievable paths – Path instrumentation – Transaction Flow Testing Techniques – Data Flow Testing Strategies -Linguistic – Metrics – Structural Metrics.

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

Software Project Management : The Management spectrum – W5HH principle –Process and Project Metrics –Software Measurement – Software Project Estimation – Decomposition Techniques - Project Scheduling and Tracking, Risk Assessment and Mitigation, Software Quality Assurance (SQA), Project Plan, Project Metrics.

PRESCRIBED BOOKS :

1. Roger. S. Pressman, 2010, Software Engineering A Practitioners approach, Seventh Edition, Tata McGraw-Hill, New Delhi.
2. B. Beizer , 2003, Software Testing Techniques, II Ed., DreamTech India, New Delhi.

REFERENCE BOOKS :

1. I. Sommerville, 2001, Software Engineering, 6th Edition, Addison Wesley, Boston.
2. Rajib Mal, 2005, -Fundamental of Software engineering , 2 nd Edition , PHI, New Delhi.
3. N. E. Fenton, S. L. Pfleenger, 2004, Software Metrics, Thomson Asia, Singapore.
4. Richard H.Thayer, ”Software Engineering& Project Management”, Willey India
5. Pankaj Jalote , ”An Integrated Approach to Software Engineering”, Narosa Pub, 2005

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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	

CORE - V
PRACTICAL - I : PROGRAMMING IN C LAB

SUBJECT CODE : 19PMCA305P	**PRACTICAL**	**MARKS : 100**
SEMESTER : I	**CREDITS : 2**	**TOTAL No. OF HOURS :60**

COURSE OBJECTIVES:

- To have hands-on experience in C programming.
- At the end of this course students will be able to write C program and good at debugging.

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 - VI

PRACTICAL - II : OPEN SOURCE TECHNOLOGY LAB

SUBJECT CODE : 19PMCA306P	**PRACTICAL**	**MARKS : 100**
SEMESTER : I	**CREDITS : 2**	**TOTAL No. OF HOURS : 60**

COURSE OBJECTIVES:

- To have hands-on experience in Open Source Technology – LINUX.
- At the end of this course students will be able to write shell programs in Linux and good at debugging.

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 n^{th} column from a file.
10. Remove duplicate words from a List or File.
11. To Process electricity billing using awk command.

SOFT SKILL - I
.: LANGUAGE AND COMMUNICATION SKILL

SUBJECT CODE : 19PGSL401C	**SOFT SKILL**	**MARKS : 100**
SEMESTER : I	**CREDITS : 2**	**TOTAL No. OF HOURS : 30**

COURSE OBJECTIVES:

- Students are trained in basic communication skills and this helps them to have command over the language.
- At the end of this course, students will be able to communicate well and this will help them to grow in real world.

UNIT-I : **(6 Hours)**
Twinning Functions of Listening and Speaking.

UNIT-II : **(6 Hours)**
Twinning Functions of Reading and Writing.

UNIT-III : **(6 Hours)**
Individual Communication.

UNIT-IV : **(6 Hours)**
Intermediary Communication.

UNIT-V : **(6 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 - VII
DATA STRUCTURES AND ALGORITHMS

SUBJECT CODE : 19PMCA307	**THEORY**	**MARKS : 100**
SEMESTER : II	**CREDITS : 4**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand about the basic concepts of algorithms and data structures.
- At the end of this course students will be able to understand algorithms and create efficient algorithms for applications.

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

Abstract data types - Arrays and sequential representations – ordered lists – Stacks and Queues – Evaluation of Expressions – Singly Linked List –Polynomial addition.

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

Trees – Binary tree representations – Tree Traversal – Binary Tree Representation of Trees – Graphs and Representations –Graph Implementation - Graph Traversals - Minimum Cost Spanning Trees.

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

Algorithms – Pseudo code conventions - Sorting – Heap Sort – Merge Sort – Quick Sort – Binary Search – Finding the Maximum and Minimum.

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

Greedy Method : The general method – optimal storage on tapes – Knapsack Problem – Job Sequencing with deadlines .

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

ack tracking: The general method – The 8-Queens Problem – Sum of Subsets – Graph Coloring.

PRESCRIBED BOOKS :

1. Ellis Horowiz, Sartaj Sahni and Sanguthevar, " Fundamentals of Data Structure".
2. Ellis Horowiz, Sartaj Sahni and Sanguthevar Rajasekaran, Galgotia Publications, 2001, "Fundamentals of Computer Algorithms ".

REFERENCE BOOKS :

1. A.V.Aho, J.D. Ullman, J.E. Hopcraft, 1983, Data Structures and Algorithms, Addison Wesley, Boston.

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

CORE - VIII
ADVANCED INTERNET TECHNOLOGIES

SUBJECT CODE : 19PMCA308	**THEORY**	**MARKS : 100**
SEMESTER : II	**CREDITS : 4**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand the basic concepts of Advanced Internet Technologies like HTML5, CSS,XML and scripting languages.
- At the end of this course students will be able to work in HTML5, CSS, Javascript, VBscript and XML.

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

Introduction to HTML and HTML5 - Formatting and Fonts -Commenting Code – Anchors – Backgrounds – Images – Hyperlinks – Lists – Tables –Nested Tables– Frames - HTML Forms- HTML Media – Audio and Video.

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)**

XML Introduction- Introduction of XML- Some current applications of XML, Features of XML, Anatomy of XML document, The XML Declaration, Element Tags-Nesting and structure, XML text and text formatting element, Table element, Mark-up Element and Attributes, Document Type Definition (DTD) types.

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.

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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	
	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 - IX
OPERATING SYSTEMS

SUBJECT CODE : 19PMCA309	**THEORY**	**MARKS : 100**
SEMESTER : II	**CREDITS : 4**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand different operating systems and their core concepts.
- At the end of this course students will have in-depth 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, Inter-process 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.

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

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

CORE - X
ADVANCED JAVA PROGRAMMING

SUBJECT CODE : 19PMCA310	**THEORY**	**MARKS : 100**
SEMESTER : II	**CREDITS : 4**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand the advanced concepts of Java technologies.
- At the end of this course students will be able to write programs in Advanced Java Technologies.

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

Understanding Object oriented programming-classes and Inheritance – Abstract classes – Inner classes and Lambda- working with string, Array and classes: Array list- Linked list- Generic collection classes – Handling bulk data operation with collections-Files and Databases : working with files- JDBC connectivity- working with XML.

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

Power of servlets –Http Basics- Servlet API –Page Generation- Server Side Includes- Servlet chaining and Filters-Servlet Life Cycle: Basic Aspects- Servlet Reloading – Init and Destroy Method - Single Thread Model-Background Processing. Retrieving information- Initialization parameters, The Server, Client, and Request.

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

Session Tracking: User Authorization- Hidden form fields-URL Rewriting- Persistent Cookies-Session Tracking API. Security-HTTP authentication- Digital Certificates – Secure Socket Layer- Data Base Connectivity – Internationalization: European Languages - Conforming to Local Customs -Multiple Languages.

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

JSP Basics – Declarations – Expressions – Scriptlets - Implicit objects - Standard actions- Directives-Declarations- Expressions – Scriptlet- Implicit objects- Standard actions - JSP Standard Tag Library (JSTL) : JSTL Core Library - General-purpose actions- Conditional actions.

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

Spring Basics-Exploring Spring's Architecture-The Application context- Beans-The Spring Life cycle - Understanding Bean Scopes - Dependency Injection and Inversion of Control-Setter-Based Dependency Injection – Hibernate : Understanding object/relational persistence- persistence - Persistence in object-oriented applications- Persistence layers and alternatives- Object/relational mapping (ORM).

PRESCRIBED BOOKS :

1. Java All-In-One for Dummies, Doug Lowe , 4th Edition, Published by John Wiley& Sons Inc.
2. Java ™ Servlet Programming- Jason Hunter with William Crawford, Published by O'Reilly & Associates, Inc.
3. Learn Java for Web Development,Vishal Layka, Apress publication.
4. Hibernate in Action, Christian Bauer Gavin King, Manning Publications Co

REFERENCE BOOKS :

1. Murachs ,Java Servlet and JSP,2nd Edition, Joel Murach Andrea Steelman, Mike Murach & Associates Inc.

Question Paper Pattern

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	Unit – 4	1	
	Unit – 5	1	

CORE - XI
PRACTICAL - III : ADVANCED INTERNET TECHNOLOGIES LAB

SUBJECT CODE : 19PMCA311P	**PRACTICAL**	**MARKS : 100**
SEMESTER : II	**CREDITS : 2**	**TOTAL No. OF HOURS : 60**

COURSE OBJECTIVES:

- To have hands-on experience in HTML5, CSS, Script and XML programming.
- At the end of this course students will be able to develop design Web Based Applications and good at debugging.

APPLICATION:

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.

CORE - XII
PRACTICAL - IV : ADVANCED JAVA PROGRAMMING LAB

SUBJECT CODE : 19PMCA312P	**PRACTICAL**	**MARKS : 100**
SEMESTER : II	**CREDITS : 2**	**TOTAL No. OF HOURS : 60**

COURSE OBJECTIVES:

- To have hands-on experience in Advanced Java Programming.
- At the end of this course students will be able to develop server side applications based on Java Technologies and good at debugging.

APPLICATION

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.

SOFT SKILL - II
PRESENTATION SKILL

SUBJECT CODE : 19PGSL402F	**SOFT SKILL**	**MARKS : 100**
SEMESTER : II	**CREDITS : 2**	**TOTAL No. OF HOURS : 30**

COURSE OBJECTIVES:

- Students are trained in presentation skill which is significant for their personal and professional success.
- At the end of this course students will have positive attitude and they will be confident in effective verbal and non-verbal Communication.

UNIT-I : (6 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 : (6 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 : (6 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 : (6 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 : (6 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 - XIII
WEB DEVELOPMENT USING PHP AND MYSQL

SUBJECT CODE : 19PMCA313	**THEORY**	**MARKS : 100**
SEMESTER : III	**CREDITS : 4**	**TOTAL No. OF HOURS : 60**

COURSE OBJECTIVES:

- To understand the basic concepts of web development using PHP and MySQL.
- At the end of this course students will be able to work with PHP and MySQL database and deploy them in servers.

UNIT-I : **(12 Hours)**

Introduction to PHP, History of PHP, Versions of PHP, Features of PHP, Advantages of PHP over Other Scripting Languages, Installation and Configuration of PHP, Data Types in PHP, PHP Syntax, Comments, PHP Variables and Constants, Scope of Variables, PHP String, String Manipulation, PHP Operators, Precedence of Operators, Expressions, Creating a PHP Script, Running a PHP Script.

UNIT-II : **(12 Hours)**

Basic HTML, Embedding PHP in HTML, Passing Information between Pages, PHP $_GET, PHP $_POST, PHP Conditional Statements, PHP Looping Statements, Break, Continue, Exit, PHP Functions: Built-in and User Defined Function, Regular Expression Functions, Mathematical, Date and Time Functions, PHP Arrays: Creating Array and Accessing Array Elements.

UNIT-III : **(12 Hours)**

PHP File Permissions, Working with Files: Opening, Closing, Reading, Writing a File; Working with Directory: Creating, Deleting, Changing a Directory; Working with Forms: Introduction to a Web Form, Processing a Web Form, Validating a Web Form, Input Validation, PHP with Client Side Scripting Language, Exception and Error Handling in PHP, Introduction to Cookies and Session Handling.

UNIT-IV : **(12 Hours)**

Working with Database: PHP-Supported Databases; Using PHP & My SQL: Installation and Configuration of My SQL on Windows, Checking Configuration, Connecting to Database, Selecting a Database, Adding Table and Altering Table in a Database, Inserting, Deleting and Modifying Data in a Table, Retrieving Data, Performing Queries, Processing Result Sets.

UNIT-V : **(12 Hours)**

Code Re-use, require(), include(), and the include path, File System Functions and File Input and Output, File Uploads, Use of CSS, Introduction to Object Oriented Programming with PHP, Installing and Configuring Apache to use PHP on Windows, php.ini File, Handling and Avoiding Errors.

PRESCRIBED BOOKS :

1. Vikram Vaswani ,"Php & My Sql", Tmh Publications
2. Julie C. Meloni ," Php Essentials", Bpb Publications

REFERENCE BOOKS :

1. Expert Php And Mysql, Wrox Programmer To Programmer, Wrox Press, 2010

Question Paper Pattern

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EXTRA DISCIPLINARY
ACCOUNTING AND FINANCIAL MANAGEMENT

SUBJECT CODE : **19PMCA314**	**THEORY**	**MARKS : 100**
SEMESTER : III	**CREDITS : 4**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand the basic concepts in accounting and financial statements.
- At the end of this course, student will be able to work with and analyze financial statements of a business.

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

Budget/Forecasting: preparation of and Characteristics of functional budgets, Production, Material Purchase Budget, sales, cash and flexible budgets.

UNIT-V : **(15 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.
2. Khan and Jain "Financial Management" Tata McGraw Hill (Recent Edition).

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

CORE - XIV
DATA ANALYSIS USING PYTHON

SUBJECT CODE : 19PMCA314	**THEORY**	**MARKS : 100**
SEMESTER : III	**CREDITS : 4**	**TOTAL No. OF HOURS : 60**

COURSE OBJECTIVES:

- To understand the basic concepts of Python programming and Data Analysis.
- At the end of this course, student will be able to analyze data using Python.

UNIT-I: **(12 Hours)**

Input, Processing, and Output - print Function - Variables - Reading Input from the Keyboard - Performing Calculations - Simple Functions - Introduction to Functions - Defining and Calling a Function - Designing a Program to Use Functions - Local Variables - Passing Arguments to Functions - Global Variables and Global Constants – different lopping constructs.

UNIT – II : **(12 Hours)**

Files and Exceptions - File Input and Output - Using Loops to Process Files - Processing Records – Exceptions - Lists and Tuples – Sequences – Lists -List Slicing -List Methods and Useful Built-in Functions - Copying Lists - Processing Lists - Two-Dimensional Lists - Tuples - Basic String Operations - String Slicing Dictionaries and Sets - Dictionaries - Sets -Serializing Objects.

UNIT – III: **(12 Hours)**

Classes and Objects in Python - Object-Oriented Programming - Inheritance
Polymorphism - Recursion and its Examples - GUI Programming: Using the tkinter Module - Display Text with Label Widgets - Organizing Widgets with Frames - Button Widgets and Info Dialog Boxes -Getting Input with the Entry Widget - Labels as Output Fields - Radio Buttons and Check Buttons.

UNIT – IV: **(12 Hours)**

Role of Statistics and Mathematics in Analysis - Knowledge domain: Data, information, and knowledge Data Analysis Process - Data preparation -Data exploration - Predictive modeling - Visualization of results - Quantitative versus qualitative data analysis - Importance of data visualization - Sensors and cameras in Social networks analysis.

UNIT-V: **(12 Hours)**

Working with Data – Data source - Open data – Text, Excel - SQL databases -NoSQL databases - Multimedia - Web scraping - Data scrubbing - Text parsing - Data transformation - Data formats - CSV - Parsing a CSV file with the csv module - Parsing a CSV file using NumPy - Parsing an XML file in Python using xml module - Simulation of Stock Prices - Financial time series.

PRESCRIBED BOOKS:

1. Starting out with Python, " Tony Gaddis", Addison-Wesley, Pearson pub. 2012.
2. Practical Data Analysis, "Hector Cuesta", Packt Publication 2013.

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

CORE - XV
ARTIFICIAL INTELLIGENCE

SUBJECT CODE : 19PMCA316	**THEORY**	**MARKS : 100**
SEMESTER : III	**CREDITS : 3**	**TOTAL No. OF HOURS : 60**

COURSE OBJECTIVES:

- To understand the basic concepts of Artificial Intelligence.
- At the end of this course, students will be having deep insight in basic concepts of Artificial Intelligence.

UNIT-I : **(12 Hours)**

Problems and Search : What is AI – AI problems – AI Techniques – Level of Model – **Problems, Problem Space and Search :** Defining the problem as a State Space Search – Production Systems – Depth First Search - Breadth First Search

UNIT-II : **(12 Hours)**

Heuristic Search Techniques : Generate-and-Test - Hill Climbing – Breadth first Search- Best First Search- The A* algorithm - **Problem Reduction** : AND –OR graphs – the AO* algorithm.

UNIT-III : **(12 Hours)**

Knowledge Representation : Representation and Mappings – approaches to knowledge representation – **Using Predicate Logic :** Representing Instance and Isa Relationship – Computable functions and Predicates- Resolution – The Unification Algorithm – Resolution in Predicate Logic - Question Answering.

UNIT-IV: **(12 Hours)**

Representing Knowledge using Rules : Procedural vs. Declarative Knowledge – Logic programming - Forward vs Backward reasoning - Matching

UNIT-V : **(12 Hours)**

Introduction to Non-monotonic Reasoning – Minimalist Reasoning - **Expert Systems :** Representing and using Domain Knowledge – Expert System shells – Knowledge Acquisition.

PRESCRIBED BOOKS :

1. Artificial Intelligence (SIE), Kevin Knight, Elaine Rich, B. Nair, Mc-Graw Hill Publication.

REFERENCE BOOKS :

1. Artificial Intelligence By Example, Denis Rothman, Packt Publishing Ltd.

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NON-MAJOR ELECTIVE
ESSENTIAL STATISTICS FOR ANALYTICS

SUBJECT CODE : 19PMCA317	**THEORY**	**MARKS : 100**
SEMESTER : III	**CREDITS : 4**	**TOTAL No. OF HOURS : 60**

COURSE OBJECTIVES:

- To understand the essential statistical concepts for Analytics.
- At the end of this course, students will have required knowledge in Statistics for Data Analytics.

UNIT-I : (12 Hours)

Measures of location – Arithmetic Mean, Median, Mode, Geometric Mean, Harmonic Mean, and their properties, Merits and demerits - Measures of Dispersion -- Range, Mean Deviation, Quartile Deviation, Standard deviation, Coefficient of variation, Skewness and Kurtosis.

UNIT-II : (12 Hours)

Sample spaces - events - Axiomatic approach to probability - conditional probability - Independent events - Baye's formula - Random Variables : Continuous and Discrete random variables.

UNIT-III : (12 Hours)

Bivariate distribution - conditional and marginal distributions - Discrete distributions - discrete uniform, Binomial poison Distributions - Continuous distributions - Uniform, Normal, Exponential and Gamma distributions.

UNIT-IV : (12 Hours)

Correlation ,Regression – Rank Correlation Coefficient – Curve fitting by the Method of Least Squares.

UNIT-V : (12 Hours)

Concept of Sampling Distributions – Standard Error – Test of Significance based on t, Chi-Square and F-distributions with respect to Mean and Variance.

PRESCRIBED BOOKS :

1. P.R.Vittal&V.Malini, Statistical and Numerical methods, Margham Publications.
2. Snedecor, G.W., & Cochran, W.G.(1967): Statistical Methods, Oxford and IBH,Prentice Hall
3. Dr. S.P. Gupta - Sultan Chand & Sons , “Statistical Methods”.

REFERENCE BOOKS :

1. Fundamental of Mathematical Statistics - S.C. Gupta & V.K. Kapoor - Sultan Chand
2. Wilks, S.S.: Elementary Statistical Analysis - Oxford and IBH
3. Mode, E.B.: Elements of Statistics - Prentice Hall.

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	Unit – 5	1	

CORE - XVI
PRACTICAL - V : PHP AND MYSQL LAB

SUBJECT CODE : 19PMCA318P	**PRACTICAL**	**MARKS : 100**
SEMESTER : III	**CREDITS : 2**	**TOTAL No. OF HOURS : 60**

COURSE OBJECTIVES:

- To have hands-on experience in PHP and MySQL Applications.
- At the end of this course students will be able to develop Web Applications in PHP and MySQL.

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APPLICATIONS:

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 Query string (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

CORE - XVII
PRACTICAL - VI : DATA ANALYSIS USING PYTHON LAB

SUBJECT CODE : 19PMCA319P	**PRACTICAL**	**MARKS : 100**
SEMESTER : III	**CREDITS : 2**	**TOTAL No. OF HOURS : 60**

COURSE OBJECTIVES:

- To have hands-on experience in Data Analysis using Python.
- At the end of this course students will be able to analyze data efficiently using Python

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1. Write a program in Python to print the Max value in the given list and find whether a given number prime or not.
2. Write a program to search a given number using Liner
3. Design a program in python to find a number using Binary search.
4. Sort a numbers using insertion sort.
5. Write a program in python to sort the numbers in ascending order using merge sort.
6. Simulate an elliptical orbit in PyGame.
7. Simulate a bouncing ball using PyGame.
8. Create a database application to add, display and delete in the Book Database.
9. Create a simple calculator in python.
10. Create a database application to add, display and delete students detail in the student database.
11. Write a program in python to print the distance between two prints.
12. Create a Frame Widget using Tkinter .
13. Create a Radio button and the checkbox using Tkinter.
14. Create Tkinter object called Slider which allows the user to set a value by moving an indicator.
15. Create a menu bar using Tkinter.
16. Create Client / Server application using python
17. Write a python program to count the vowels in a given word.
18. Write a python program to find the hash in a File.
19. Write a python program to find the resolution of a image.
20. Write a Python program for a banking application.

SOFT SKILL - 3
MANAGERIAL SKILL

SUBJECT CODE : 19PGSL403J	**SOFT SKILL**	**MARKS : 100**
SEMESTER : III	**CREDITS : 2**	**TOTAL No. OF HOURS : 15**

COURSE OBJECTIVES:

- To help students to understand about stress, negative emotions and manage them effectively.
- To enlighten about the important interpersonal skills like 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
MACHINE LEARNING USING R

SUBJECT CODE : 19PMCA320	**THEORY**	**MARKS : 100**
SEMESTER : IV	**CREDITS : 3**	**TOTAL No. OF HOURS : 60**

COURSE OBJECTIVES:

- To understand about the basic concepts of machine learning using R.
- At the end of this course students will be able to apply machine learning concepts in environments where huge volumes of data are used.

UNIT-I : (12 Hours)

Introducing Machine Learning - The origins of machine learning - Uses of machine learning - How do machines learn : Abstraction and knowledge representation Generalization - Assessing the success of learning - Steps to apply machine learning to your data - Choosing a machine learning algorithm : Thinking about the input data - Thinking about types of machine learning algorithms - Matching your data to an appropriate algorithm.

UNIT-II : (12 Hours)

Using R for machine learning: Installing and loading R packages - Managing and Understanding Data: R data structures: Vectors - Factors – Lists - Data frames – Matrices and arrays - Managing data with R: Saving and loading R data structures importing and saving data from CSV files - Importing data from SQL databases.

UNIT-III : (12 Hours)

Exploring and understanding data - Exploring the structure of data - Exploring numeric variables - Measuring the central tendency – mean and median - Measuring spread and quartiles - boxplots - histograms - normal distributions - Measuring spread, variance and standard deviation - Exploring relationships between variables - Visualizing relationships – scatterplots.

UNIT-IV : (12 Hours)

Finding Patterns – Market Basket Analysis Using Association Rules - Understanding association rules - The Apriori algorithm for association rule learning - Measuring rule interest – Building a set of rules with the Apriori principle – identifying frequently purchased groceries with association rules.

UNIT-V : (12 Hours)

Understanding neural networks - From biological to artificial neurons - Activation functions - Network topology - The number of layers - The direction of information travel - The number of nodes in each layer - Training neural networks with back propagation

PRESCRIBED BOOKS :

1. Machine Learning with R, " Brett Lantz " , Packt Publishing , Open Source, 2013 Edition.

REFERENCE BOOKS :

1. R Deep Learning Essentials, " Dr Joshua F. Wiley" , Packt Publishing open source, 2016 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	
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	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	2	
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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 - XIX
USER INTERFACE DESIGN AND DEVELOPMENT

SUBJECT CODE : 19PMCA321	**THEORY**	**MARKS : 100**
SEMESTER : IV	**CREDITS : 3**	**TOTAL No. OF HOURS : 60**

COURSE OBJECTIVES:

- To understand the basic concepts of responsive web designing using AngularJS and Node JS.
- At the end of this course, students will be able to efficiently design and develop Web Pages with Interactive User Interface Tools.

UNIT-I : **(12 Hours)**

Introduction to HTML5 and CSS3 : Overview of HTML5 and CSS3 -New Structural Tags and Attributes - CSS Building Block : Working with style sheet- Defining Selectors - Showing Progress : <meter> Element Creating User Friendly Web Forms -Describing Data with New Input Fields, Slider, Spinboxes, Dates, Email, URL, Color**.**

UNIT-II : **(12 Hours)**

Autofocus, Placeholder, Validating User Input, In-Place Editing with content editable - Drawing in the Browser: Drawing Logos, Drawing Lines, Adding text- Embedding Audio and Video, Plug-ins, YouTube - Geolocation**.**

UNIT-III : **(12 Hours)**

Introduction to AngularJS: Architectural Concept : MVC Architecture - Setting up the framework - Organizing the code - Creating Reusable components with Directives : Directive, built-in directives - ngApp ,ngController, ngBind , ngRepeat, ngModel and ngInclude Creating our own Directives**.**

UNIT-IV : **(12 Hours)**

AngularJS Data Handling: Expressions - Filters - Basic usage with Expressions - Creating filters - Angular JS Forms - Events - Form Validation - Creating our form - Basic Validation -Understanding the $pristine and $dirty properties - AngularJS Includes.

UNIT-V : **(12 Hours)**

Introduction to Node Js : Understanding the Node Environment - V8 - Extending Javascript -Features of Node JS -Memory and other limits - console - REPL - Node.js Package Manager - Module - Node Js Web Server- Streams - Node Js File System - Process Model- Timers- Callbacks - Node Js Event Loop.

PRESCRIBED BOOKS :

1. Briyan P.Hogan , " Html5 And Css3",Second Edition.
2. Rodrigo Branas , "Angularjs Essentials",Packt Publishing.
3. Sandro Pasquali, "Mastering Node.Js", Packt Publishing

REFERENCE BOOKS :

1. Angularjs – 1st Edition, Brad Green, Shyam Seshadri, O'reilly
2. Html5 And Css3 Responsive Web Design Cookbook, Benjamin Lagrone, Packt Publishing

Question Paper Pattern

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	Unit – 5	1	
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	Unit – 2	1	
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	Unit – 4	1	
	Unit – 5	1	

CORE - XX
ADVANCED DATABASE MANAGEMENT SYSTEM

SUBJECT CODE : 19PMCA322	**THEORY**	**MARKS : 100**
SEMESTER : IV	**CREDITS : 4**	**TOTAL No. OF HOURS : 60**

COURSE OBJECTIVES:

- To understand the advanced database management systems concepts.
- At the end of this course, students will be able to work with DBMS, write and work with SQL queries and PL/SQL cursors, procedures, functions and triggers.

UNIT-I : **(12 Hours)**

Introduction : Definition of Data, Database and DBMS – Need for database –Advantages of Relational Database Systems - Database characteristics - **Database related terms** : Concurrency, Consistency, Data Availability, Reliability, Transparency, Data Integrity and Data Security.

UNIT-II : **(12 Hours)**

Relational data structure: Relation – Domains & Attributes – Keys – SQL Data types – **E-R model:** Entities, Entity Sets – Relationships and Mapping Cardinalities, Relationship Sets – ER Diagram Notations – Participation Constraints - Extended E-R Features – Rules for transforming ER Diagram into Tables – **Data Definition Language** : Create, Alter and Drop Tables –**Normalization** : Need, Normalization process - **Normal forms :** 1NF, 2NF and 3 NF – Denormalization. **Transaction Control Language(TCL) commands:** Commit, Savepoint, Rollback - **Database Administration:** DBA Tasks – User Privileges**.**

UNIT-III : **(12 Hours)**

Data Manipulation Language : Insert, Update, Delete and Select statement with all its clauses – **Subqueries** : Nested and Correlated subqueries - **JOINS :** Self Join, Equi Join, Non-Equi Join, Outer Join **VIEWS :** View Definition – Uses of Views -Simple and Complex Views- View Expansion - Updating tables through views.

UNIT-IV : **(12 Hours)**

PL / SQL: Basic Concepts - tables and records manipulations – control statements – Anonymous blocks, Stored Procedures, Functions, Exception handling, Cursors and Triggers.

UNIT- V : **(12 Hours)**

Introduction to NoSQL ("not only SQL") Databases & MongoDB : Introducing NoSQL and MongoDB - What Is NoSQL- Choosing RDBMS, NoSQL, or Both - Understanding MongoDB - MongoDB Data Types - Planning Your Data Model

PRESCRIBED BOOKS :

1. Database Management System - Post, Gerald V ,Tata McGraw-Hill, 2004
2. Database Management System - Date ,C.J., Galgotia Publications
3. An introduction to Database Systems - Bipin C Desai Galgotia Publications Ltd.,
4. Sams Teach Yourself NoSQL with MongoDB in 24 Hours, 2015 - Brad Dayley

REFERENCE BOOKS :

1. Database Management Systems - Raghu Ramakrishnan McGraw Hill Publishing Company Limited, 2004.

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	Unit – 4	1	
	Unit – 5	1	

CORE – XXI
CLOUD COMPUTING AND VIRTUALIZATION

SUBJECT CODE : 19PMCA323	**THEORY**	**MARKS : 100**
SEMESTER : IV	**CREDITS : 4**	**TOTAL No. OF HOURS : 60**

COURSE OBJECTIVES:

- To understand about the basics of Cloud Computing and Virtualization.
- At the end of this course, students will have a deep in-sight about cloud environment.

UNIT-I : **(12 Hours)**

Cloud Computing Fundamentals: Cloud Computing definition, Types of cloud, Cloud services: Benefits and challenges of cloud computing, Evolution of Cloud Computing , Applications cloud computing, Business models around Cloud - Major Players in Cloud Computing - Issues in Cloud - Eucalyptus - Nimbus - Open Nebula, CloudSim.

UNIT-II : **(12 Hours)**

Cloud Models and Characteristics: Cluster Computing, Grid Computing, Grid Computing Versus Cloud Computing, Key Characteristics of Cloud Computing. Cloud Models: Benefits of Cloud Models, Public Cloud, Private Cloud, Hybrid Cloud, Community Cloud, Shared Private Cloud, Dedicated Private Cloud, and Dynamic Private Cloud.

UNIT-III : **(12 Hours)**

Cloud Services and File System: Types of Cloud services: Software as a Service - Platform as a Service - Infrastructure as a Service - Database as a Service - Monitoring as a Service - Communication as services. Service providers - Google App Engine, Amazon EC2, Microsoft Azure, Sales force.

UNIT-IV : **(12 Hours)**

Virtualization: Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management - Virtualization for Data-center Automation. Introduction to MapReduce, GFS, HDFS, Hadoop Framework.

UNIT-V : **(12 Hours)**

Security in the Cloud: Security Overview - Cloud Security Challenges and Risks - Software-as-a-Service Security - Security Monitoring - Security Architecture Design - Data Security - Application Security - Virtual Machine Security - Identity Management and Access Control - Autonomic Security.

PRESCRIBED BOOKS :

1. Cloud Computing ”A Practical Approach” Anthony T. Velte, Toby J. Velte, TMH.
2. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”,Morgan Kaufmann Publishers.
3. John W.Rittinghouse and James F.Ransome, “Cloud Computing: Implementation, Management, and Security”, CRC Press, 2010.
4. Kumar Saurabh,“Cloud Computing-insights into New-Era Infrastructure”, WileyIndia
5. Ronald L. Krutz, Russell Dean Vines, “Cloud Security - A comprehensive Guide to Secure Cloud Computing”, Wiley - India, 2010.

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

ELECTIVE – I
MOBILE COMPUTING-(LATEST TECHNOLOGY)

SUBJECT CODE : 19PMCA324	THEORY	MARKS : 100
SEMESTER : IV	CREDITS : 3	TOTAL No. OF HOURS : 60

COURSE OBJECTIVES:

- To understand the basic concepts of mobile computing.
- To learn the basics of mobile telecommunication system.
- To know the basis of transport and application layer protocols.
- To gain knowledge about different mobile platforms and application development.

UNIT-I : **(12 Hours)**

INTRODUCTION-Introduction to Mobile Computing –Generations of Mobile Communication Technologies-Applications of Mobile Computing-Vehicles-Emergencies-Business-Replacement of wired networks-Mobile and Wireless devices-Wireless Transmission-Frequencies for radio transmission – Spread spectrum – Multiplexing-Medium access control – SDMA- TDMA- FDMA- CDMA.

UNIT-II: **(12 Hours)**

TELECOMMUNICATION SYSTEM- Introduction to Cellular Systems - GSM –Mobile Services Bearer services-Tele services-Supplementary services-Sytem Architecture-Radio interface – Protocols –Localization and Calling-Handover-Security-New data services–Frequency Allocation — GPRS.

UNIT-III: **(12 Hours)**

WIRELESS STANDARDS- Wireless LAN- Infrared vs Radio Transmission, Infrastructure Networks, Ad-hoc Networks, IEEE 802.11-System architecture-Protocol architecture-Physical Layer-Medium access control layer-MAC management-Bluetooth-User scenarios-Architecture-Radio layer-Baseband layer.

UNIT-IV: **(12 Hours)**

SATELLITE SYSTEMS & MOBILE NETWORK LAYER- History – Applications – Basics – GEO 173-LEO 174-MEO 175-Mobile IP –Goals, assumptions and requirements-Entities and terminology-IP packet delivery-Agent discovery-Registration-Tunneling and encapsulation-Optimization-Dynamic host configuration protocol-Mobile ad-hoc networks.

UNIT-V: **(12 Hours)**

MOBILE TRANSPORT LAYER-Traditional TCP– Congestion control-Slow start-Fast retransmit/fast recovery-implications of mobility-Classical TCP improvements-Indirect TCP-Snooping TCP-Mobile TCP-Selective retransmission-Transaction-Oriented TCP-TCP over 2.5/3G wireless networks-Performance enhancing proxies**.**

PRESCRIBED BOOKS :

1. Jochen H. Schiller ―Mobile Communications‖, Pearson, Second Edition, 2003.

REFERENCE BOOKS:

1. Prasant Kumar Pattnaik, Rajib Mall, ―Fundamentals of Mobile Computing‖, PHI Learning Pvt.Ltd, New Delhi – 2012.

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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 - XXII
PRACTICAL - VII : UI DESIGN AND DEVELOPMENT LAB

SUBJECT CODE : 19PMCA325P	**PRACTICAL**	**MARKS : 100**
SEMESTER : IV	**CREDITS : 2**	**TOTAL No. OF HOURS : 60**

COURSE OBJECTIVES:

- To have hands-on experience in user interface design and development using Angular JS and Node JS.
- At the end of this course, students will be able to design and develop attractive and efficient user interface.

HTML5 and CSS3:

1. Create a website in HTML5 to display Header and Footer.
2. Create a form to implement audio and video Element in HTML .
3. Create a webpage to implement Internal style sheet.
4. Create a webpage to implement External style sheet.
5. Create user friendly web forms using HTML5 controls.
6. Create HTML5 form controls for Validating user Input.

ANGULARJS:

7. Create a webpage to implement Angularjs Expressions
8. Write a script for Angularjs Controller.
9. Write a script for Angularjs Includes
10. Write a script for Angularjs Filters.

CORE - XXIII
PRACTICAL -VIII : ADVANCED DBMS LAB

SUBJECT CODE :19PMCA326P	**PRACTICAL**	**MARKS : 100**
SEMESTER : IV	**CREDITS : 2**	**TOTAL No. OF HOURS : 60**

COURSE OBJECTIVES:

- To have hands-on experience in PL/SQL.
- At the end of this course, students will be able to create stored procedures, functions, cursors and triggers using PL/SQL.

1. Create an Anonymous PL/SQL block and exhibit control statement usage in it .
2. Create a Stored Procedure using PL/SQL to increase the Basic pay of an employee with a specific amount.
3. Create a Stored Procedure using PL/SQL to exhibit Exception handling in PL/SQL.
4. Create a Function procedure using PL/SQL to calculate and return the Net pay of an employee .The function must receive necessary inputs as parameters.
5. Create a Cursor using PL/SQL to exhibit manipulation of the result of a Select query.
6. Create a Trigger using PL/SQL to validate Basic pay given in Insert Query. Allow insertion only if Basic Pay is greater than 5000.
7. Create a Trigger using PL/SQL to exhibit BEFORE trigger
8. Create a Trigger using PL/SQL to exhibit AFTER trigger
9. Create a Trigger using PL/SQL to exhibit COLUMN LEVEL trigger
10. Create a Trigger using PL/SQL to exhibit ROW LEVEL trigger

SOFT SKILL - 4
QUANTITATIVE APTITUDE

SUBJECT CODE : 19PGSL407L	**SOFT SKILL**	**MARKS : 100**
SEMESTER : IV	**CREDITS : 2**	**TOTAL No. OF HOURS : 30**

COURSE OBJECTIVES:

- Students are trained in Aptitude which includes numerical problems.
- At the end of this course, students will be able to clear aptitude tests conducted by several agencies.

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

Numbers, HCF, LCM, Decimal Fractions, Simplification, Square Roots, Cube roots, Averages.

UNIT- II : **(6 Hours)**

Problems in numbers and ages, Surds, Indices, Percentages, Profit and Loss, Ratio and Proportion, Partnership, Chain Rule.

UNIT- III : **(6 Hours)**

Time and Work, Pipes and Distances. Time and distance, Problems on Trains.

UNIT- IV : **(6 Hours)**

Boats and Streams, Alligation, Simple Interest, Compound Interest, Logarithms, Area, Volume and Surface Area.

UNIT- V : **(6 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.

CORE - 24
ROBOTIC PROCESS AUTOMATION

SUBJECT CODE : 19PMCA327	**THEORY**	**MARKS : 100**
SEMESTER : V	**CREDITS : 4**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand the basics of Robotic Process Automation using UiPath.
- At the end of this course, students will be able to automate process using UiPath.

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

Introduction to RPA : Scope and Techniques of Automation -Robotic process automation - Benefits of RPA - Applications of RPA - Industries, Companies using RPA - Components of RPA - The future of automation -RPA Tools - RPA Tools in Google Trends - Introduction to UiPath and its Components.

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

Learning UiPath Studio: Projects- The user interface- Various Panels- Argument - Task recorder - Advanced UI interactions - Input methods - Output methods -Example using Recorder. Sequence, Flowchart: Sequencing the workflow - Sequence - Activities - Using activities with workflows -Flowcharts.

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

Control Flow: The Assign activity- The Delay activity - The Break activity - The While activity - The Do while activity - The For each activity - The If activity - The Switch activity - Step-by-step example using Sequence and Control flow.

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

Data Manipulation : Variables and the scope of a variable in the workflow - Collections, how to store data in arrays, and how to traverse them - Arguments - Clipboard usage - Data scraping - File management - Data table usage.

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

Taking Control Of The Controls and Exception Handling: Finding and Attaching Windows - Finding the control - Techniques for waiting for a control - Act on controls – mouse and keyboard activities - Working with UiExplorer -Handling events - Exception handling -Common exceptions and ways to handle them.

PRESCRIBED BOOKS :

1 Alok mani tripathi, "learning robotic process automation", Packt Publishing , Open Source.
2 https://www.edureka.co/blog/rpa-tutorial/

Question Paper Pattern

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	Unit – 2	1	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	

ELECTIVE - 2
DATA MINING AND WAREHOUSING

SUBJECT CODE : 19PMCA334	**THEORY**	**MARKS : 100**
SEMESTER : V	**CREDITS : 4**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand the basic concepts of Data mining and Data warehousing.
- At the end of this course students will be able to enlighten in Data mining and warehousing concepts.

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 A Priori 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.

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	Unit – 2	1	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	

ELECTIVE - 2
HADOOP BIG DATA

SUBJECT CODE : 19PMCA335	**THEORY**	**MARKS : 100**
SEMESTER : V	**CREDITS : 4**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand the basic concepts of Big Data Analytics and usage of R for implementing machine learning algorithms.
- At the end of this course, students will have in-depth knowledge in working 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 mongo 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

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 SCIENCE AND BIG DATA ANALYTICS

SUBJECT CODE : 19PMCA328	**THEORY**	**MARKS : 100**
SEMESTER : V	**CREDITS : 4**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand the basics of Data Science, Big Data Analytics, usage of R for implementing machine learning algorithms
- At the end of this course, students will have deep insight in Data Science and Big Data Analytics.

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 Versus Data Science -Current Analytical Architecture - Drivers of Big Data -Emerging Big Data Ecosystem 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 - Exploratory Data Analysis-.Visualization Before Analysis - Dirty Data -Visualizing a Single Variable - Examining Multiple Variables - Data Exploration Versus Presentation.

UNIT-III : (15 Hours)

Statistical Methods for Evaluation- Hypothesis Testing - ANOVA. Overview of Clustering - K-means - Use Cases - Overview of the Method -Determining the Number of Clusters –Diagnostics- Overview of Clustering - K-means - Use Cases - Overview of the Method -Determining the Number of Clusters –Diagnostics.

UNIT-IV : (15 Hours)

Regression–Linear Regression –Use Cases-Model Description-Logistic Regression-Use Cases-Model Description - Additional Regression Models - Classification: Decision Trees- Overview of a Decision Tree - The General Algorithm -Decision Tree Algorithms - Evaluating a Decision Tree.

UNIT-V : (15 Hours)

Naive Bayes - Bayes' Theorem- Nai've Bayes Classifier- Smoothing - Additional Classification Methods - MapReduce and Hadoop: Analytics for Unstructured Data- MapReduce - Apache Hadoop - The Hadoop Ecosystem – Basics of Pig, Hive.

PRESCRIBED BOOKS :

1. Data Science & Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data. Published by John Wiley & Sons, Inc.2015 Edition.
2. Machine Learning with R, " Brett Lantz " , Packt Publishing , Open Source, 2013 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
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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 - 3
MATLAB PROGRAMMING

SUBJECT CODE : 19PMCA336	**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 this course students will be able to work in MATLAB projects.

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 Matlab 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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	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 - 3
OBJECT ORIENTED ANALYSIS, DESIGN AND UML

SUBJECT CODE : 19PMCA329	**THEORY**	**MARKS :**
SEMESTER : V	**CREDITS : 3**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand object oriented analysis and UML concepts.
- At the end of this course students should be able to design UML diagrams for object oriented programming.

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

System Development - Object Basics - Development Life Cycle - Methodologies - Patterns -Frameworks - Unified Approach .

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

Use-Case Models - Object Analysis - Object relations - Attributes - Methods – Class and Object responsibilities.

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

Design Processes - Design Axioms - Class Design - Object Storage - Object Interoperability.

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

User Interface Design - View layer Classes - Micro-Level Processes - View Layer Interface.

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

UML Basics – UML Specifications –Drawing Usecase Diagrams, Sequence Diagrams, State Chart Diagrams, Class Diagrams, Component Diagrams, Deployment diagrams using UML editor – Working with Star UML.

PRESCRIBED BOOKS :

1. Ali Bahrami, Reprint 2009, Object Oriented Systems Development, Tata McGraw Hill International Edition.
2. UML 2.0 in a Nutshell: A Desktop Quick Reference, By Dan Pilone, Neil Pitman, O'Reilly Media, Inc." 2005

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
Section - B	**Short Answer** Answer any 5 out of 7 questions (Each in 300 words)	11-17	7	35
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	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 - 3
DESIGN AND ANALYSIS OF ALGORITHM

SUBJECT CODE : 19PMCA337	**THEORY**	**MARKS : 100**
SEMESTER : V	**CREDITS : 3**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand about the basic concepts of algorithms.
- At the end of this course, students will be able to understand how to design and analyze 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)**

Merge sort - Quicksort, Selection, Strassen's matrix multiplication – Greedy Method: General Method – knapsack problem - Tree vertex splitting.

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

Job sequencing with deadlines – 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.

WEBSITES:

1. http://www.cise.ufl.edu/~raj/BOOK.html

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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	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	

ELECTIVE - 4
.: INFORMATION SECURITY AND CYBER LAWS

SUBJECT CODE : 19PMCA330	**THEORY**	**MARKS : 100**
SEMESTER : V	**CREDITS : 3**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand about the importance and need of security of information and cyber laws that aid information security.
- At the end of this course, student will have required knowledge in information security to work in real world environment..

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

Introduction to Information Systems and Security: Information Systems - Types of IS - Development of IS - Introduction to Information Security - Need for Information Security - Threats to Information Systems - Information Assurance - Cyber Security - Security Risk Analysis.

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

Introduction to Application Security and Counter Measures: Introduction to Application Security - Data Security Considerations - Security Technologies - Security Threats - Security Threats to E-Commerce - E-Cash and Electronic Payment System - Credit/Debit/Smart Cards - Digital Signature - Cryptography and Encryption.

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

Introduction to Security Measures: Secure Information System Development Application, Development Security - Information Security Governance and Risk Management - Security Architecture and Design - Security Issues in Hardware, Data Storage, and Downloadable Devices - Physical Security of IT Assets - Backup Security Measures.

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

Introduction to Security Policies: Need for an Information Security Policy - Information Security Standards – ISO - Introducing Various Security Policies and Their Review Process .

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

Cyber Laws : Introduction to Indian Cyber Law - Objective and Scope of the IT Act, 2000 - Intellectual Property Issues - Overview of Intellectual-Property- Related Legislation in India - Patent - Copyright - Law Related to Semiconductor Layout and Design - Software License.

PRESCRIBED BOOKS:

1. Dr. Surya Prakash Tripathi, Ritendra Goyal, Praveen kumar Shukla ,"Introduction to Information Security and Cyber Laws" Willey Dreamtech Press.
2. Saurabh Sharma, "Information Security and Cyber Laws" by Vikas Publishing.

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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	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 - 4
ENTERPRISE RESOURCE PLANNING

SUBJECT CODE : 19PMCA338	**THEORY**	**MARKS : 100**
SEMESTER : V	**CREDITS : 3**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand the basics of Enterprise Resource planning and managing ERP projects.
- At the end of this course, students will 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
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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 - 4
E-COMMERCE

SUBJECT CODE : 19PMCA339	**THEORY**	**MARKS : 100**
SEMESTER : V	**CREDITS : 3**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand the basics of E-commerce and its intricacies.
- At the end of this course, students will be able to understand the basic aspects of Ecommerce to develop their own E-commerce 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.

PRESCRIBED BOOKS :

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, Web commerce Technology Handbook, TMH..

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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	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 - 4
HUMAN RESOURCE MANAGEMENT

SUBJECT CODE : 19PMCA340	**THEORY**	**MARKS : 100**
SEMESTER : V	**CREDITS : 3**	**TOTAL No. OF HOURS : 75**

COURSE OBJECTIVES:

- To understand the basic concepts of Human Resource management.
- At the end of this course, students will be able to understand 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 programme – 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

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

CORE – XXV

PRACTICAL – IX : ROBOTIC PROCESS AUTOMATION LAB

SUBJECT CODE : 19PMCA331P	**PRACTICAL**	**MARKS : 100**
SEMESTER : V	**CREDITS : 2**	**TOTAL No. OF HOURS : 60**

COURSE OBJECTIVES:

- To have hands-on experience in RPA programming.
- At the end of this course students will be able to create RPA programs to automate manual applications using UiPath.

1. Create a simple project which will greet you with the name.
2. Create a simple project to enter 2 numbers & check whether their sum is less than 20.
3. Create a simple automation that writes two messages to the Output panel with a delay of 50 seconds.
4. Create a project use the Break activity to execute only one iteration
5. Create a project with to display an integer variable, increases from 5 to 50 in increments of 5.
6. Use Do while Activity to generate all multiples of 2, less than 20.
7. Use the For each activity to go through a collection of even numbers and display each element one at a time.
8. Use If activity to check whether the sum of any two numbers is less than 6.
9. Use switch Activity to check whether a given number is odd or even.

CORE – XXVI
PRACTICAL – X : MINI PROJECT

SUBJECT CODE : 19PMCA332P	**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 this course, students will be confident in creating and working with projects.

SOFT SKILL - 5
GROUP DISCUSSION

SUBJECT CODE : 19PGSL408M	**SOFT SKILL**	**MARKS : 100**
SEMESTER : V	**CREDITS : 2**	**TOTAL No. OF HOURS : 15**

COURSE OBJECTIVES:

- To help students to understand about the skills required for group discussion.
- At the end of this course, students will be able to discuss about the problems in a group efficiently.

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 : 19PINT401	**INTERNSHIP**	**MARKS : 100**
SEMESTER : V	**CREDITS : 3**	**DURATION: 6 to 8 Weeks (During Summer Vacation of IV Semester)**

COURSE OBJECTIVES:

- Students will be able to understand the working aspects and important features of organizations.
- At the end of this course, students will have awareness in practices that are followed in the corporate environment.

Internship 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 - 6
CONTENT WRITING

SUBJECT CODE : 19PGSL409N	**SOFT SKILL**	**MARKS : 100**
SEMESTER : VI	**CREDITS : 2**	**TOTAL No. OF HOURS : 30**

COURSE OBJECTIVES:

- Students are trained to document software project development and write the report of the work done.
- At the end of this course students will be proficient in content writing.

UNIT-I : **(6 Hours)**
Introduction, Problem Analysis

UNIT-II : **(6 Hours)**
Design, Filter Module

UNIT-III : **(6 Hours)**
Stemming Module, Parser Module

UNIT-IV : **(6 Hours)**
Testing Documentation

UNIT-V : **(6 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 : 19PMCA333	**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.