

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE (AUTONOMOUS)
POLLACHI

P.G. DEPARTMENT OF COMPUTER APPLICATIONS

SYLLABUS FOR ACEDAMIC YEAR
2013-2016 Regular

Batch no : 23

MASTER OF COMPUTER APPLICATIONS (M.C.A)

(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2013 ONWARDS)

I TO VI SEMESTERS : SCHEME OF EXAMINATIONS

Course Code	Course Title	Lecture+ tutorial/ practical hrs/week	Duration of Exam Hrs	Marks			Credit Points
				Internal	End of Semeste	Total	
	Semester I						
13PMC101	Fundamentals of Programming languages and C	4	3	25	75	100	4
13PMC102	Data and File Structures	4	3	25	75	100	4
13PMC103	Digital Electronics and Computer System Architecture	4	3	25	75	100	4
13PMC104	Foundation of Mathematics	4	3	25	75	100	4
13PMC105	Internet and Web Designing	4	3	25	75	100	4
13PMC106	LAB-I C Programming	4	3	40	60	100	2
13PMC107	LAB-II Internet and Web Designing Lab	4	3	40	60	100	2
Semester Total				205	495	700	24
	Semester II						
13PMC201	Object Oriented Programming with C++	4	3	25	75	100	4
13PMC202	Relational Database Management	4	3	25	75	100	4
13PMC203	Accounting and Financial Management	4	3	25	75	100	4
13PMC204	Visual Programming	4	3	25	75	100	4
13PMC205	Software Engineering	4	3	25	75	100	4
13PMC206	LAB – III C++ Lab	4	3	40	60	100	2
13PMC207	LAB- IV VB & Oracle Lab	4	3	40	60	100	2
13PMC208	Mini Project – 1			20	30	50	2
Semester Total				225	525	750	26
	Semester III						
13PMC301	Operating System	4	3	25	75	100	4
13PMC302	Resource Management Techniques	4	3	25	75	100	4
13PMC303	Programming with Java	4	3	25	75	100	4
13PMC304	Scripting Language	4	3	25	75	100	4
13PMC305	OOAD with UML	4	3	25	75	100	4
13PMC306	LAB – V – Java Lab	4	3	40	60	100	2
13PMC307	LAB- VI Scripting Language Lab	4	3	40	60	100	2
13PMC308	LAB – VII- OOAD with UML lab	4	3	40	60	100	2

Semester Total			245	555	800	26
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Semester IV

13PMC401	J2EE Technologies	4	3	25	75	100	4
13PMC402	PHP/MYSQL	4	3	25	75	100	4
13PMC403	Computer Networks	4	3	25	75	100	4
13PMC404	Elective – I Software Testing	4	3	25	75	100	4
13PMC405	Elective – II–Human Resource Management	4	3	25	75	100	4
13PMC406	Lab – VIII – J2EE Lab	4	3	40	60	100	2
13PMC407	Lab – IX– PHP/MYSQL	4	3	40	60	100	2
13PMC409	Mini project – II			20	30	50	2
Semester Total				225	525	750	26
Semester IV							
13PMC501	UNIX Programming	4	3	25	75	100	4
13PMC502	.Net Framework	4	3	25	75	100	4
13PMC503	Programming in C#	4	3	25	75	100	4
13PMC504	Elective – III Information Security	4	3	25	75	100	4
13PMC505	Elective – IV Big Data Management	4	3	25	75	100	4
13PMC506	Lab – X –UNIX Programming I	4		40	60	100	2
13PMC507	Lab – XI - .Net Lab	4		40	60	100	2
13PMC508	Lab – XII Programming in C#	4		40	60	100	2
Semester Total				245	555	800	26

SEMESTER - VI

13PMC601	Project and Viva Voce		40	160	200	12
Grant Total			1185	2815	4000	140

SEMESTER I

Department	P.G Department of Computer Applications	
Course	MCA	Effective from the year:2013
Subject Code: Title :	13PMC101 Fundamentals of Programming Languages and C	Semester:I
Hrs/Week:	4 Hours	Credit:4
Objectives	The goal is to develop a clear, consistent and unambiguous standard for the C programming language which codifies the common, existing definition of C and which promotes the portability of user programs across C language environments	

Unit	Content	Hours
Unit-I	Concepts of Programming : Introduction- steps in developing a program – Software Design Techniques : Top-down design approach, bottom-up design approach- Programming Methodologies: stepwise refinement, modularity – Pseudo code – classification of programming languages – generation of Programming Languages	8 Hours
Unit-II	An Overview of C – History of C- Importance of C Basic Structure of C programs – character Set – Data types and Sizes – Variables – constants – Operators – Expressions – Type conversion – Storage Classes – Program Control Structures – Loop Control Structures – C Formatted Input/output – Arrays – Strings – String handling function	10 Hours
Unit-III	Functions – Need of user Defined functions- passing values between function- function declaration and prototypes – call by value and call by reference – category of functions – recursion – nesting of functions – Functions with Arrays Structures – uses of structures – array of structures – Array within Structures – Structures within Structures – unions – user defined type declarations : type definition, enumerated data type	13 Hours
Unit-IV	Pointers – Introduction – understanding pointers – accessing the address of a variable – declaring and initializing pointers – accessing a variable through its pointer – pointer expressions – pointer increments and scale factor Pointer and Arrays – Pointers and Strings – Pointers and Functions – Pointer and Structures	15 Hours
Unit-V	File Processing – Introduction- Definition and opening a file – closing a file – I/O operations in files – error handling during I/O operations – Random access to files- command line Arguments Dynamic Memory Allocation – C Preprocessors – Macro Substitution – File inclusion- Compiler Directives.	14 Hours

Text Books :

1. Balagurusamy .E, “ *Programming in ANSI C*” (Unit IV,V), McGraw-Hill Publications
2. Sundharasan.P, “ *Fundamentals of Computing* “, RBA publications (Unit I)
3. Yeswanth Kanetkar, “*Let us C*”, BPB Publicaions (Unit II , III, IV)

Reference Books:

1. Robert L.Kruse, “*Data Structures and Program Design*”
2. Dromey, “*Problem Solving and Algorithm Design*”, (Problem Analysis)

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M.Rajasenathipathi			(For office use only)

Department	P.G Department of Computer Applications	
Course	MCA	Effective from the year: 2013
Subject Code:	13PMC102	Semester:I
Title :	DATA AND FILE STRUCTURES	
Hrs/Week:	4 Hours	Credit:4
Objectives	The Purpose of this syllabus is to impart Knowledge on various data structures concepts. Several data structures concepts	

Unit	Content	Hours
Unit-I	Introduction – Overview – types of data – How to create programs – how to analyze programs – arrays – representation of arrays – ordered list- stacks – definitions and concepts – operations on stack – application of stack – recursion – evaluation of expressions	9 Hours
Unit-II	Sparse Matrices – Queue – its definition – simple queue – linked linear lists – circularly linked lists – doubly linked lists – application of linked lists – polynomial manipulation	12 Hours
Unit-III	Sorting – Selection sort – Quick sort – Bubble sort – merge sort – radix sort – heap sort – Searching – Sequential Search – Binary Search. Symbol Tables – Static tree tables – Dynamic tree tables – hash tables	13 Hours
Unit-IV	Tree – Basic Terminology – Binary tree – Representation – Binary Tree traversal – more on binary tree – representation of tree. Graphs – Terminology and termination – introduction – Definitions and Terminology – Graph representations – traversals, connected components and spanning trees	13 Hours
Unit-V	Sequential files – the structures of sequential files – indexed sequential file – its structure – processing indexed sequential files – direct files – structure of direct files- processing direct files	13 Hours

Text Books :

1. Ellis Horowitz & Sarataj Sahni , “ *Fundamentals of data structures*”, Galgotia Publications
2. Trembly Sorenson, “*An Introduction to data structures with applications*”, Second Edition, McGraw-Hill Publications

Reference Books:

1. Robert L.Kruse, “*Data Structures and Program Design*”
2. Dromey, “*Problem Solving and Algorithm Design*”, (Problem Analysis)

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Department	P.G Department of Computer Applications	
Course	MCA	Effective from the year:2013
Subject Code: Title :	13PMC103 DIGITAL ELECTRONICS AND COMPUTER SYSTEM ARCHITECTURE	Semester:I
Hrs/Week:	4 Hours	Credit:4
Objectives	The Purpose of this syllabus is to make the student to understand the fundamental principles of digital electronics and computer architecture. This will make the student aware about the digital components of the computer hardware	

Unit	Content	Hours
Unit-I	Number systems: Complements – Binary codes – error detection code. Digital Circuits: Logic gates (AND, OR, NOT, NAND, NOR, XOR) – Demorgan’s Theorem – Map Simplification Combinational Circuits : Half adder – Full adder – Decoder- Encoder – Multiplexer – Demultiplexer	12 Hours
Unit-II	Sequential Circuits: Flip flops – RS – D – JK – JK Master/slave – Edge Triggered – Registers : SISO – SIPO- PIPO – Counters: Binary- UP-Down counter – Ring Counter	14 Hours
Unit-III	Central Processing Unit : General Register organization – Stack Organization – Instruction formats – Addressing modes – Data Transfer and manipulation instruction – Program control. Arithmetic Processor Design: Addition and Subtraction- Division and Multiplication algorithms	12 Hours
Unit-IV	I/O Organization: Peripheral Devices – I/O Interface – Asynchronous data transfer – mode of transfer – priority interrupt – direct Memory Access – I/O processor	12 Hours
Unit-V	Memory Organization : Memory Hierarchy – Main memory – Auxiliary memory – Associative memory	10 Hours

Text Books :

1. Albert Paul Malvino, Donald P. Leach, “*Digital Principles and Applications*”, Second Edition
2. Morris Mano, “*Computer System Architecture*”, Third Edition

Reference Books:

1. V.C Hamachar, Z.G. Vraesic, S.G. Zaky,(1996) “*Computer Organization*”, Tata McGraw Hill.
2. Vincent P. Heuring, Harry F. Jordan,(1999) “*Computer Systems Design and Architecture*”, Addison Wesley.
3. John p. Hayes(1999), “*Computer Architecture and Organization*”, McGraw hill, 3rd Edition.
4. David A. Patterson and John L. Hennessy(1999), “*Computer Organization and Design*”, Harcourt Asia PTE Ltd, 2nd edition.
5. William Stallings, “*Computer organization and Architecture – Designing for performance*”, Pearson Education, Sixth Edition

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Department	P.G Department of Computer Applications	
Course	MCA	Effective from the year:
Subject Code:	13PMC104	Semester:I
Title :	Numerical Methods	
Hrs/Week:	5 Hours	Credit:4
Objectives	With the present development of the computer technology, it is necessary to develop efficient algorithms for solving problems in Science, Engineering and Technology. This course gives a complete procedure for solving different kinds of problems that occur in engineering numerically. At the end of the course the students would be acquainted with the basic concepts in numerical methods and their uses.	

Unit	Content	Hours
Unit-I	The Solution of Numerical Algebraic and Transcendental Equations : The Bisection Method – Iteration Method – Regula Falsi Method – Newton Raphson method	15Hours
Unit-II	Solution of Simultaneous Linear Algebraic Equations (Direct) – Gauss Elimination Method – Gauss Jordan Elimination Method – Gauss Jacobi method – Gauss Seidel method	15Hours
Unit-III	Interpolation : Newton’s forward Interpolation formula – Newton’s backward Interpolation formula – Gauss’s forward Interpolation formula – Gauss’s backward Interpolation formula – Stirling’s formula – Bessel’s formula – Lagrange’s interpolation formula for unequal intervals.	15Hours
Unit-IV	Numerical Differentiation and Integration : Newton’s forward difference formula to get the derivative – Newton’s backward difference formula to compute the derivative – derivative using Stirling’s formula. Numerical Integration : Trapezoidal rule – Simpson’s one-third rule – Simpson’s three-eighths rule.	15Hours
Unit-V	Numerical Solution of Ordinary Differential Equations : Solution by Taylor series – Improved Euler method – Modified Euler method – Runge Kutta Method – Predictor Corrector methods : Milne’s Predictor Corrector Formulae	15Hours

Text Books :

1. Dr.P.Kandasamy, Dr.K.Thilagavathy, Dr.K.Gunavathi (2010), “*Numerical Methods*”, First Edition, S.Chand Publishing.

Reference Books:

1. E.Balagurusamy, (1999), “*Numerical Methods*”, Tata McGraw-Hill Pub.Co.Ltd., New Delhi.
2. Burden, R.L and Faires T.D. (2002), “*Numerical Analysis*”, Seventh Edition, Thomson Asia P.Ltd., Singapore.

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Department	P.G Department of Computer Applications	
Course	MCA	Effective from the year:2013
Subject Code: Title :	13PMC105 Internet and WEB Designing	Semester:I
Hrs/Week:	5 Hours	Credit:4
Objectives	This course enables students to understand about the internet, web page site planning, Management and Maintenance. The course explains the concepts of developing advanced HTML pages with the help of frames, scripting languages and evolving technologies like DHTML and XML	

Unit	Content	Hours
Unit-I	Introduction: What is Internet ? History of internet- Internet services and Accessibility – Uses of the internet – protocols – web concepts – Internet Standards	15 Hours
Unit-II	Internet Protocols: Introduction – Internet protocols – Host Names – Internet Applications and Application protocols, Datagram Vs Stream, Trivial File Transfer protocol. FTP – File transfer protocol, Telnet, HTTP, Email Protocols, SMTP, POP, IMAP	15 Hours
Unit-III	HTML : Introduction - SGML – Outline of an HTML Document – Head Section – Body Section – HTML forms	15 Hours
Unit-IV	Dynamic HTML (DHTML) : Introduction – Cascading Style Sheets(CSS) DHTML – Event Handling – Filters and Transitions – Data Binding	15 Hours
Unit-V	Extensible Mark-up Language (XML) : Introduction – HTML vs XML – Syntax of the XML Document- XML Attributes – XML Validation – XML DTD – The building Blocks of XML Documents – DTD Elements – DTD Attributes – DTD Entities – DTD Validation – XSL – XSL Transformations – XML Namespaces – XML Schema	15 Hours

Text Books :

1. *Web Technology* – N.P. Gopalan, J.Akilandeswari

Reference Books:

1. *The Complete Reference HTML* – Thomas A.Powell
2. *The Complete Reference Internet* – Thomas A.Powell

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I Semester	Programming Lab – I C LAB	13PMC106
		Credit Points = 2 25 + 75 = 100 Hours/week = 4
Program 1	Control Structures	
Program 2	Arrays	
Program 3	Matrix Operations using Arrays	
Program 4	String Applications	
Program 5	Functional concepts	
Program 6	Recursion	
Program 7	Structures & Union	
Program 8	Pointers	
Program 9	Linked Lists	
Program 10	Stack & Queue	
Program 11	Searching Techniques	
Program 12	Sorting Techniques	
Program 13	File Operations	

I Semester	Programming Lab – II Internet and WEB Designing LAB	13PMC107
		Credit Points = 2 25 + 75 = 100 Hours/week = 4
Program 1	Designing 25 to 30 different colors using table frame and color code	
Program 2	Prepare a Time table for five hours in a week	
Program 3	Prepare a resume using physical character formatting, elements, frame, target etc.,	
Program 4	Designing an advertisement for two wheeler like bike, scooter etc., using bg color, image links etc	
Program 5	Design as advertisement for four wheeler like car using bg color, image, link etc.,	
Program 6	Design an advertisement for hospital using bg color, image , link etc.	
Program 7	Design a website for college it includes logo, caption, course details etc.,	
Program 8	Prepare student mark sheet for 5 student using External Style Sheet	
Program 9	Display Source program information on the same window using frame (Addition of any three numbers)	
Program 10	Display letters from A to H and produce the corresponding word and image using frame	
Program 11	Prepare a website for library management system	
Program 12	Prepare a website for library management system payroll system	
Program 13	Using XML, Design a web page for five operating system with main function using font Style, Size, bg color (XML Style sheet link)	
Program 14	Design a web page for configuration of three computers using XML	

SEMESTER II

Department	PG Department of Computer Applications	
Course	MCA	Effective from the year:2013
Subject Code: Title :	13PMC201 Object Oriented Programming with C++	Semester: II
Hrs/Week:	4Hours	Credits:4
Objectives	The purpose of this syllabus is to use C++ as a tool for programming using Object oriented concept. The students learn the basic concepts of object oriented programming, structure and programming constructors of C++, to identify objects, relationships and communication among objects, to implement inheritance and polymorphism to design and use programs with STLs	

Unit	Content	Hours
Unit-I	Object Oriented Programming–Difference Between Traditional Approach and OOPS - Need of OOPS–Objects–Classes–Data Abstraction–Data Encapsulation–Inheritance–Polymorphism–Dynamic Binding–Message Passing–Benefits of OOPS–Application of OOPS.	10 Hours
Unit-II	Application of C++ - Structure of C++ Program-Tokens-Expressions-Basic Data Types-User Defined Data Types-Derived Data Types-Symbolic Constants-Declaring Variables-Reference Variables-Operators in C++-Scope Resolution Operators-Manipulators-Type cast Operators-Expression and their types-Special assignment Expresion-Implicit Conversions-Control Structures-Function in C++ -Function Prototyping-Call by Reference-Return by Reference-Inline Functions-Default Arguments-Const Arguments-Classes and Objects-Defining Member Functions-Static Data member and Member Functions.	12 Hours
Unit-III	Array of Objects-Object as function argument -Friend function-Returning objects-Const Member Function-Pointer to Member-Constructor-Parameterized constructor-Multiple Constructor in a Class-Constructor with Default Arguments-Copy Constructor-Dynamic Constructor-Destructor-Operator overloading and Type Conversions-Rules of Operator Overloading.	12 Hours
Unit-IV	Inheritance-Defining Derived classes-Single Inheritance-Making a Private Member Inheritable-Multiple Inheritance-Multilevel Inheritance-Hierarchy Inheritance-Hybrid Inheritance-Pointers,Virtual functions and Polymorphism.	12 Hours
Unit-V	Managing Console Operations-C++ Streams-Stream classes-Unformatted, Formatted I/O Operations-Managing output with manipulators-Opening and Closing a file-Detecting end of file-File Modes-File pointer and their manipulations-Sequential IO operations- Error Handling during File Operations-Command Line Arguments-Introduction of templates.	14 Hours

Text Books :

- 1.E.Balagurusamy , “*Object Oriented Programming with C++*”, Tata McGraw-Hill Publications
- 2.Bruce Eckel , “*Thinking in C++* “, Second Edition

Reference Books:

- 1.Herbert Schild,(1995) : “*C++ The Complete Reference*”,Third Edition, Osborn McGraw- Hill

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Department	PG Department of Computer applications	
Course	MCA	Effective from the year:2013
Subject Code: Title :	13PMC202 RELATIONAL DATABASE MANAGEMENT SYSTEM	Semester:II
Hrs/Week:	4Hours	Credits:4
Objectives	Understand fundamental database concepts and the different database systems. Understand methodologies to conceptualize and design database systems. Identify the key issues in developing database systems and applications. Develop applications involving database systems, in particular Web-based applications, and commercial RDBMS such as MySQL, Oracle, SQL Server and Access.	

Unit	Content	Hours
Unit-I	Overview of database systems: Managing data – A historical perspective file systems versus a DBMS – Advantages of a DBMS – Describing and storing data in a DBMS – Queries in a DBMS – Transaction management – Structure of a DBMS. Database design & ER diagrams – Entities attributes and entity sets – Relationships and Relationship sets – Additional features of the ER model – conceptual database design with the ER model.	12 hours
Unit-II	Relational Model: Integrity constraints over relations – Enforcing integrity constraints – Querying relational data – Logical database design; ER to relational introduction to views – Destroying / Altering Tables & Views. Relational algebra and calculus: Relational Algebra – Relational Calculus.’	12 hours
Unit-III	SQL: Queries, Programming Triggers: The form of a basic SQL Query – UNION, INTERSECT and EXCEPT – Nested Queries – Aggregate operators – Null values – Complex integrity constraints in SQL – Triggers & Active data bases. Transaction Management Overview: The ACID properties – Transactions & Schedules – Concurrent execution of transactions – Lock-based concurrency control – performance of locking – Transaction support in SQL.	12 hours
Unit-IV	Schema Refinement and normal forms: Introduction to schema refinement – Functional dependencies – Reasoning about functional dependencies – Normal forms – Properties of Decompositions – Normalization – Schema refinement in data base design – Other kinds of dependencies. Security: Introduction to database security – Access control – Discretionary access control – Mandatory access control – Additional issues to security. Concurrency control: 2PL, serializability and Recoverability – Introduction to lock Management – Lock conversions – Specialized Locking techniques- Concurrency control without locking.	12 hours
Unit-V	Parallel & Distributed databases: Introduction – Architecture for parallel databases – Parallel Query evaluation – Parallel zing individual operations – Parallel query optimization – Introduction to distributed databases – Distributed DBMS architecture sorting data in a distributed DBMS. Object Database Systems: Motivation Example – Structured data types – Operation on structured data types – Encapsulation & ADTS – Inheritance – Objects, OIDS and reference Types – Database design for and ORDBMS – OODBMS – comparing RDBMS OODBMS and ORDBMS.	12 hours

Text Books :

1. Raghu Ramakrishnan, Johannes Gehrke “*Database Management Systems*”, Third edition, McGraw-Hill Higher Education.

Reference Books:

1. Silberschatry, Korth, Sundarshan, “*Database System Concepts*”, Fourth Edition, McGraw-Hill Higher Education.
2. Elmasri Navathe, “*Fundamentals of Database Systems*”, Third Edition, Pearson Education Asia.

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Course	MCA	Effective from the year:2013
Subject Code: Title :	13PMC203 Accounting and Financial Management	Semester: II
Hrs/Week:	4Hours	Credits:4
Objectives	To enable the students to understand the concepts and principles for Accounting including company accounting, cost accounting, Management Accounting and Forecasting.	

Unit	Content	Hours
Unit-I	Financial Accounting :Accounting Definition –Objectives – Concepts –Conventions – Classification –Financial accounting – Capital and Revenue items – Basic Records – Preparation of Final accounts of a sole trader.(simple adjustment problems only)	13Hours
Unit-II	Cost Accounting :Element of Cost – Cost sheet: Meaning – Uses - Preparation of Cost sheet and Quotations. Budgeting and budgetary control: Meaning – Objectives – Classification of budget – Preparation of Production, Cash and flexible budget	13Hours
Unit-III	Management Accounting :Marginal costing; Meaning – Advantages and Disadvantages – Cost Volume Profits analysis and Break even analysis – Application of Marginal Costing Techniques. Standard costing - Material and Labour Variance.	12Hours
Unit-IV	Financial Analysis :Fund flow and Cash flow analysis: Meaning – Objects – Difference - Preparation of fund flow and cash flow Statements.	12Hours
Unit-V	Case Studies :Case studies from above context	10Hours

Text Books : R.L.Gupta, (1999),“*Advanced Accounting*”, Sulthan chand and sons, Ninth Edition

Reference Books:

- 1.S.N.Maheswari,(1995),”*Advanced Accounting* “,Vikas publications, Sixth Edition
- 2.S.M.Sukhla,(1999),”*Advanced Accounting*”,Sulthan chand and sons, Fourteenth Edition

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Course	MCA	Effective from the year : 2013
Subject Code: Title :	13PMC204 VISUAL PROGRAMMING	Semester : II
Hrs /Week: 4	4 Hours	Credit : 4
Objectives	The purpose of this course is to give students the general knowledge required to understand many of the general programming concepts required in any programming language. In addition to the general programming concepts, students will gain the ability to design, create, test and debug a fully functioning programs using the Visual Basic language.	
Unit	Content	Hours
Unit-I	Introduction to Client/Server Computing – Tier Architecture-Client/server building blocks-network bandwidth.	13 hours
Unit-II	VISUAL BASIC : Introduction – Data Access – ID Environment with Wizards – Working with the VB Development Environment - Development Interface – Event driven Programming – Working with objects and controls – Building Event Driven code – Building a Data Project – Building Objects in VB.	13 hours
Unit-III	Working with Control Structures and Arrays - Designing User Interfaces - Visual elements of a VB Applications – Design tools and guidelines – Building our sample applications – Error Handling, debugging and deploying applications – Menus, Toolbars, Status bar – Input Box, Message Box.	12 hours
Unit-IV	Connecting to Databases - Data access objects – Remote Data Objects – ActiveX Data Objects – Using DAO, RDO,ADO to build a simple Database Interface, Testing and running Applications	12 hours
Unit-V	Working with the VB Report Designer - Data Environment – Building Reports in the designer – Building an interface to the reports-testing and running reports.	10 hours

Text Books:

1. Robert orfli, Dan Harkey , Jeri Edwards ” Client/Server Survival Guide, Wiley India Edition, Third Edition.
2. Noel Jerke, “*The Complete Reference Visual Basic 6*”, Tata McGraw-Hill Edition

Reference Book :

1. Paul Deitel, H.M.Deitel and G.J.Ayer “*Simply Visual Basic 2008*”, Prentice Hall
2. Travis Dewire, “*Client/Server Computing*”, Tata McGraw-Hill Edition

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Course	MCA	Effective from the year:2013
Subject Code: Title :	13PMC205 Software Engineering	Semester:II
Hrs/Week:	4Hours	Credits:4
Objectives	The purpose of this syllabus is to provide the students with the concepts of development of programs in a structured and organized way. It also make them understand the problems involved in project management and show them how a disciplined engineering approach in the development of projects, makes it easier, effective and efficient. To know the different steps involved in software development activity. To have some knowledge about how to perform project planning and estimation. To use master systematic and disciplined way of development software. To Test and quality the software products. To know the international standards of software development and maintenance process.	

Unit	Content	Hours
Unit-I	Evolving role of software: Software-software crisis and myths-software Engineering layered Technology- The Software process model- Evaluating software process models-component based development model – The formal methods model-4GT Software project planning: Project planning objectives – software scope-Resources-software project estimation-Decomposition Techniques-Empirical estimation models.	10 Hours
Unit-II	Analysis concepts & Principles: Requirement analysis-Analysis Principles-software Prototyping-Specification. Analysis Modeling: Data Modeling –Functional Modeling & information flow-Behavioral modeling.	10 Hours
Unit-III	Design Concepts & Principles: The design process – Design principles – Design Concepts-Effective Modular Design. Architectural design-software Architecture-data design-Analyzing alternative Architectural Design – Mapping requirements into software Architecture-Transform mapping-Transaction mapping.	14 Hours
Unit-IV	User Interface design: The golden rules- user interface design-Task analyzing and modeling-interface design activities-implementation tools-design evaluation. Component Levwel design: Structures Programming – comparison of Design notations.	14 Hours
Unit-V	Software Testing Techniques: Software Testing Fundamentals-Test Case design-White Box Testing-Basis path Testing-Control structure testing – Black box testing . Software Testing strategies: A strategic approach to software testing-strategic issues-unit testing-Integratin testing-Validation testing-system testing, Software Quality Assurance.	12 Hours

Text Books :

1. Roger S.Pressman , “*Software Engineering a practioner’s Approach*”, Fifth Edition, McGraw hill Higher Education.

Reference Books:

- 1.Rajib Mall “*Fundamentals of software Engineering* “, PHI , Second Edition
2. Sommerville, “*Software Engineering*”, Pearson education , Sixth Edition
3. Richard fairly, (1997), “*Software Engineering concepts*”, Tata mc Graw hill
4. Carlo Gihezzi , Mehdi Jazayeri , Dino Mandrioli , “*Fundamentals of Software Engineering*”, Second edition , Pearson Education, Asia.

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II SEMESTER	PROGRAMMING Lab III C++ Lab	13PMC206 Credits :2
Program 1	Call by Reference, Call by Value and Return by Reference	
Program 2	Array of Objects	
Program 3	Static, Dynamic, Constructor, Destructor	
Program 4	Default Arguments and Multiple Constructors	
Program 5	Operator Overloading	
Program 6	Inheritance	
Program 7	Virtual Function	
Program 8	Concept of pointers	
Program 9	Function Overloading	
Program 10	Random access file	
Program 11	Command Line Arguments	
Program 12	String Operations	
Program 13	Templates	
Program 14	Exceptions	

II SEMESTER	Lab-IV VB and Oracle Lab	13PMC207 Credits:2
Program 1	Programs using Application wizard.	
Program 2	SDI, MDI Drawing inside the view window, Device Context.	
Program 3	Program to handle Basic events.	
Program 4	The message map, saving the view's state, initializing a view Class data member.	
Program 5	Programs using graphical devices interface objects	
Program 6	Program to display modal and modeless dialogs.	
Program 7	Program using Static and dynamic controls.	
Program 8	Program using document – view architecture.	
Program 9	Programs with toolbars and status bars.	
Program 10	Program using SDI and MDI serialization.	
Program 11	Program to create dynamic link libraries using MFC.	
Program 12	Program to interface with database.	
Program 13	Oracle: SQL Operations	
Program 14	Queries	
Program 15	Database Triggers	
Program 16	Procedures	
Program 17	Functions	
Program 18	Cursors	
Program 19	Implicit cursors	
Program 20	Packages	
Program 21	Exceptions	

II Semester	Mini project –I (No internal)	13PMC 208 Credits:2
Project Evaluation:20	Viva:30	Total:50

SEMESTER III

Department	PG DEPARTMENT OF COMPUTER APPLICATIONS	
Course	MCA	Effective from the year : 2013
Subject Code Title	13PMC301 Operating Systems	Semester : III
Hrs/Week :	4 Hours	Credit : 4
Objectives	Every computer professional should have a basic understanding of how an operating system controls the computing resources and provides services to the users. This syllabus provides an introduction to the operating system functions, design and implementation. This syllabus serves as a strong foundation for courses like networks, Data base systems. The students learn about: structure and functions of OS , process scheduling, Deadlocks Device Management, Memory Management and File systems.	

Unit	Content	Hours
Unit-I	Introduction _ What is an Operating System? – Mainframe systems – Desktop systems – Multiprocessor systems – Distributed systems – Clustered systems – Real Time systems. Operating System Structures: System components – OS services – System calls – System Programs – System structure – Virtual machines – System Design & implementation – System Generation.	10 hours
Unit-II	Process Management: Process concept – Process Scheduling – Operations on processes – Cooperating processes – Inter process communication. CPU Scheduling: Scheduling Criteria – Scheduling Algorithms – Multiple – Processor Scheduling – Real Time scheduling.	12 hours

	Deadlocks: Deadlock characterization – Methods for handling Deadlocks – Deadlock prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlock	
Unit-III	Memory Management: Background – Swapping – Contiguous memory allocation – Paging – Segmentation - Segmentation with paging. Virtual Memory: Demand Paging – Process creation – Page Replacement – Allocation of Frames – Thrashing.	14 hours
Unit-IV	File System Interface : File concept – Access methods - Directory Structure. File system Implementation : File-System Structure - File system Implementation – Directory implementation – Allocation Methods – Free space Management – Efficiency & Performance – Recovery. Mass-Storage Structure: Disk structure – Disk scheduling – Disk Management – Swap – space management	14 hours
Unit-V	Distributed System Structures : Introduction – Topology – Network Types – Local Area Networks – Wide Area Networks Communication – Naming and Name Resolution – Routing Strategies – Packet Strategies – Connection Strategies - Communication Protocols – Robustness Distributed File Systems : Introduction – Naming and Transparency – Naming Structures – Naming Schemes – Implementation Techniques - Remote File Access – Stateful versus Stateless Service – File Replication.	10 hours

Text Books:

1. Silberschatz and Galvin Gagne,), “*Operating System Concepts*”, 6th edition, Wiley – India Edition

Reference Books:

1. Achyut S. Godbole, “*Operating Systems*”, 2nd edition, Tata Mc Graw Hill Publications,(1985).
2. Deital, “*An Introduction to Operating Systems*”, 2nd edition, Addition Wesley Publishing Co.(1985).

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Department	PG DEPARTMENT OF COMPUTER APPLICATIONS	
Course	MCA	Effective from the year : 2013
Subject Code Title	13PMC302 Resource Management Techniques	Semester : III
Hrs/Week :	4 Hours	Credit : 4
Objectives	Operation Research Solves ⇒ Modeling linear programs and solving with a computer ⇒ Simplex algorithms to solve linear programs ⇒ Other algorithms for linear programming ⇒ Integer Programming ⇒ Network problems ⇒ Non-linear programming	

Unit	Content	Hours
Unit-I	Introduction: Simplex method – Graphical method – Standard form – IBFS- Artificial Variable technique – big M – Two phase simplex method	14 Hours
Unit-II	Transportation : Mathematical formulation – Initial feasible solution – North – West Corner Method – Matrix minima method – Vogel’s approximation method – Optimized basic feasible solution- Solution by UV method Assignment Problem : Introduction – Definition – Assignment algorithm – Balanced Assignment Problem – Unbalanced Assignment problem – Hungarian Method	12 Hours
Unit-III	Networks : Networks and basic components – rules – time calculation in networks – CPM – PERT – PERT Calculations- Resource analysis in network scheduling project cost – time cost optimization algorithm	10 Hours
Unit-IV	Inventory : Introduction – Reasons for carrying Inventory – Type of Inventories – The Inventory decision – EOQ with no Shortages – Production problem with no shortages – EOQ with Shortages – Production problem with shortages- EOQ with Price Breaks – EOQ with no price breaks – EOQ with two price breaks Queuing Theory : Queuing System characteristics – Poisson process and exponential distribution (M/M/1) : (α /FIFO) , (M/M/1) : (N/FIFO) , (M/M/C) : (α / FIFO) , (M/M/C) : (N/FIFO)	12 Hours
Unit-V	Sequencing : Introduction- problems of sequencing – problems with n jobs and two machines – Problems with n jobs and three machines – problems with n jobs and m machines Replacement Theory : Introduction – replacement of equipment or asset the deteriorates gradually – replacement of equipment that fails suddenly	12 Hours

Text Books : 1. Kantiswarp, P. Gupta, Manmohan , “*Operations Research*”, McGraw Hill Publication

Reference Books:

1. P.K. Gupta, D.S. Hira, “*Problem in Operations Research*”, S.Chand & Company Ltd.,
2. J.K. Sharma, “*Operations Research Theory and Applications*”, Second Edition, Macmillan India Ltd.,

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Department	PG DEPARTMENT OF COMPUTER APPLICATIONS	
Course	MCA	Effective from the year : 2013
Subject Code: Title :	13PMC303 Programming with Java	Semester: III
Hrs/Week:	3 Hours	Credit : 4
Objectives	The Main Purpose of this syllabus is to Provide a platform for learning Java and develop some web based applications. To understand the need for new languages environment for internet applications. Effectively use the huge library routines while solving problems. To handle exceptional situations and to access data to external medium. To make use of java utilities for documenting. Debugging programs and packing programs into Modules. To understand why certain language feature have been left out in java and the way java system is implements	

Unit	Content	Hours
Unit-I	An Overview of Java – Data Types – Variables and Arrays – Operators –Control Structures – Introduction to classes	9 Hours
Unit-II	A closer look at Methods and Classes – Inheritance – Packages and interfaces – Exception Handling – String Handling	9 Hours
Unit-III	Multithreaded Programming – Thread Model – Creating a Thread – Creating Multiple Thread Priorities – Synchronization – Interthread Communication. Networking – Basics – Networking Classes and Interfaces – Inet Address – TCP/IP Client Sockets – URL – URL Connection – TCP/IP Server Socket – Data Grams.	9 Hours
Unit-IV	I/O Basics: Byte Streams – Character Streams –Event Handling – Delegation Event Model – Event Classes – Source of Events – Event Listener Interface -. Applet Basics – Applet Architecture - Applet Skeleton - Simple Applet Display Methods – HTML Applet Tag – Passing Parameters to Applets	9 Hours
Unit-V	Introduction to AWT – Working with Windows – Graphics and Text – Using AWT Controls – Layout Managers – Menus – Dialog Boxes – File Dialog – JDBC Connectivity	9 Hours

Text Books :

1. Herbert Schildt, “ *The Complete Reference – Java* “, 4th Edition, Tata Macgraw Hill, 2011.

Reference Books:

1. Deital and Deital, “ *Java How to Program*”, Third Edition, Pearson Education Asia, 2001.

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Department	PG DEPARTMENT F COMPUTER APPLICATIONS	
Course	MCA	Effective from the year:2013
Subject Code: Title :	Scripting Languages 13 PMC304	Semester:III
Hrs/Week:	4Hours	Credit:4
Objectives	This syllabus focuses on principles of testing, Test automation. It also covers some of the recognized methodologies for testing. It discusses Test Management, test metrics and measurements.	

Unit – I	Java Script(JS): Introduction - Webpages- Database Connectivity- Client Side Java Script – Advantages of Java Script – Writing Java script into HTML – Basic Programming techniques-Data types & Literals - Functions - Operators Comparisons - Conditions -Switch - Loop :For -While - Breaks - Errors - Event Handling - Validation JS Html DOM: DOM Introduction DOM HTML DOM CSS DOM Events DOM Nodes JS Object: Number - String -Date - Array – Boolean- Math- - RegExp - Window - Screen – Location- History Navigator PopupAlert - Timing - Cookies - Libraries - JQuery - Prototype	12 Hours
Unit II	VB Script: VBScript Basics- VB Variables Sub types and Constants- Arrays- VBScript operators-VBScript Procedures- Program control and Structures- Built in functions and statements, objects, using Cookies, frames and Animation with VB Script - Strings and Numbers-Message and Input boxes- Dates and Times-The Document Object Model – Event handlers	14 Hours
Unit III	ASP: ASP Introduction- Syntax- Variables- Procedures - Forms - Cookies - Session - Application - Send Email - Objects: Response - request -Session Server - Error - file System - TextStream - Drive - File - Folder -Dictionary ADO Components: AdRotator- Browser Cap -Content Linking - Content Rotator	10 Hours
UNIT IV	Introducing XML: An Eagle's Eye View of XML -XML Applications- Your First XML Document- Structuring Documents- Attributes, Empty Tags, and XSL-Well-Formed XML Documents Document Type Definitions: Document Type Definitions and	14 Hours

	Validity - Element Declarations- Attribute Declarations- Entity Declarations- Namespaces Style Sheets: CSS Style Sheets-CSS Layouts- CSS Text Styles- XSL Transformations- XSL Formatting Objects	
UNIT-V	Supplemental Technologies: XLinks- XPointers- XInclude - Schemas XML Applications: XHTML- Modular XHTML- RDDL- Scalable Vector Graphics- Designing a New XML Application	10 Hours

Text Books :

1. Ivan Bayross(2009), “*Web Enabled Commercial Application Development Using HTML,DHTML,Javascript,PERL,CGI*” Edition IIBPB Publications.
2. William-J-Orvis(1998), “*Understanding VB Script-Web page Interactivity*”, Galgotia Publications,
- 3.H.M Deitel, P.J Deital, T.R Neito, T.M Lin, P Sadhu(2001) “*XML – How to Program-Featuring Java2, Perl CGI and Active Server Pages*”, Pearsons Education, 2nd Edition.

Reference Books:

- 1.Nicholas C. Zakas “*Professional JavaScript for Web Developers* “ 3rd Edition
- 2.Cristopher J Goddard, Mark White “*Mastering VB Script* “— Galgotia Publications
- 3.Elliotte Rusty Harold(2004), “*XML 1.1 Bible*”, 3rd Edition, John Wiley & Sons.

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Department	PG DEPARTMENT OF COMPUTER APPLICATIONS	
Course	MCA	Effective from the year:2013
Subject Code: Title :	OBJECT ORIENTED ANALYSIS AND DESIGN WITH UML 13 PMC305	Semester:III
Hrs/Week:	4 hours	Credit:4
Objectives	Become familiar with all phases of Object –Oriented Analysis and Design. Master the main features of the Unified Modeling Language (UML). Understand how UML supports the entire OOAD process. Understand the Rational Unified Process. Master the main concepts of Object Technologies and how to apply them at work. Develop the ability to analyze and solve challenging problem Domains. Learn the object design principles and understand how to apply them towards implementation. Discover and learn how to use the main Object oriented Analysis Patterns and Design Patterns	

Unit – I	Introduction: An Overview of Object- Oriented Systems Development - Introduction-Two orthogonal views of the software-Object Oriented Systems Development Methodology- Why an object orientation?-Overview of the unified approach. Object-Oriented Systems Development life cycle : Introduction - The software development process - Building high-quality software Object Oriented Systems Development: a use-case Driven Approach - Reusability.	12 Hours
Unit II	Object Oriented Methodologies: Introduction: Toward Unification - Too many methodologies - Survey of some of the Object Oriented Methodologies - Rumbaugh Object Modeling Technique - The Booch Methodology - The Jacobson Methodologies - Patterns - Frameworks - The Unified approach	14 Hours
Unit III	UML Over view: UML History, Goals of UML - UML concept areas- Syntax of Expressions and Diagrams. Nature and purpose of models: A Model, Levels of models, Meaning of model. UML walkthrough: UML views - static view-use case view - interaction view - state machine view - activity view - physical view - model management view - extensibility constructs. Static view: Overview – Classifiers – relationship - associations-generalization-realization-dependencies, constraints, instances. Use case view: Overview, actor, use case.	10 Hours
UNIT IV	State machine view: Overview-state machine-event, state, transition, composite state. Activity view: Overview-activity diagram-activities and other views, activation collaboration, Interaction, sequence diagram, Physical view: Overview-component-node.	14 Hours
UNIT-V	Model Management view: Package-Dependencies on packages-access and import dependency, model and subsystem. Extension Mechanism: Constraints, tagged view, stereo types tailoring with UML. UML Environment: Semantics responsibilities, notation responsibilities, programming language responsibilities, modeling with tools.	10 Hours

Text Books:

1. Ali Bahrami(1999), “*Object Oriented Systems Development Using The Unified Modeling Language* “, McGraw-Hill Edition
2. Grady Booch, “*Object Oriented Analysis And Design*”, Presley Edition Ivar Jacobson, James, Rumbaugh, Grady Booch, “*The Uml Reference Manual*”

Reference Books:

1. Craig Larman(2000), “*Applying UML and patterns*”, Addison Wesley.
2. Grady Booch, James Rumbaugh, Ivar Jacobson(1999), “*The Unified Modeling Language User Guide*”, Addison - Wesley Long man, ISBN 0-201-57 168-4.
3. Fowler(1996), “*Analysis Patterns*”, Addison Wesley.
4. Erich Gamma(1994), “*Design Patterns*”, Addison Wesley.
5. Grady Booch, “*Object Oriented Analysis and Design with applications*”, Second edition, Pearson Education.

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III Semester	Programming Lab – V Java	13PMC306
		Credit Points = 2 Hours/week = 4
Program – 1	Class, objects, recursion , constructor, destructor	
Program – 2	Array Using sorting techniques	
Program – 3	Inheritance	
Program – 4	Package	
Program – 5	Interface	
Program – 6	Multithreading	
Program -7	String handling	
Program – 8	Applets	
Program – 9	AWT tools	
Program – 10	Event handling	
Program – 11	I/O operations	
Program – 12	Networking	
Program – 13	JDBC	
Program – 14	Animation	

III Semester	Programming Lab –VI -Scripting Language Lab	13PMC307
		Credit Points = 2 40 + 60 = 100 Hours/week = 4
Program – 1	Create a JS code block using arrays to generate the current date in words	
Program – 2	Create a JS code block which checks the contents entered in a forms text element	
Program – 3	Create a JS code block that validate username and password	
Program – 4	Create a web page using two image files switch between one another at the mouse pointer moves over the images	
Program – 5	Create a web page which accept the user information and commands on the web site to check if all the text fields have been entered with data else display an alert	
Program – 6	Write text using VBScript	
Program -7	Write html using VBScript	
Program-8	Create an Array Using VBScript	
Program-9	Create a Procedure using VBScript	
Program-10	Write a program using VBScript built in functions	
Program -11	Design the XML elements to hold membership information for a computer club	
Program-12	XML document to hold the elements for 5 students	
Program-13	Create a Link to a CSS to display student information	
Program-14	Create a Cookie program using ASP	
Program-15	Create a session object using ASP	

III Semester	Programming Lab – VII – OOAD & UML	13PMC308
		Credit Points = 2 25 + 75 = 100 Hours/week = 4

Program – 1	Music Collection
Program -2	Air line Reservation
Program – 3	Library Management System
Program – 4	Payroll Processing
Program – 5	Railway Reservation
Program – 6	Inventory Management
Program – 7	Hospital Management
Program - 8	Student Information System
Program – 9	Electricity Bill
Program – 10	Human Resource Management
Program – 11	Bank Transactions

SEMESTER IV

Department	PG DEPARTMENT F COMPUTER APPLICATIONS	
Course	MCA	Effective from the year:2013
Subject Code: Title :	J2EE Technologies 13 PMC401	Semester: IV
Hrs/Week:	4Hours	Credit:4
Objectives	To learn the advanced concepts of Java to cope with any kind of programming. To develop distributed applications in J2EE.	

Unit- I	Introduction to JFC-JPanel-JFrame-JApplet-JSplitPane-JTabbedPane-JViewport-JMenus-Items and Labels-JTextField-JTextArea – Buttons - JButton classes- JCheckBoxes-JRadioButton - JCombo Boxes and JList	12 Hours
Unit- II	Advanced JFC components-JTrees-Jtables-JInternalFrame-JDesktopPane-JDesktopManager-JProgressbar. Java Beans-Introduction to Java Bean-Advantages of a Java Bean-Application Builder tools-The Bean Developer Kit (BDK)-jar files-Introspection-Developing a simple Bean-Using Bound properties-Using Bean Info Interface-Constrained properties-Persistence-Customizes-Java Beans API.	14 Hours
Unit –III	Servlet over view and Architecture-Movement to server side java – practical Applications for Java Servlets-Java Servlet Alternatives-Reasons to use java Servlets-Java Server Architecture-Servlet Basics-The Life cycle of the Servlet-A basic Servlet. Servlet Chaining-Definition for Servlet Chaining-uses of Servlet Chains-A practical example using Servlet Chaining-Servlets and JDBC-Two Tier and Three Tier Database access models-JDBC Driver types-JDBC Servlet Basics-A basic JDBC Servlet-Session Tracking-Using Cookies-Using Session objects	12 Hours
Unit –IV	Java Server Pages(JSP)-Beans-Conditions-Directives-Declarations-Implicit Variables-Scripts-Expressions. RMI(Remote Method Invocation)-Introduction –Alternatives to RMI-RMI Architecture-. RMI Registry-The RMI Compiler-Object serialization and parameter passing-A simple example.	12 Hours
Unit –V	Enterprise Java Beans (EJB)-Introduction-Transaction-Transaction processor-Two Tier and Three Tier Client/Server Architecture-Distributed Transaction processing-EJB's Role -EJB's Architecture-Logical Architecture-Overview of EJB's Software Architecture-A High Level view of an EJB conversation-RMI clients-CORBA Clients-Building and Deploying EJB's-Roles of EJB –Requirements-Design-Implementation	10 Hours

Text Books

1. Patrick Naughton and Herbert Scheldt (2000), “*The Complete Reference Java 2*”, 3rd Edition, TMH Publications
2. James GoodWill (2001), “*Developing Java Servlets*”, 2nd edition, Sams series.

Reference Books

1. Dr.Sathya Raj Pantham (1999), “*Pure JFC Swing*”, Tech Media Publications, , 1st edition. Sam Series.
2. Troy Bryan Downing (1998),” *Java RMI*”, IDG Books Worldwide Inc.
- 3.Tom Valesky (1999), “*Developing distributed applications using Enterprise Java Bean*”, 1st edition Addison Wesley.
- 4.Karl Avedal,Danny Ayers (2000), ”*Professional JSP*”, Wrox Press Ltd.

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Course	MCA	Effective from the year:2013
Subject Code: Title :	13PMC402 PHP & MySQL	Semester: IV
Hrs/Week:	4hrs	Credit:4
Objectives	Aim of the course is to understand the concept of PHP and MYSQL and combine PHP with MYSQL Databases.	

Unit	Content	Hours
Unit-I	Importance of PHP and MYSQL Server side Scripting Overview: Static HTML-Client/Side Technologies-Server side Scripting. Learning PHP syntax and variables: PHP syntax-comments-variables-types in PHP-Control Structures	12Hours
Unit-II	PHP Functions- Passing Information with PHP - Learning PHP string Handling- Learning Arrays: Creating Arrays – Retrieving values- Multidimensional arrays-Inspecting Arrays-Deleting from Arrays- Iteration.	12Hours
Unit-III	Learning PHP Number Handling: Numerical Types-Mathematical Operators-Simple mathematical Functions-Randomness. Working with File System -Working with Cookies and sessions. Handling exception with PHP	12Hours
Unit-IV	MySQL : Introducing Databases and MySQL-Learning Structured Query Language(SQL).Integrating PHP with MySQL-Performing Database Queries- Integrating web forms and databases.	14Hours
Unit-V	Improving database efficiency-MYSQL functions: Using SQL functions AVG,COUNT,SUM,MIN,MAX,LCASE,UCASE- MySQL Joins.	10Hours

Text Books

1. Steve Suehring, Tim Converse, Joyce Park (2009)“*PHP 6 and MySQL 6 Bible*” Wiley Publishing Inc.

Reference Books

1. Robin Nixon (2010), “Learning PHP , MYSQL, Java script and CSS” O’Reilly media inc.,
2. By Lynn Beighley, Michael Morrison (2008), “Head First PHP & MySQL” O'Reilly Media, Inc.
3. Steve Holzner (2008)“PHP: The Complete Reference “Mc Graw Hill Publications.

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Department	PG DEPARTMENT OF COMPUTER APPLICATIONS	
Course	MCA	Effective from the year : 2013
Subject Code: Title :	13PMC403 Computer Networks	Semester: IV
Hrs/Week:	4 Hours	Credit : 4
Objectives	This syllabus provides an understanding of the various principles, protocols and design aspects of computer networks. Discuss, learn and critique various network technologies and data communication technologies. To learn the wide area and local area networks. To learn the various communication protocols and applications.	

III Semester	Computer Networks	13PMC305
Objectives	This syllabus provides an understanding of the various principles, protocols and design aspects of computer networks. Discuss, learn and critique various network technologies and data communication technologies. To learn the wide area and local area networks. To learn the various communication protocols and applications.	
Unit I	Network fundamentals: use of computer networks – network hardware – network software – reference model – OSI reference model – TCP/IP model Physical Layer : The theoretical basis for data communication – guided transmission media – wireless transmission – communication satellites.	14 hours
Unit II	Data link Layer : Data link layer design issue – error detection and correction – elementary data link protocols – sliding window protocol – protocol specification and verification.	12 hours
Unit III	Network Layer: Network layer design issues – routing algorithms(shortest path routing , distance vector, link state, mobile routing) – Internetworking- network layer in the internet (IP protocol, IP addresses, subnet, internet control protocols)	12 hours
Unit IV	Transport Layer: The transport service- elements of transport protocol-a simple transport protocol- the internet transport protocols: TCP(TCP service models, TCP protocol)-UDP-wireless TCP and UDP.	12 hours
Unit V	Application Layer: DNS, Telnet, rlogin, SNMP, Email,World Wide Web.Multimedia: Introduction to Digital Audio – Audio Compression – Streaming Audio- Internet Audio- Voice Over IP- Introduction to Video- Video Compression – The JPEG Standard – The MPEG Standard	10 hours

Text Book

1. Andrew S Tanenbaum, (2003) ,“*Computer Networks*”, IV Edition, Pearson Education.

Reference Books

1. Larry L.Peterson & Bruce S.Davie, (2000) “*Computer Networks – A Systems Approach*”, 2nd edition , Harcourt Asia/Morgan Kaufmann,.
2. William Stallings(1997), “*Data and Computer Communications*”, 5th edition, PHI publications.
3. P.Green, (1982), “*Computer Network Architecture and protocols*”, Plenum Press.

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Department	PG DEPARTMENT F COMPUTER APPLICATIONS	
Course	MCA	Effective from the year:2013
Subject Code: Title :	Software Testing 13 PMC404	Semester:IV
Hrs/Week:	4 Hours	Credit:4
Objectives	This syllabus focuses on principles of testing, Test automation. It also covers some of the recognized methodologies for testing. It discusses Test Management, test metrics and measurements.	

Unit – I	Testing, verification and validation – White Box Testing : Static testing – Structural testing - challenges – Black Box Testing : What, Why, When to do ? How to do ?	12 Hours
Unit II	Integration Testing: Integration Testing as a type of testing, Integration testing as a phase of testing – Scenario testing – defect bash. System and Acceptance testing: Functional System Testing – Non-Functional testing – Acceptance Testing.	14 Hours
Unit III	Performance Testing – Methodology, Tools, Process, Challenges, Regression testing - Types , When to do? What to do?, Internationalization testing.	10 Hours
UNIT IV	Test management and automation: Test planning-test management-test process-test reporting- Best practices.	14 Hours
UNIT-V	Software Test Automation: Skills needed for automation- what to automate, scope of automation – design and architecture for automation- generic requirements for test tools framework- selecting a test tool- challenges. Test Metrics and measurements.	10 Hours

Text Books

- 1.Srinivasan Desikan, Gopalswamy Ramesh(2009), “*Software testing principles and practices*” – Pearson education – 7th impression .

Reference Books

1. K.Mustafa, R.A.Khan (2009), “*Software testing concepts and practices*”, Narosa publishing house Pvt. Ltd.
2. Ron Patton (2006), “*Software Testing*”, Pearson Education, Second Edition

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Department	PG DEPARTMENT F COMPUTER APPLICATIONS	
Course	MCA	Effective from the year:2013
Subject Code: Title :	Human Resource Management 13 PMC405	Semester:IV
Hrs/Week:	4 Hours	Credit:4
Objectives	This syllabus focuses on the human resource functions, recruitment, placement, training, development, compensation, managing quality, labour relations and employee security. Students learn the importance of the human resources, recruitment and training and also the importance of the labour relations in the organization.	

Unit – I	HUMAN RESOURCE FUNCTION Human Resource Philosophy – Changing environments of HRM – Strategic human resource management – Using HRM to attain competitive advantage – Trends in HRM – Organization of HR departments – Line and staff functions – Role of HR Managers.	12 Hours
Unit II	RECRUITMENT & PLACEMENT Job analysis : Methods - IT and computerised skill inventory - Writing job specification - HR and the responsive organisation. Recruitment and selection process : Employment planning and forecasting - Building employee commitment : Promotion from within - Sources, Developing and Using application forms - IT and recruiting on the internet. Employee Testing & selection : Selection process, basic testing concepts, types of test, work samples & simulation, selection techniques, interview, common interviewing mistakes, Designing & conducting the effective interview, small business applications, computer aided interview.	14 Hours
Unit III	TRAINING & DEVELOPMENT Orientation & Training: Orienting the employees, the training process, need analysis, Training techniques, special purpose training, Training via the internet. Developing managers - Management development- The responsive managers- on-the-job and off-the-job development techniques using HR to build a responsive organization- Management development	14 Hours

	and CD-ROMs-Key factors for success. Performance appraisal- Methods- Problems and solutions- MBO approach – The appraisal interviews- Performance appraisal in practice. Managing careers: Career planning and development - Managing promotions and transfers.	
UNIT IV	COMPENSATION & MANAGING QUALITY Establishing Pay plans: Basics of compensation - factors determining pay rate - Current trends in compensation - Job evaluation - pricing managerial and professional jobs - Computerized job evaluation. Pay for performance and Financial incentives: Money and motivation - incentives for operations employees and executives - Organization wide incentive plans - Practices in Indian organizations. Benefits and services: Statutory benefits - non-statutory (voluntary) benefits - Insurance benefits - retirement benefits and other welfare measures to build employee commitment.	11 Hours
UNIT-V	LABOUR RELATIONS AND EMPLOYEE SECURITY Industrial relation and collective bargaining: Trade unions - Collective bargaining - future of trade unionism. Discipline administration - grievances handling - managing dismissals and separation. Labour Welfare : Importance & Implications of labour legislations - Employee health - Auditing HR functions, Future of HRM function.	9 Hours

Reference Books

1. Gary Dessler (2002), *“Human Resource Management”*, Eighth edition, Prentice-Hall of India Pvt Ltd., Pearson.
2. David A. DeCenzo & Stephen P. Robbins (1988), *“Personnel/Human Resource Management”*, Third edition, PHI/Pearson.
3. VSP Rao (2000), *“Human Resource Management: Text and cases”*, First edition, Excel Books, New Delhi.
4. Dr. R. Venkatapathy & Assissi Menacheri (2001), *“Industrial Relations & Labour Welfare”*, Adithya Publications, CBE.
5. Robert L. Gibson and Marianne H. Mitchell (2005), *“Introduction to Counseling and Guidance”*, VI edition, PHI.

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IV Semester	Programming Lab – VII J2EE	13PMC406
		Credit Points = 2 40 + 60 = 100 Hours/week = 4
Program – 1	JFC Programs to create Tabbed panes, Split panes, JTree, JTable, JMenus, JProgress bar and MDI Frames	
Program – 2	Beans Programs to demonstrate association among inbuilt beans, beans with simple, bound, constrained properties and introspection of beans	
Program – 3	Servlets Programs to demonstrate Generic and HTTP servlets, servlet chaining, session tracking using cookies and session objects and JDBC servlet interaction	
Program – 4	JSP Programs to demonstrate Scriptlets, Expressions and directives	
Program – 5	RMI Programs to demonstrate Student mark processing, Employee payroll processing and to generate roots of quadratic equation	

IV Semester	Programming Lab- XI PHP & MySQL LAB	13 PMC407 Credit Points = 2 40+60= 100 Hours/week = 4
Program -1	Create a PHP program for registration form which contains fields name,Roll No,Gender and a submit button	
Program -2	Write a PHP program to check whether the given number is prime or not	
Program -3	Create PHP Forms	
Program -4	Dynamically storing and manipulating items stored in a database using HTML forms and PHP	
Program -5	Searching a database using PHP	
Program -6	Accessing a MySQL database using PHP	
Program -7	Connecting to MySQL with PHP	
Program -8	Performing SQL Queries with PHP	
Program -9	Modify and update a MySQL database from a webpage using HTML forms and PHP	
Program -10	Modify and update a MySQL database from a webpage using HTML forms and PHP	

IV Semester	Mini project –II	13PMC 408
	(No internal)	Credits:2
Project Evaluation:30	Viva:20	Total:50

Department	PG DEPARTMENT OF COMPUTER APPLICATIONS	
Course	MCA	Effective from the year : 2013
Subject Code:	13PMC501	Semester: V

Title :	UNIX PROGRAMMING	
Hrs/Week:	4 Hours	Credit : 4
Objectives	This syllabus tells how to use regular expressions in UNIX Shell commands and 'ed' line editor. This syllabus tells how to use various UNIX commands in UNIX shell, various shells, Kernol and Vi-editor. Also it covers the Shell programming in networks and Operating system. To understand the security, it covers backup's and administration tasks of UNIX.	

Unit	Content	Hours
Unit-I	Introduction to UNIX: UNIX operating system- background-multuser capability-multi tasking capability-features of Unix (Communication, Security, Pattern matching, Portability, Open systems, Programming facility, Tool gate, System calls and Library, User interface, Documentation, Online help). UNIX Kernal: Kernal and Shell, Types of shell- File systems- Types of files, Structure of file- working with file (touch, cat, cp, rm, md, ls, sort dwc commands)- working with directories (cd, pwd, mkdir, rmdir commands)- file and dir, permission, miscellaneous commands (log name, id, uname, ply, who, day)- filename substitutions (* and ?)- commands files, sleep and walk up.	8Hours
Unit-II	File Systems: Boot block- super block- Inode table- data blocks-storage of files- disk related commands (df, du, ulimit) UNIX Tools: General in UNIX (password, calendar, banner, dd, file compression)- Input and Output redirection and piping- redirection in UNIX, redirection standard output- redirection standard input-pipelines in UNIX- splitting with pipeline using the head and tail commands- Vi editor- modes of operation- commands used to handling the text- block commands- set commands- handling multiple file.	9 Hours
Unit-III	Communication and scheduling: The bulletin board- message of day-two way communication- message to users- mail facility- addressing all users- delaying shell script- calendar and batch commands- cron facility. Filters and process: Simple awk filtering- formatting output- number processing- positional parameter and shell variables, nawk, getline statements- built in variables- arrays, functions- Interface with the shell. SH Process: Parents and Children- Process status- System process-Multi jobs in background- Background process using kill, nice and time command.	10 Hours
Unit-IV	Shell Programming: Shell script- Shell variables- Shell keywords, User defined variables- Passing command line arguments- echo command- looping with for, if, exit, else, break and while statements-continue statement- case statement- using input to shell procedures-shell functions- input/output redirection meta character- conditional execution using AND and OR operation- debugging shell procedures- simple programs.	9 Hours
Unit-V	System Administration: Adding and removing users- daily administration- staring up, shutting down the system- disk management- formatting disk- making and mounting a file system-unmounting the file system- ensuring system security- file system administration- backups- important commands (tar, fack, lost, found, cron).	9 Hours

Text Books :

1. Sumitabha Das,(2000) “*Unix and shell programming*”,
2. Yeswant Kanitkar , (2003), “*Unix and Shell programming*”, Second Edition, BPB Publication

Reference Books:

1. Maruice J. Bach, Reprint (2001), “*The design of the UNIX operation system*”, Prentice Hall of India, 20th Indian.
2. W. Richard Stevens, (1990), “*Unix Network Programming*”, Prentice Hall of India,.
3. Rebecca Thomas, Lawrence R. Rogers, Jean L. Yates, (1987), “*Advanced Programmers Guide to Unix System V*”, Mc Graw Hill International Editions.

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Department	PG Department of Computer Applications	
Course	MCA	Effective from the year:2013
Subject Code:	13PMC502	Semester: V
Title :	.Net Framework	
Hrs/Week:	4	Credit: 4
Objectives	Aim of the course is to understand the concept of .net framework, VB.NET, ADO.NET and enable the students to write program. This paper introduces the .NET framework and creating simple web applications	

Unit	Content	Hours
Unit-I	Net framework Overview: .Net Framework class libraries-Name spaces – Languages in .Net Visual studio on .Net-Need of VB.Net-Objects-Encapsualtion-Overloading-Inheritance-Polymorphism-Constructors-Destructors-Interface-Free threading- Delegates-Structuring exception handling-XML-Web services-Console applications-Assemblers-ADO.Net –Asp.Net. VB.Net programs-Explorer Window –Class View Window-Tool Box-Output Window-Task List Window. Datatypes /Operators: Literals, Variables-Declaration of data types(ALL)-Declaration of Variables-Constants-Operators(Arithmetic, relational, Compound, Assignment, logical Bitwise)-keywords, Comments-Scope of variables-Console Applications in VB.Net	10 Hours
Unit-II	Console Statements and Array procedures: Control: if –Types of IF-Looping-Select case statements-Goto statements-Exit from control statements- intrinsic control statements-form control statements-Events-Label-Textbox-Group Box Control-Check box control-Radio Button Control-Scroll Bar Control-Types-Track Bar-Time link labels-Date time Picker-month Calendar Array: One dimensional, multidimensional array, Redim Statements, Array of Array, list box Control-Check list box control-Combo Box control Procedure/Structure: Subroutine procedure-function procedure-property procedure-functions(return values, calling functions, call by reference), Functions with array- functions with param array-function overloading-Sub Procedure, Calling sub procedure-Class view window-Tool box-Output window-Task list window	12 Hours
Unit-III	Structure: Definition of Structure – giving Value to Structure – Function inside the structure – nested Structure – Message box functions – input box functions. Creating Menus and using dialog boxes : Menus – MDI form – Context menu – rich Text box – Color dialog box - font dialog box	12 Hours
Unit-IV	Object oriented concept in VB.Net: Boxing – Unboxing - read only and write only properties – adding methods to classes – classes with constructors – Assemblies – Assemblies that C# program – namespaces – Overriding properties and Methods – Shadow statements – Polymorphism Events, delegates and Exception Handling : Events and classes – delegates – single cast Delegates – multicast delegates – exception – try-catch – Finally – end –try – Multiple catch – nested try statements – Try Finally	14 Hours

Unit-V	Data Access with ADO.Net : Meaning of database – Relational Database – table creation – record insertion – displaying data – deleting data – drop table – special features of ADO.Net – Difference between ADO and ADO.Net Connection – Commands– Data reader – Dataset – using data grid – using data Adaptor – Configuration wizard – XML and Ado.Net – Filtering data using data View – Complex data binding – Command parameter properties – using stored procedure with the command Web Application with VB.Net and ASP.Net : First ASP.Net program – Server Controls – Validation summing Control – Ado.Net and Data Binding	12 Hours
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Text Book :

1. Sitech , “*VB.Net*” , TMGH publications

Reference Book :

1. Sapiro, “(2002) “*The Complete Reference for Visual Basic .Net*, TMGH publications
2. Jamsa, ”(2002) ”*Visual Basic. Net3.* ”,(2000)Wallace and J.Smiley, “*Learn to programming with Visual basic .Net*

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Department	PG Department of Computer Applications	
Course	MCA	Effective from the year:2013
Subject Code: Title :	13PMC503 PROGRAMMING IN C#	Semester: V
Hrs/Week:	4hrs	Credit:4
Objectives	The goal is to develop a clear, consistent and unambiguous standard for the c# programming language which codifies the common, existing definition of C# and which promotes the portability of user programs across C# language environments	
Unit	Content	Hours
Unit-I	Understanding .NET : Strategy -Origins of .NET Technology - .NET framework – Common Languages Runtime – Frame work base classes – VB .Net - .Net Languages – Benefits of .Net approach – C # and the .Net What is C# ? – Why C#? – Evaluation of C# - Characteristics of C# - How C# differ from C++ and Java? Overview of C# : Introduction - A Simple C# program – Name spaces – Main returning a Value – Using aliases for Name Space Classes – Passing String object to write line method – Main with a class – Providing interactive input – Multiple main methods	10 Hours
Unit-II	Literals, Variable and Data types – Boxing and Unboxing – Operators & Expressions – Mathematical Functions – Decision Making & Branching statements – Decision Making and Looping statements. Methods in C# : Declaring methods – Main methods – Invoking methods – Nesting of methods – Methods parameters – Pass by value – Pass by reference – Output parameters – Variable, Arguments list – Methods overloading. Handling Arrays : Creating a array – Variable size array – The system array class – array list class	9 Hours
Unit-III	Manipulating Strings: Creating strings – Strings methods – Comparing String – Mutable Strings – Arrays – Regular Expressions. Structures & Enumerations: Structures – Struts with methods – Enumerations – Enumerations initializations – Enumerator Type Conversions. Class and Objects : Defining a class – Adding variables and methods – Creating Objects – Constructors – Overloading constructors – Static, Private, Copy constructors – Destructors – Read only members – Properties – Indexes	8 Hours
Unit-IV	Inheritance and Polymorphism : Introduction – Classical Inheritance – Containment Inheritance – Defining a subclass – Defining a subclass constructors – Multilevel Inheritance – Overloading Methods – Hiding Methods – Abstract Classes and Methods – Sealed Classes and Methods – Polymorphism – Interfaces. Multiple Inheritance : Introduction – Defining an interfaces – Extending an Interface – Implementing Interfaces – Interfaces and Inheritance – Explicit Interfaces Implementation. Operator Overloading : Introduction – Overloadable Operators – Defining Operator Overloading – Overloading Unary Operators – Overloading Binary Operators – Overloading binary operators – Overloading Comparison Operators	9 Hours

Unit-V	Delegates and Events : Introduction – Delegates – Delegate Declaration – Delegate Methods – Delegate Instantiation – Using Delegates – Multicast Delegates – Events. Managing Console I/O Operations : Introduction – Console class – Console Input – Console Output – Formatted Output – Numeric Formatting – Standard Numeric Formats – Custom Numeric Format. Checked and Unchecked operators.	9 Hours
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Text Books:

1. E.Balagurusamy, (2002)“Programming in C#”, TATA MC Graw hill Publishing Ltd.,NewDelhi

Reference Books:

1. Jesse Liberty, “Programming C#: Building .NET Applications with C#”, 4 th edition.
2. Dan Clark, ”Beginning C# Object Oriented Programming”.

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Department	PG Department of Computer Applications	
Course	MCA	Effective from the year:2013
Subject Code: Title :	13PMC504 Elective – III – Information security	Semester: V
Hrs/Week:	4hrs	Credit:4
Objectives	To understand the basics of Information Security To know the legal, ethical and professional issues in Information Security To know the aspects of risk management To become aware of various standards in this area To know the technological aspects of Information Security	

Unit	Content	Hours
Unit-I	INTRODUCTION :History- What is Information Security- Critical Characteristics of Information- NSTISSC Security Model,-Components of an Information System- Securing the Components- Balancing Security and Access,-The SDLC-The Security SDLC	10 Hours
Unit-II	SECURITY INVESTIGATION :Need for Security- Business Needs- Threats- Attacks- Legal- Ethical and Professional Issues	9 Hours
Unit-III	SECURITY ANALYSIS :Risk Management: Identifying and Assessing Risk- Assessing and Controlling Risk	8 Hours
Unit-IV	LOGICAL DESIGN :Blueprint for Security- Information Security Policy- Standards and Practices, ISO 17799/BS 7799,-NIST Models,-VISA International Security Model,-Design of Security Architecture,- Planning for Continuity	9 Hours
Unit-V	PHYSICAL DESIGN :Security Technology-IDS- Scanning and Analysis Tools,-Cryptography,-Access Control Devices- Physical Security- Security and Personnel	9 Hours

Text Books:

1. Michael E Whitman and Herbert J Mattord (2003), "*Principles of Information Security*", Fourth Edition, Vikas Publishing House, New Delhi.

Reference Books:

1. Micki Krause, Harold F. Tipton (2004), "*Handbook of Information Security Management*", Vol 1-3 CRC Press LLC,.
2. Stuart Mc Clure, Joel Scrambray, George Kurtz,(2003) "*Hacking Exposed*", Tata McGraw-Hill.
3. Matt Bishop, "*Computer Security Art and Science*", Pearson/PHI,.

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Department	PG Department of Computer Applications	
Course	MCA	Effective from the year:2013
Subject Code:	13PMC505	Semester: V
Title :	Elective –IV Big Data Management	
Hrs/Week:	4Hours	Credit: 4
Objectives	To know about big data, its architecture and the integration with datawarehouse. Explains the concept of Hadoop and Map reduce functions. Gives an idea about virtualization and explains the cloud in the context of Big data. Emphasis the Big data best practices and its resources for further improvements.	

Unit	Content	Hours
Unit-I	Fundamentals of Big Data: Evolution of Data Management- Managing the data – Big Data – Big data management architecture. Big Data Types: Structured data – Unstructured Data –Real Time and Non- real time requirements – Big Data together. Distributed Computing: History of Distributed Computing – Basics of Distributing Computing – Performance.	11 Hours
Unit-II	Big Data Technology Components: Big Data Stack – Redundant Physical Infrastructure – Security Infrastructure – Operational Databases – Organizing Data Services and Tools – Analytical Data Warehouses – Big Data Analytics – Big Data Applications. Virtualization: Basics of Virtualization – Managing virtualization with Hypervisor – Abstraction and Virtualization – Implementing Virtualization. Cloud and Big Data: Cloud in the context of Big Data – Cloud Deployment and Delivery models – Cloud as an imperative for big data – Use of cloud for Big data – Providers in the Big Data Cloud Market.	13 Hours
Unit-III	Operational Database: Relational, Non-relational, Key-value Pair, Document, Columnar, Graph, Spatial, polygot Persistence. MapReduce Fundamentals: Origin of MapReduce- Map Function – Reduce Function – Putting Map and Reduce together – Optimizing Map-ReduceTasks. Exploring the world of Hadoop: Hadoop – Hadoop Distributed File System – Hadoop map Reduce. Hadoop Foundation and Ecosystem: Building Big Data Foundations with Hadoop Ecosystems – Managing Resources and Applications with Hadoop YARN – Storing Big Data with HBase – Mining Big Data with Hive – Interacting with Hadoop Ecosystem	12 Hours
Unit-IV	Appliances and Big Data Warehouse: Integrating Big Data with Traditional Data Warehouse – Big Data Analysis and Data Datawarehouse – Changing the role of Data Warehouse – Changing Deployment Models to the Big Data Era – Future of Data Warehouse Defining Big Data Analytics: Using Big Data to get results – Modifying BI products to handle Big Data – Big Data Analytics Examples. Integrating Data Sources: Identifying the data – Fundamentals of Big Data Integration – Defining Traditional ETL – Understanding ELT – Prioritizing Big Data Quality – Using Hadoop as ETL – Best practices for Data Integration in a Big Data World.	13 Hours
Unit-V	Importance of Big Data to business: Big Data as a Business planning Tool-Adding new Dimesions to the planning cycle –	11 Hours

	Keeping data analytics in perspective – Getting Started with the right Foundation – Getting the Big data Strategy started- Planning for Big Data – Transforming Business Processes with Big Data. Ten Big Data Best Practices – Ten Big Data Resources – Ten Big data do's and don't's.	
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Text Book:

1. Judith Hurwitz, Alan Nurgent, Dr. Fern Halper, Marcia Kaufman,(2013) “ *Big Data for Dummies*” A Wiley Publication, First Edition.

Reference Books :

1. Michael Minelli, Michele Chambers, Ambiga Dhiraj,(2013) “*Big Data, Big Analytics – Emerging Business Intelligence and Analytic Trends For Today's Businesses*”, A Wiley Publication, First Edition
2. Strata Conference, Making Data Work,(2013) “*Big Data Now*”, Shroff Publication, First Edition

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V Semester	Programming lab – X Unix Programming Lab	13PMC506
		Credit Points = 2 Hours/week = 3
Program -1	File Related commands	
Program -2	Directory related commands	
Program -3	Shortest Job First algorithm	
Program -4	Round Robin scheduling algorithm	
Program -5	FIFO Algorithm	
Program -6	Dead Lock detection algorithm	
Program -7	Paging	
Program -8	Segmentation	
Program -9	DOS Commands	
Program -10	Command Line Arguments	

V Semester	Programming lab – XI .NET PROGRAMMING LAB	13 PMC507 Credit Points = 2 40+60= 100 Hours/week = 3
Program -1	Online Shopping	
Program -2	Library Management System	
Program -3	EB Bill and generate the necessary reports	
Program -4	College Management	
Program -5	Railway reservation	
Program -6	Airline Reservation	
Program -7	Housing Board Maintenance	
Program -8	Passport transactions	
Program -9	Online Exam	
Program -10	Develop a program for Time Table Management System.	

V Semester	Programming lab – XII Programming in C#	13 PMC508 Credit Points = 2 40+60= 100 Hours/week = 3
Program – 1	Command Line Arguments	
Program – 2.	Expressions	

Program – 3.	Method overloading	
Program – 4.	Sorting	
Program – 5.	Transpose Matrix	
Program – 6.	Array	
Program – 7.	List	
Program – 8.	Strings	
Program – 9.	Structures	
Program –10.	Constructors	
Program –11.	Inheritance	
Program –12.	Polymorphism	
Program – 13	Interfaces	

	Semester VI					
13PMC601	Project and Viva Voce		40	160	200	12