

**NALLAMUTHU GOUNDER MAHALINGAM
COLLEGE (AUTONOMOUS)
POLLACHI**

**P.G. DEPARTMENT OF COMPUTER
APPLICATIONS**

Batch No : 25

SYLLABUS FOR ACADEMIC YEAR 2015 - 2018

MASTER OF COMPUTER APPLICATIONS (M.C.A)

(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2015 ONWARDS)

I - 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						
15PMC101	Fundamentals of Programming languages and C	4	3	25	75	100	4
15PMC102	Data and File Structures	4	3	25	75	100	4
15PMC103	Digital Electronics and Computer System Architecture	4	3	25	75	100	4
15PMC104	Computer Oriented Numerical Methods	4	3	25	75	100	4
15PMC105	Internet and Web Designing	4	3	25	75	100	4
15PMC106	LAB-I C Programming	5	3	40	60	100	2
15PMC107	LAB-II Internet and Web Designing Lab	5	3	40	60	100	2
Semester Total				205	495	700	24
	Semester II						
15PMC208	Object Oriented Programming with C++	4	3	25	75	100	4
15PMC209	Relational Database Management system	4	3	25	75	100	4
15PMC210	Accounting and Financial Management	4	3	25	75	100	4
15PMC211	Visual Programming	4	3	25	75	100	4
15PMC212	Software Engineering	4	3	25	75	100	4
15PMC213	LAB – III C++ Lab	5	3	40	60	100	2
15PMC214	LAB- IV VB & Oracle Lab	5	3	40	60	100	2
15PMC215	Mini Project – 1			40	60	100	2
Semester Total				245	555	800	26

SEMESTER-III							
Subject Code	Subject Title	Lecture+ tutorial/ practical hrs/week	Duration of Exam Hrs	Marks			Credit Points
				Internal	End of Semester	Total	
15PMC316	Operating Systems	4	3	25	75	100	4
15PMC317	Resource management Techniques	4	3	25	75	100	4
15PMC318	Java Programming	4	3	25	75	100	4
15PMC319	Scripting Language	4	3	25	75	100	4
15PMC320	Object oriented Analysis and Design with UML	4	3	25	75	100	4
15PMC321	Programming Lab – V Java Lab	4	3	40	60	100	2
15PMC322	Programming Lab – VI Scripting Language Lab	4	3	40	60	100	2
15PMC323	Programming Lab –VII OOAD & UML Lab	2	3	40	60	100	2
Total				245	555	800	26
SEMESTER-IV							
Subject Code	Subject Title	Lecture+ tutorial/ practical hrs/week	Duration of Exam Hrs	Marks			Credit Points
				Internal	End of Semester	Total	
15PMC424	J2EE Technologies	4	3	25	75	100	4
15PMC425	Computer Networks	4	3	25	75	100	5
15PMC426	PHP5/MYSQL	4	3	25	75	100	4
15PMC427	Elective – I Data Mining	4	3	25	75	100	4
15PMC428	Elective – II Software Testing	4	3	25	75	100	4
15PMC429	Programming Lab – VIII J2EE Lab	5	3	40	60	100	2
15PMC430	Programming Lab –IX PHP/MYSQL Lab	5	3	40	60	100	2
15PMC431	Mini Project - II			40	60	100	2
Total				245	555	800	27

SEMESTER-V							
Course Code	Course Title	Lecture+ tutorial/ practical hrs/week	Duration of Exam Hrs	Marks			Credit Points
				Internal	End of Semester	Total	
15PMC532	Unix Programming	4	3	25	75	100	4
15PMC533	.Net Framework	4	3	25	75	100	4
15PMC534	Programming in C#	4	3	25	75	100	5
15PMC535	Elective – III Information Security	4	3	25	75	100	4
15PMC536	Elective – IV Big Data	4	3	25	75	100	4

	Big Data Management						
15PMC537	Programming Lab – X Unix Programming	4	3	40	60	100	2
15PMC538	Programming Lab – XI .Net Lab	4	3	40	60	100	2
15PMC539	Programming Lab – XII Programming in C# lab	2	3	40	60	100	2
Total				245	555	800	27

SEMESTER - VI							
15PMC640	Project and Viva Voce		40	160	200	10	
Grant Total			1225	2895	4100	140	

SEMESTER I

Department	P.G Department of Computer Applications	
Course	MCA	Effective from the year:2015
Subject Code: Title :	15PMC101 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	10 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	10 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	11 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.	11 Hours

Text Books

1. Sudharsan.P, (2004) “ *Fundamentals of Computing* “, I Edition, RBA publications (Unit I).
2. Yashavant P. Kanetkar (2010),“*Let us C*”, 12th Edition, BPB Publicaions, (Unit II , III, IV).
3. Balagurusamy .E,(2004) “ *Programming in ANSI C*”, Third Edition , ,McGraw-Hill Publications (Unit IV,V).

Reference Books

1. Yeswanth Kanetkar,(2003) “*Pointers in C* ”, 3rd Edition, BPB Publicaions.
2. Bryon.S. Gottfried, (2009)“*Programming with C*”, Schaum’s Outlines, Second Edition, Tata McGraw-Hill,

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M.Rajasenathipathi	M.Rajasenathipathi		(For office use only)

Department	P.G Department of Computer Applications	
Course	MCA	Effective from the year:2015
Subject Code: Title :	15PMC102 DATA AND FILE STRUCTURES	Semester : I
Hrs/Week:	4 Hours	Credit : 4
Objectives	The purpose of this syllabus is to impart knowledge on various data structure 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	10 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	10 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	10 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	11 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	11 Hours

Text Books :

1. Ellis Horowitz & Sarataj Sahni (1981), “ *Fundamentals of data structures*”, Ninth Edition, Galgotia Publications.
2. Trembly Sorenson (1984), “ *An Introduction to data structures with applications*”, Second edition, McGraw-Hill Publications.

3. Reference Books:

1. Robert L.Kruse(1984) , “ *Data Structures and Program Design*”, Second Edition, Prentice Hall Publications.
2. Dromey.R.G ,(2008) “ *How to Solve it by computer* ”, Fourth Edition, Pearson Education, India

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Department	P.G Department of Computer Applications	
Course	MCA	Effective from the year:2015
Subject Code: Title :	15PMC103 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 to 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	10 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	10 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	10Hours
Unit-IV	I/O Organization: Peripheral Devices – I/O Interface – Asynchronous data transfer – mode of transfer – priority interrupt – direct Memory Access – I/O processor	11Hours
Unit-V	Memory Organization : Memory Hierarchy – Main memory – Auxiliary memory – Associative memory	11 Hours

Text Books :

1. Albert Paul Malvino(1991), , Donald P Leach, “Digital Principles and Applications”, Fourth Edition. Tata McGraw Hill.
2. Morris Mano(2008), “*Computer System Architecture*”, Third Edition, Pearson India.

Reference Books:

1. V.C Hamachar, Z.G. Vraesic, S.G. Zaky,(2010), “*Computer Organization*”, Fifth Edition, Tata McGraw Hill.
2. Vincent P.Heuring, Harry F.Jordan,(2008) “*Computer Systems Design and*

- Architecture*”, Second Edition, Addison Wesley,
3. John p. Hayes(1999), “*Computer Architecture and Organization*”, Third Edition, McGraw Hill.
 4. David A. Patterson and John L.Hennessy(1999), “*Computer Organization and Design*”, Second edition, Harcourt Asia Pvt Ltd.
 5. William Stallings (2007), “*Computer organization and Architecture – Designing for performance*”, Sixth Edition, Pearson Education,

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Department	P.G Department of Computer Applications	
Course	MCA	Effective from the year:2015
Subject Code: Title :	15PMC104 Computer Oriented Numerical Methods	Semester : I
Hrs/Week:	5 Hours	Credit : 5
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	10Hours
Unit-II	Solution of Simultaneous Linear Algebraic Equations (Direct) – Gauss Elimination Method – Gauss Jordan Elimination Method – Gauss Jacobi method – Gauss Seidel method	10Hours
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.	10Hours
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 – Simpon’s three-eighths rule.	11Hours
Unit-V	Numerical Solution of Ordinary Differential Equations : Solution by Taylor series – Improved Euler method – Modifies Euler method – Runge Kutta Method – Predictor Corrector methods : Milne’s Predictor Corrector Formulae	11Hours

Text Books :

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

Reference Books:

1. E.Balagurusamy, (1999), “*Numerical Methods*”, First Edition, 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:2015
Subject Code : Title :	15PMC105 Internet and WEB Designing	Semester : I
Hrs/Week:	5 Hours	Credit : 5
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	10Hours
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	10Hours
Unit-III	HTML : Introduction - SGML – Outline of an HTML Document – Head Section – Body Section – HTML forms	10 Hours
Unit-IV	Dynamic HTML (DHTML) : Introduction – Cascading Style Sheets(CSS) DHTML – Event Handling – Filters and Transitions – Data Binding	11 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	11 Hours

Text Books :

1. N.P. Gopalan, J.Akilandeswari,(2011), '*Web Technology- A developers Perspective*', Second Edition, PHI Learning Private Limited.

Reference Books:

1. Thomas A.Powell '*The Complete Reference HTML*', 5th Edition, Tata McGraw Hill.
2. Thomas A.Powell '*The Complete Reference Internet*', 2nd Edition, Tata McGraw Hill.

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I Semester	Programming Lab – I C LAB	15PMC106
		Credit Points = 2 25 + 75 = 100 Hours/week = 4
Program 1	Programs using Control Structures	
Program 2	Programs using Arrays	
Program 3	Matrix Operations using Arrays	
Program 4	Using String Applications in a Program	
Program 5	Programs using Functional concepts	
Program 6	Programs using Recursion	
Program 7	Using Structures & Union	
Program 8	Programs using Pointers	
Program 9	Linked Lists Programs	
Program 10	Stack & Queue Programs	
Program 11	Programs using Searching Techniques	
Program 12	Programs using Sorting Techniques	
Program 13	File Operations in different applications	

I Semester	Programming Lab – II Internet and WEB Designing LAB	15PMC107
		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:2015
Subject Code:	15PMC208	Semester : II
Title :	Object Oriented Programming with C++	
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 constructs 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 Expression–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.	10 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.	10 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.	11 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.	11 Hours

Text Books :

1. Balagurusamy. E (2013) , “*Object Oriented Programming with C++* ”., Sixth edition, Tata McGraw-Hill Publications
2. Bruce Eckel (2000) , “*Thinking in C++* “, Second Edition, Prentice Hall

Reference Books:

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

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Department	PG Department of Computer applications	
Course	MCA	Effective from the year:2015
Subject Code: Title :	15PMC209 Relational Database Management System	Semester : II
Hrs/Week:	4 Hours	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.	10 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.	10 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.	10 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.	11 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.	11 hours
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Text Books :

1. Raghu Ramakrishnan, Johannes Gehrke (2002), “*Database Management Systems*”, Third edition, McGraw-Hill Higher Education.

Reference Books:

1. Silberschatry, Korth, Sundarshan (2010), “*Database System Concepts*”, Sixth Edition, McGraw-Hill Higher Education.
2. Elmasri Navathe, (2007), “*Fundamentals of Database Systems*”, Fifth Edition, Pearson Education Asia.

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Department	PG Department of Computer Applications	
Course	MCA	Effective from the year:2015
Subject Code:	15PMC210	Semester : II
Title :	Accounting and Financial Management	
Hrs/Week :	4 Hours	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)	10Hours
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	10Hours
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.	10Hours
Unit-IV	Financial Analysis :Fund flow and Cash flow analysis: Meaning – Objects – Difference - Preparation of fund flow and cash flow Statements.	11Hours
Unit-V	Case Studies :Case studies from above context	11Hours

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

Reference Books:

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

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Department	PG DEPARTMENT OF COMPUTER APPLICATIONS	
Course	MCA	Effective from the year : 2015
Subject Code: Title :	15PMC211 VISUAL PROGRAMMING	Semester : II
Hrs / Week :	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.	10 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.	10 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.	10 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	11 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.	11 hours

Text Books:

1. Robert orfli, Dan Harkey , Jeri Edwards (2011), ” Client/Server Survival Guide “,Third Edition, Wiley India.
2. Noel Jerke (2002), “*The Complete Reference Visual Basic 6*”, Second Edition, Tata McGraw-Hill Edition.

Reference Book :

1. Paul Deitel, H.M.Deitel and G.J.Ayer(2008) “*Simply Visual Basic 2008*”, Third Edition, Prentice Hall
2. Travis Dewire (2003), “*Client/Server Computing*”, Productivity series, Tata McGraw-Hill Edition

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Department	PG Department of Computer Applications	
Course	MCA	Effective from the year: 2015
Subject Code: Title :	Software Engineering 15PMC212	SEMESTER II
Hrs/Week:	4	Credit: 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.	

Units	Content	Hours
Unit-I	Nature of Software – The unique nature of Web Apps- Software Engineering – Software Process – Software Engineering Practice – Software Myths A generic process model – Process Assessment and Improvement - Prescriptive Process Model (Waterfall, Incremental, Evolutionary and concurrent)– Specialized Process Models(Component Based Development, Formal Methods Model and Aspect oriented Software Development)	10
Unit-II	Requirements analysis – Scenario based Modeling – UML Models – Data Modeling concept, class based modeling.	11
Unit-III	Design Concepts : The Design process – Design concepts – Design Model. Software Architecture – Architectural design – Accessing Alternative Architectural Design- Architectural mapping using data flow.	10
Unit-IV	User Interface design: The golden rules – User interface analysis and design – Interface Analysis – Interface design steps – design evaluation.	11
Unit-V	Testing conventional Applications: Fundamentals – Internal and External view of Testing- [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 - integration testing – validation testing – System Testing.	10

Text Book

Roger S. Pressman (2004), “Software Engineering a Practioner’s Approach “, Seventh Edition , McGraw Hill Higher Education

Reference Book

1. Rajib Mall(2004), “Fundamentals of Software Engineering”, second Edition, PHI

Learning Series

2. Sommerville (2007) “Software Engineering” Pearson Education, Sixth Edition
3. Richard Fairly(2004)“Software Engineering Concepts”, First Edition, Tata McGraw-Hill

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II SEMESTER	Programming Lab III C++ Lab	15PMC213 Credits :2
Program 1	Programs using Call by Reference, Call by Value and Return by Reference	
Program 2	Using Array of Objects	
Program 3	Using Static, Dynamic, Constructor, Destructor	
Program 4	Programs using Default Arguments and Multiple Constructors	
Program 5	Operator Overloading Programs	
Program 6	Using Inheritance in programs	
Program 7	Using Virtual Function in programs	
Program 8	Programs using Concept of pointers	
Program 9	Function Overloading programs	
Program 10	Using Random access file in different applications	
Program 11	Using Command Line Arguments	
Program 12	Programs using String Operations	
Program 13	Programs using Templates	
Program 14	Programs using Exceptions	

II SEMESTER	Programming Lab-IV VB and Oracle Lab	15PMC214 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)	15PMC 215 Credits : 2
Project Evaluation:30	Viva : 20	Total : 50

SEMESTER III

Department	PG DEPARTMENT OF COMPUTER APPLICATIONS	
Course	MCA	Effective from the year : 2015
Subject Code Title	15PMC316 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 Os – Mainframe systems – Desktop systems – Multiprocessor systems – Distributed systems – Clustered systems – Real Time systems. Operating system structures: Systems 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 process – Cooperating process – Inter process communication. CPU Scheduling: Scheduling Criteria – Scheduling algorithms – Multiple – processor Scheduling – Real Time scheduling. Deadlocks: Deadlock characterization – methods for handling Deadlocks – Deadlock prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlock	10 hours
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.	10 hours
Unit-IV	I/O Systems: Disk structure – Disk scheduling – Disk Management – Swap – space management File Systems: File concept – Access methods Directory structure – File system structure – File system implementation – Directory implementation – Allocation Methods – Free space	11 hours

	Management – Efficiency & Performance – Recovery.	
Unit-V	CASE STUDIES: Linux: Design Principles – Kernel modules – Process Management, scheduling –Memory Management – File systems – Input & Output – Interprocess Communication – Network structure – Security. Windows 2000:Design principles – system components – Environmental subsystems –File systems- Networking – Programmer Interface.	11hours

Text Books:

1. Silberschatz and Galvin , (2003), “*Operating System Concepts*”, Sixth edition, Addison Wesley Publishing Co.

Reference Books:

1. Achyut S. Godbole, (2010), “*Operating Systems*”, Third edition, Tata Mc Graw Hill Publications

2. Deital, (1990) “*An Introduction to Operating Systems*”, Second Edition, Addison Wesley Publishing Co.

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Department	PG DEPARTMENT OF COMPUTER APPLICATIONS	
Course	MCA	Effective from the year : 2015
Subject Code Title	15PMC317 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	10 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	10 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)	11Hours
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	11 Hours

	Replacement Theory : Introduction – replacement of equipment or asset the deteriorates gradually – replacement of equipment that fails suddenly	
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Text Books :

1. Kanti Swarup, P.K. Gupta and Man Mohan, (2008) ,*Operations Research*, Sultan Chand & Sons Educational Publishers, New Delhi.

Reference Books:

1. P.K. Gupta, D.S. Hira (2007), “*Problem in Operations Research*”, S.Chand & Company Ltd.,
2. J.K. Sharma(2006) , “*Operations Research Theory and Applications*”, Third Edition, Macmillan India Ltd.,
3. Hamdy A. Taha (2008), “*Operations Research : An Introduction*” Eight Edition PHI, New Delhi,

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Department	PG DEPARTMENT OF COMPUTER APPLICATIONS	
Course	MCA	Effective from the year : 2015
Subject Code: Title :	15PMC318 Programming with Java	Semester: III
Hrs/Week:	3 Hours	Credit : 3
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	10 Hours
Unit-II	A closer look at Methods and Classes – Inheritance – Packages and interfaces – Exception Handling – String Handling	10 Hours
Unit-III	Multithreaded Programming – Thread Model – Creating a Thread – Creating Multiple Thread Priorities – Synchronization – Interthread Communication. Networking – Basics – Java and the net – Inet Address – TCP/IP Client Sockets – URL – URL Connection – TCP/IP Server Socket – Data Grams.	10 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	11 Hours
Unit-V	Introduction to AWT – Working with Windows – Working with colors – Working with fonts – Using AWT Controls – Layout Managers – Menus – Dialog Boxes – File Dialog – JDBC	11 Hours

Text Books :

1. Patrick Naughtan, (1999),“ *The Complete Reference – Java* “, 4th Edition, Osborne/McGraw-Hill

Reference Books:

1. Deital and Deital, (2012)“ *Java How to Program*”, Third Edition, Pearson Education Asia
2. Herbert Schildt, (2002)*The Complete Reference Java 2*, Third Edition, TMH .

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Department	PG DEPARTMENT F COMPUTER APPLICATIONS	
Course	MCA	Effective from the year:2015
Subject Code: Title :	Scripting Languages 15 PMC319	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 JS in Webpages- JS Database Connectivity- JS Client Side Java Script – Advantages of Java Script – Writing Javascript into HTML – Basic Programming techniques-Datatypes&Literals - JS Functions JS Operators Js Comparisons JS Conditions JS Switch JS Loop For JS Loop While JS Breaks JS Errors Js Event Handling Js Validation JS Html Dom: DOM Introduction DOM HTML DOM CSS DOM Events DOM Nodes JS Object: JS Number JS String JS Date JS Array JS Boolean Js Math JS RegExp JS Window JS Screen JS Location JS History JS Navigator JS PopupAlert JS Timing JS Cookies JS Libraries JS Libraries JS JQuery JS Prototype	10 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	10Hours
Unit III	ASP: ASP Introduction- ASP Syntax- ASP Variables- ASP Procedures -ASP Forms -ASP Cookies -ASP Session -ASP Application -ASP Send Email -ASP Objects: ASP Response -ASP request- ASP Session- ASP Server -ASP Error -ASP file System -ASP TextStream -ASP Drive ASP File -ASP Folder -ASP Dictionary -ASP -ADO ASP Components: ASP AdRotator- ASP Browser Cap -ASP Content Linking -ASP Content Rotator	10 Hours
UNIT IV	Introducing XML: An Eagle's Eye View of XML -XML	11 Hours

	Applications- Your First XML Document- Structuring Documents- Attributes, Empty Tags, and XSL-Well-Formed XML Documents Document Type Definitions: Document Type Definitions and 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	11 Hours

Text Books :

1. Ivan Bayross (2009), “Web Enabled Commercial Application Development Using HTML,DHTML,Javascript,PERL,CGI” ,Third Edition, BPB Publications.
2. William-J-Orvis (1996), “Understanding VB Script-Web page Interactivity”, First Edition,Prima 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 (2012),“*Professional JavaScript for Web Developers* “ Third Edition,WROX Publication.
- 2.Cristopher J Goddard, Mark White (1996),“*Mastering VB Script* “,Pap/Cdr edition ,Macmillan Audio Books;
- 3.Elliotte Rusty Harold(2004), “*XML 1.1 Bible*”, Third Edition, John Wiley & Sons.

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Department	PG DEPARTMENT OF COMPUTER APPLICATIONS	
Course	MCA	Effective from the year:2015
Subject Code: Title	OBJECT ORIENTED ANALYSIS AND DESIGN WITH UML 15 PMC320	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.	10 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	10Hours
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.	11Hours

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.	11 Hours
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Text Books:

1. Ali Bahrami(1999), *“Object Oriented Systems Development Using The Unified Modeling Language “*, McGraw-Hill Edition
2. Grady Booch (1993),*“Object Oriented Analysis And Design”*, Second Edition, Addison Wesley Object technology series Edition
3. Ivar Jacobson, James, Rumbaugh, Grady Booch, (2004) *“The Uml Reference Manual”*, Second Edition, Addison Wesley Publications

Reference Books:

1. Craig Larman(2000), *“Applying UML and patterns”*, Addison Wesley.
2. Grady Booch, James Rumbaugh, Ivar Jacobson(2005), *“The Unified Modeling Language User Guide”*, Second Edition, Addison - Wesley Long man, ISBN 0-201-57168-4.
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 Programming	15PMC321
		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	15PMC322
		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 Lab	15PMC323
		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:2015
Subject Code: Title :	J2EE Technologies 15 PMC424	Semester: IV
Hrs/Week:	4 Hours	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	10 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.	10 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	10 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.	11 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	11 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*", 1st edition, Tech Media Publications Sam Series.
2. Troy Bryan Downing (1998), "*Java RMI*", First edition, 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*", 1st edition, Wrox Press Ltd.

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Department		PG DEPARTMENT OF COMPUTER APPLICATIONS	
Course		MCA	Effective from the year : 2015
Subject Code: Title :		15PMC425 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.		
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.		10 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.		10 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)		10 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.		11 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		11 hours

Text Book:

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

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*”, 1st edition, Plenum Press.

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Course	MCA	Effective from the year:2015
Subject Code: Title :	15PMC426 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	10Hours
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.	10Hours
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	10Hours
Unit-IV	MySQL : Introducing Databases and MySQL-Learning Structured Query Language(SQL).Integrating PHP with MySQL-Performing Database Queries- Integrating web forms and databases.	11Hours
Unit-V	Improving database efficiency-MYSQL functions: Using SQL functions AVG, COUNT, SUM, MIN, MAX, LCASE, UCASE-MYSQL Joins.	11Hours

Text Book:

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

Reference Books:

1. Robin Nixon (2012), “*Learning PHP , MYSQL,Java script and CSS*”,2nd edition, O’Reilly media inc.,
2. By Lynn Beighley, Michael Morrison (2009),“*Head First PHP & MySQL*”,1st edition, O'Reilly Media, Inc.
3. Steve Holzner (2008)“*PHP: The Complete Reference* “, 1st edition, Mc Graw Hill Publications.

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Department	PG Department of Computer Applications	
Course	MCA	Effective from the year:2015
Subject Code: Title	15PMC427 : Elective –I Data Mining and Warehousing	Semester:IV
Hrs/Week:	3Hours	Credit: 3
Objectives	To understand the concept of data warehouse and data mining and its application. To understand OLTP and developing a data warehouse, data mining technique and algorithms. To learn data mining environment and applications	

Unit	Content	Hours
Unit-I	Data warehouse, definition, necessary of data warehouse, difference between operational database and data warehouse, design of decision support system, integration with data mining, client server and data warehousing, multiprocessing machine, cost justification. Data warehouse architecture, steps for design and construction of data warehouse, three tier architecture, types of OLAP servers, ROLAP vs NOLAP vs HOLAP, data warehouse to data mining, data warehouse usage, OLAP and OLAM.	10 Hours
Unit-II	Data Mining : Definition – Information as a production. Computer systems that can learn, data mining vs query tools, data mining and marketing, practical application of data mining. Learning, self learning computer systems, machine learning methodology of science, concept teaching, issue of learning algorithm.	10 Hours
Unit-III	KDD, data selection, cleaning, enrichment, coding, data mining, visualization techniques, likely hood and distance, OLAP, k-nearest algorithm, decision trees, association rules, neural networks, genetic algorithm and reporting	10 Hours
Unit-IV	Setting up a KDD environment, different forms of knowledge, 10 golden rules, format aspects of learning algorithm, learning as compression dataset, information content, noise and redundancy, significance of noise, fuzzy database, relational database, relation of tables, key to satisfied dependency, demoralization, data mining primitives.	11 Hours
Unit-V	Application and trends in data mining, Bio medical and DNA analysis, financial data analysis, retail industry, telecommunication industry, social impacts of Data Mining, Trends in data mining.	11 Hours

Text Books:

1. Peter Adriaans, “*Data Mining*”, 3rd edition, Pearson Publication
2. Jaihaewan Kamber, *Data Mining concepts and Techniques*”3rd edition, PHI

Reference Book :

1. Arun Pujari, “*Data Mining concepts*”, 2nd edition, PHI

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Department	PG DEPARTMENT F COMPUTER APPLICATIONS	
Course	MCA	Effective from the year:2015
Subject Code: Title :	Elective-II Software Testing 15 PMC428	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 ?	10 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.	10 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.	11 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.	11 Hours

Text Book:

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

Reference Books:

1. K.Mustafa, R.A.Khan (2009), “Software testing concepts and practices”,5th edition, Narosa publishing house Pvt. Ltd.
2. Ron Patton (2006), “Software Testing”, Second Edition ,Pearson Education

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IV Semester	Programming Lab – VIII J2EE	15PMC429 Credit Points = 2 40 + 60 = 100 Hours/week = 4
Module 1	JFC Programs to create Tabbed panes, Split panes, JTree, JTable, JMenus, JProgress bar and MDI Frames	
Module 2	Beans Programs to demonstrate association among inbuilt beans, beans with simple, bound, constrained properties and introspection of beans	
Module 3	Servlets Programs to demonstrate Generic and HTTP servlets, servlet chaining, session tracking using cookies and session objects and JDBC servlet interaction	
Module 4	JSP Programs to demonstrate Scriptlets, Expressions and directives	
Module 5	RMI Programs to demonstrate Student mark processing, Employee payroll processing and to generate roots of quadratic equation	

IV Semester	Programming Lab- IX PHP & MySQL LAB	15 PMC430 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	15PMC 431
	(No internal)	Credits:2
Project Evaluation:30	Viva:20	Total:50

SEMESTER V

Department	PG DEPARTMENT OF COMPUTER APPLICATIONS	
Course	MCA	Effective from the year : 2015
Subject Code: Title :	15PMC532 UNIX PROGRAMMING	Semester: V
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, Kernel 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-multituser 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.	10 Hours
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.	10 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-	10 Hours

	Multi jobs in background- Background process using kill, nice and time command.	
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.	11 Hours
Unit-V	System Administration: Adding and removing users- daily administration- starting 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).	11 Hours

Text Books:

1. Sumitabha Das,(2006) “*Unix Concepts and Applications*”,*Fourth Edition*,, Mc Graw Hill Publications
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*”, 4th Indian reprint, Prentice Hall of India
2. W. Richard Stevens, (1990), “*Unix Network Programming*”, 2nd edition, 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:2015
Subject Code: Title :	15PMC533 .Net Framework	Semester: V
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	Microsoft .NET Framework - . The .NET Framework classes –Common Language Runtime – Common Type system and Common Language specification – Visual studio .NET IDE. Visual Basic .NET – Visual Basic .NET IDE –Variables – Data types – Constants – Arrays – Dynamic arrays- Controlling the flow – if statement – select case – Loops.	10 Hours
Unit-II	Procedures: modular coding, arguments – Structures- Collections: Advanced array, Arraylist and hash table. Lists- sorted list. Creating custom class, adding methods and properties. Building Windows Applications – working with forms.	10 Hours
Unit-III	Basic windows controls- common dialog controls- Rich text box control- Debugging and Error Handling: types of errors, Exceptions and structured exception handling – Accessing databases – Building Database applications with ADO .Net- ADO .Net objects.	10 Hours
Unit-IV	ASP .NET – Introducing web developer tools – Introduction to ASP .NET server Programming – Using variables and constants in web forms – Working with web objects to store data – Designing .NET web Applications –Programming with Visual Basic .NET – Advanced web controls – Managing data with ASP.NET	11 Hours
Unit-V	C# Programming – Evolution of C# and .NET – Why C# - Elements of C# program – Programming Example – Data types and Expressions – Making decisions – Repeating Instructions – Arrays and Collection – Controls – Programming based on events – Database access with ADO .NET	11 Hours

Text Books:

1. Evangelos Petroustos(2005) ” *Mastering Visual Basic .NET*” , First edition, BPB Publications.
2. Barbara Doyle, (2008) “*Programming in C#*” , First Edition,Cengage Learning publications
3. Kathleen Kalata ,(2010) “*Web Applications using ASP .NET 2.0*” ,Third edition, Cengage Learning publications.

Reference Books:

1. David Chappell (2002),” *Understanding .NET*” , Fourth printing, Pearson education
2. David.S.Platt(2003),” *Introducing Microsoft .Net*” ,Version 1.1, PHI
3. G.Andrw Duthie(2003) , “*Microsoft ASP .NET Programming with Microsoft Visual C# .NET step by step*” , First edition, PHI
4. George Shepherd,(2008) ” *Microsoft ASP .NET 3.5*” ,First edition, PHI, New Delhi
5. Steven Holzner(2009), “*Visual Basic .NET Programming Black Book*” ,New edition, Dreamtech Press.

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Department	PG Department of Computer Applications	
Course	MCA	Effective from the year:2015
Subject Code: Title :	15PMC534 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	10 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	10 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	11 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.	11 Hours

Text Books:

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

Reference Books:

1. Jesse Liberty,(2005) “*Programming C#: Building .NET Applications with C#*”,4 th edition,O’Reilly media Inc
2. Dan Clark,(2011) ”*Beginning C# Object Oriented Programming*”,second edition, Apress Copyright.

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Department	PG Department of Computer Applications	
Course	MCA	Effective from the year:2015
Subject Code: Title :	15PMC535 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	10 Hours
Unit-III	SECURITY ANALYSIS :Risk Management: Identifying and Assessing Risk- Assessing and Controlling Risk	10 Hours
Unit-IV	LOGICAL DESIGN :Blueprint for Security- Information Security Poicy- Standards and Practices, ISO 17799/BS 7799,-NIST Models,-VISA International Security Model,-Design of Security Architecture,-Planning for Continuity	11 Hours
Unit-V	PHYSICAL DESIGN :Security Technology-IDS- Scanning and Analysis Tools,-Cryptography,-Access Control Devices- Physical Security- Security and Personnel	11 Hours

Text Book:

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,(2003) " *Computer Security Art and Science*", Second Edition,Pearson/PHI,.

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Department	PG Department of Computer Applications	
Course	MCA	Effective from the year:2015
Subject Code: Title :	15PMC536 Elective –IV Big Data Management	Semester: V
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.	10 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.	10 Hours
Unit-III	Operational Database: Relational, Non-relational, Key-value Pair, Document, Columnar, Graph, Spatial, polygot Persistence. MapReduce Fundamentals: Orgin 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	10 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.	11Hours
Unit-V	Importance of Big Data to business: Big Data as a Business planning Tool-Adding new Dimesions to the planning cycle – Keeping data analytics in perspective – Getting Started with the right Fpundation – Getting the Big data Strategy started- Planning for Big Data – Transforming Buisness Processess with Big Data. Ten Big Data Best Practices – Ten Big Data Resources – Ten Big data do's and dont's.	11Hours

Text Book:

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

Reference Books :

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

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V Semester	Programming lab – X Unix Programming Lab	15PMC537
		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	15 PMC538 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.	
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V Semester	Programming lab – XII Programming in C#	15 PMC539 Credit Points = 2 40+60= 100 Hours/week = 3
Program – 1	Programs using Call by Reference, Call by Value and Return by Reference	
Program – 2.	Using Array of Objects	
Program – 3.	Using Static, Dynamic, Constructor, Destructor	
Program – 4.	Programs using Default Arguments and Multiple Constructors	
Program – 5.	Operator Overloading Programs	
Program – 6.	Using Inheritance in programs	
Program – 7.	Using Virtual Function in programs	
Program – 8.	Programs using Concept of pointers	
Program – 9.	Function Overloading programs	
Program –10.	Using Random access file in different applications	
Program –11.	Using Command Line Arguments	
Program –12.	Programs using String Operations	
Program – 13	Programs using Templates	
Program –14.	Program using exception handling	

SEMESTER VI

	Semester VI					
15PMC640	Project and Viva Voce		100	100	200	9