

DON BOSCO COLLEGE (CO-ED)

Affiliated to Thiruvalluvar University

PROGRAMME HANDBOOK
MASTER OF COMPUTER SCIENCE (M.Sc)
CURRICULUM AND SYLLABUS UNDER CBCS
WITH EFFECT FROM 2017-2018



DON BOSCO COLLEGE (CO-ED)

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PROGRAM OVERVIEW

Post Graduate and Research Department of Computer Science, Don Bosco College (Co-Ed) was established in the year 2015 as a first Post Graduate Department and 2017 as a first Research Department of Don Bosco College (Co-Ed). It was the dream and initiative of Rev. Dr. S. Thaddeus SDB. The aim was to give priority to training rural and tribal students. The department has focused on the integration of Theory, practical and Research from the beginning. The duration of the course is 2 years and divided into 4 semesters. This programme provides numerous opportunities to the students who are interested in the field of Computer Science and desire to work in IT and/or IT enabled industries. It prepares students with the required knowledge to proceed for research studies such as M.Phil and Ph.D.

UNIVERSITY REGULATIONS - DEFINITIONS

PROGRAM - "Programme" means a course of study leading to the award of a degree in a discipline.

PROGRAM DURATION - It shall extend over a period of two years comprising of four semesters with two semesters in one academic year.

COURSE - "Course" refers to a paper / practical / subject offered under the degree programme. Each Course is to be designed with lectures / tutorials/Laboratory or field work / seminar / practical training / Assignments / Term paper or Report writing etc., to meet effective teaching and learning needs.

CREDITS - The weightage given to each course of study (subject) by the experts of the Board of Studies concerned. The total minimum credits, required for completing a PG program is 90.

CHOICE BASED - All Post Graduate Programmes offered by Thiruvalluvar University are under Choice Based Credit System. This is to enhance the quality and mobility of the students within and between the Universities in the country and abroad.

ELIGIBILITY FOR ADMISSION - Candidate seeking admission to the first year of the PG Degree Course should have passed the UG Computer Science or BCA in the recognised university.

PATTERN OF STUDY

The pattern of study for all PG Programs in Thiruvalluvar University consist of the following:

(i). Main Subjects

There are 4 main subjects in each semester, these subjects are mandatory.

(ii). Elective Subjects

Students can select any one subject as elective according to their choice.

(iii). Compulsory Paper

Apart from main and elective subjects, students have to study the compulsory paper (Human Rights).

(iv). Main Practical

With respect to the main subjects, there are 3 practical papers in First and Second semester and 2 Practical in 3rd Semester.

(v). Mini Project

During the third semester students have to do their mini project. This will give them an exposure to do the main project.

(vi). Main Project

In 4th semester students have to do their main project as a project trainee in any software industry. But, students are encouraged to engage with research projects.

PASSING MINIMUM

1. A candidate shall be declared to have passed the whole examination, if the candidate passes in all the theory papers and practicals wherever prescribed as per the scheme of examinations by earning 90 credits.

2. A candidate should get **not less than 50% in the University (external)** Examination, compulsorily, in any course. Also the candidate who secures **not less than 50%** marks in the external as well as internal (CIA) examinations put together in any course shall be declared to have successfully passed the examination in the subject in theory as well as Practicals.

DISTRIBUTION

Table - 1(A): The following are the distribution of marks for external and internal for University (external) examination and continuous internal assessment and passing minimum marks for **theory papers of PG Programmes.**

UNI. EXAM TOTAL (ESC)	PASSING MINIMUM FOR UNI.EXAM	CIA TOTAL	PASSING MINIMUM FOR CIA	TOTAL MARKS ALLOTTED	PASSING MINIMUM (UNI.EXAM+CIA)
75	38	25	0	100	50

Note: ESE - End Semester Examination

Table - 1(B): The following are the Distribution of marks for the Continuous Internal Assessment in the theory papers of PG Programmes.

S.No.	For Theory - UG courses	Distribution of Marks	
		Assignments	Tests
1	Assignment - 1 (First 2 Units of the Syllabus)	10	-
2	Test-1 (First 2 Units of the Syllabus for 1 Hour duration)	-	50
3	Assignment- 2 (3 rd & 4 th Units of the Syllabus)	10	
4	Test-2 (First 4 Units of the Syllabus for 2 Hours duration)	-	50
5	Assignment - 3 (5 th Unit of the Syllabus)	10	-
6	Test-3 (Entire Syllabus for 3 Hours duration)	-	100
	TOTAL MARKS	30	200
	Marks to be converted to	5	20
	Total Maximum Marks for CIA	25	

Table - 2(A): The following are the distribution of marks for University (external) examinations and continuous internal assessments and passing minimum marks for the **practical courses of PG Programmes.**

UNI. EXAM TOTAL (ESC)	PASSING MINIMUM FOR UNI.EXAM	CIA TOTAL	PASSING MINIMUM FOR CIA	TOTAL MARKS ALLOTTED	PASSING MINIMUM (UNI.EXAM+CIA)
75	38	25	0	100	50

Table - 2(B): The following are the distribution of marks for the Continuous Internal Assessment in PG practical courses.

S.No.	For Practical - UG courses	Distribution of Marks	
		Assignments	Tests
1	Regular maintenance of the Observation note book-1 (Upto the end of I-Semester)	10	-
2	Test-1 (Upto the end of I-Semester for 2 Hours duration)	-	25
3	Regular maintenance of the Observation note book-2 (Upto the end of II-Semester)	10	
4	Test-2 (Upto the end of II-Semester for 2 Hours duration)	-	25
5	Regular maintenance & proper completion of the Record note book	10	-
6	Test-3 (Entire Syllabus following University examination pattern)	-	25
	TOTAL MARKS	30	75
	Marks to be converted to	10	15
	Total Maximum Marks for CIA	25	

QUESTION PAPER PATTERN

The following question paper patterns shall be followed for CBCS pattern syllabi for the candidates admitted from the academic year 2017-2018 onwards.

External Maximum 75 Marks - wherever applicable (Ext.75 + Int.25 = Total. 100)

Section A	Short answer questions of either / or type (like 1a (or) 1b)	5 X 6 = 30	10 questions - 2 from each unit
Section B	Essay-type questions / Problem (Answer any 3 out of 5)	3 X 15 =45	5 questions - 1 from each unit

GRADING

Once the marks of the CIA and end-semester examinations for each of the course are available, they shall be added. The mark thus obtained shall then be converted to the relevant letter grade, grade point as per the details given below:

Conversion of Marks to Grade Points and Letter Grade (Performance in a Course/Paper)

RANGE OF MARKS	GRADE POINTS	LETTER GRADE	DESCRIPTION
90-100	9.0-10.0	O	Outstanding
80-89	8.0-8.9	D+	Distinction
75-79	7.5-7.9	D	
70-74	7.0-7.4	A+	
60-69	6.0-6.9	A	First Class
50-59	5.0-5.9	B	Second Class
40-49	4.0-4.9	C	Third Class
00-39	0.0	U	Re-appear
Absent	0.0	AAA	Absent

PROGRAMME STRUCTURE

SEMESTER I							
S.NO.	Study Components	Ins.hrs /week	Credit	Title of the Paper	Maximum Marks		
					CIA	Uni. Exam	Total
1	MAIN	5	5	Formal Languages and Automata Theory	25	75	100
2	MAIN	4	3	Advanced Java	25	75	100
3	MAIN	4	3	Web Application using C#	25	75	100
4	MAIN	4	3	Data Base Management	25	75	100
5	MAIN PRACTICAL	3	2	Advanced Java Programming Lab.	25	75	100
6	MAIN PRACTICAL	3	2	Web Application using C# Lab	25	75	100
7	MAIN PRACTICAL	3	2	Data Base Management Systems Lab	25	75	100
8	ELECTIVE	4	3	(Choose 1 out of 3) A. Object Oriented Analysis and Design B. Cloud Computing C. Principles of Programming Languages	25	75	100
		30	23				800

SEMESTER II							
S.NO.	Study Components	Ins.hrs /week	Credit	Title of the Paper	Maximum Marks		
					CIA	Uni. Exam	Total
9	MAIN	4	4	Compiler Design	25	75	100
10	MAIN	4	3	Enterprise Java	25	75	100
11	MAIN	4	3	Enterprise Applications using C#	25	75	100
12	MAIN	4	3	Unix Network	25	75	100
13	MAIN PRACTICAL	3	2	Enterprise Java Programming	25	75	100
14	MAIN PRACTICAL	3	2	Enterprise Applications using C# Lab	25	75	100
15	MAIN PRACTICAL	2	2	Unix Programming Lab	25	75	100
16	Compulsory Paper	2	2	Human Rights	25	75	100

17	ELECTIVE	4	3	(choose1out3) A. Software Testing B. Web Services C. Cryptography and Network Security	25	75	100
		30	24				800

SEMESTE III							
S.NO	Study Components	Ins.hrs /week	Credit	Title of the Paper	Maximum Marks		
					CIA	Uni. Exam	Total
18	MAIN	5	5	Distributed Operating Systems	25	75	100
19	MAIN	4	3	Software Project Management	25	75	100
20	MAIN	4	3	Mobile Computing	25	75	100
21	MAIN	4	3	Design and Analysis of Algorithms	25	75	100
22	MAIN PRACTICAL	3	2	Mobile Computing Lab	25	75	100
23	MAIN PRACTICAL	3	2	Design and Analysis of Algorithms Lab	25	75	100
24	MAIN PRACTICAL	3	2	Mini Project	25	75	100
25	ELECTIVE	4	3	(choose1out3) A. Software Quality Assurance B. Big Data C. Soft Computing	25	75	100
		30	23				800

SEMESTER IV							
S.No.		Ins.hrs /week	Credit	Title of the Paper	Maximum Marks		
					CIA	Uni. Exam	Total
26	Paper-11	30	20	Project Work	80	120	200
		30	20		80	120	200

PROGRAM EDUCATION OBJECTIVES (PEO)

OB1: EDUCATION - To prepare students so that they demonstrate problem solving and design skills including the ability to formulate problems and their solutions, think creatively, communicate effectively, and work collaboratively.

OB2: RESEARCH - To provide the students with specific knowledge of a variety of areas of Computer Science and have a broad idea of related disciplines, for a productive career as well as research as per the needs of the industry.

OB3: TECHNOLOGY - To provide our graduates with internship / project exposure in focused areas of their choice to solve complex real-world problems and prepare them to contribute to a specific discipline within computer science and possibly pursue advanced study or research.

OB3: ETHICAL AND PROFESSIONAL - The students will be able to exercise professional responsibility and be able to adapt to an ever-changing professional environment and be aware of societal issues with specific focus on human rights. To develop effective oral and written communication skills; and to develop an understanding of professional and ethical issues related to computing.

PROGRAM LEARNING OUTCOMES (PLO)

1. **Problem Solution:** Ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve problems to reach substantiated conclusions
2. **Individual and teamwork:** Ability to work effectively as a member and leader in teams, preferably in a multi-disciplinary setting.
3. **Communication skills:** Ability to communicate within the profession and with society at large. Such abilities include reading, writing, speaking, listening, the ability to comprehend and write effective reports and documents.
4. **Professionalism:** Understanding of the roles and responsibilities as professionals in society, especially the primary role of protection of the public and the public interest.
5. **Ethics and equity:** Ability to apply professional ethics, accountability, and equity.
6. **Life-long learning:** Ability to identify and to address one's educational needs in the changing world in ways sufficient to maintain one's competence and to allow him/her to contribute to the advancement of selected domains.
7. **Knowledge of Computer systems:** Apply the knowledge of computational concepts to real world problems and develop applications for various requirements
8. **Application of professional skills:** Exhibit professional skills required to work in a team
9. **Programming:** Conduct investigations of complex problems and find solutions through research methods
10. **Software Engineering:** Handle research projects through systematic planning, designing and implementation

11. Design, develop, implement and test a software product by applying the knowledge of project management
12. Pursue a career in networking, security, data analytics, blockchain, Internet of Things etc.

MAPPING OF INSTITUTION OBJECTIVES WITH PEOs

COLLEGE / PROGRAMME	EDUCATION	RESEARCH	TECHNOLOGY	ETHICAL AND PROFESSIONAL
OB1 : EDUCATION	√			
OB2 : RESEARCH		√		
OB3 : EMPLOYABILITY			√	
OB4 : COMM.SERVICE				√

MAPPING PEOs WITH POs / PSOs

PEO	PL01	PL02	PL03	PL04	PL05	PL06	PL07	PL08	PL09	PL010	PL011	PL012
1 : EDUCATION	√	√	√			√				√		√
2 : RESEARCH	√	√		√		√	√		√	√	√	
3 : EMPLOYABILITY	√					√				√		
4 : ETHICAL AND PROFESSIONAL		√		√	√	√		√	√	√	√	

MAPPING COURSE OUTCOMES WITH POs / PSOs

S E M	COURSE CODE	COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	MCS 11	Formal Languages and Automata Theory	√					√	√	√			√	
	MCS 12	Advanced Java Programming	√	√		√		√	√		√			
	MCS 13	Web Application using C#	√	√	√	√		√			√	√	√	
	MCS 14	Data Base Management Systems	√	√	√	√	√		√	√				√
	MCS 15A	Object Oriented Analysis and Design	√	√	√	√		√	√			√	√	
	MCS 15B	Cloud Computing		√	√	√	√	√	√	√		√		√
	MCS 15C	Principles of Programming Languages	√	√							√	√		
	MCS 16	Practical – Advanced Java Programming Lab	√	√	√	√		√	√			√	√	
	MCS 17	Practical – Web Application using C# Lab	√	√	√	√		√	√			√	√	
MCS 18	Practical – Data Base Management Systems Lab	√	√	√	√		√	√			√	√		
2	MHR20	Human Rights		√	√	√	√		√		√			
	MCS 21	Compiler Design												
	MCS 22	Enterprise Java Programming	√	√	√	√		√	√			√	√	
	MCS 23	Enterprise Applications using C#	√	√	√	√		√	√			√	√	

	MCS 24	Unix Networking Programming	√	√	√	√		√	√			√	√	√
	MCS 25A	Software Testing	√	√	√	√	√					√		√
	MCS 25B	Web Services	√	√				√	√	√		√	√	√
	MCS 25C	Cryptography and Network Security	√	√				√	√	√		√	√	√
	MCS 26	Practical – Enterprise Java Programming Lab	√	√	√	√		√	√			√	√	
	MCS 27	Practical – Enterprise Applications using C# Lab	√	√	√	√		√	√			√	√	
	MCS28	Practical – Unix Programming Lab	√	√	√	√		√	√			√	√	
3	MCS 31	Distributed Operating Systems	√	√	√	√					√	√	√	√
	MCS 32	Software Project Management	√	√	√	√	√					√		√
	MCS 33	Mobile Computing	√	√	√	√	√					√		√
	MCS 34	Design and Analysis of Algorithms	√	√				√	√	√	√			
	MCS 35A	Software Quality Assurance	√	√	√	√	√					√		√
	MCS 35B	Big Data												
	MCS 35C	Soft Computing	√	√	√	√		√	√			√	√	
	MCS 36	Practical – Mobile Computing Lab	√	√	√	√		√	√			√	√	
	MCS 37	Practical – Design and Analysis of Algorithms Lab	√	√	√	√		√	√			√	√	
	MCS 38	Practical – Mini Project	√	√	√	√		√	√			√	√	√
4	MCS41	Project Work and Viva Voce	√	√	√	√		√	√			√	√	√

MCS 11	FORMAL LANGUAGES AND AUTOMATA THEORY	Lecture	Practical	Credit
SEM I – Main		5	0	5

LEARNING OBJECTIVES

1. To demonstrate knowledge of basic mathematical models of computation and describe how they relate to formal languages.
2. To understand that there are limitations on what computers can do, and learn examples of unsolvable problems.
3. To learn that certain problems do not admit efficient algorithms, and identify such problems.

After completing this course, the students will be able to

1. Apply knowledge of computing and mathematics appropriate to the discipline
2. Apply mathematical foundations, algorithmic principles and computer science theory to the modeling and design of computer based systems in a way that demonstrates
3. Apply design and development principles in the construction of software systems of varying complexity

SYLLABUS

UNIT-I

Fundamentals - String, Alphabets, Operations, Finite State Machine – Definitions, Divisibility by Three Tester – Set Theory – Relations – Functions- Counting Techniques –Logic-Methods of Proof

UNIT-II

Finite Automata –Deterministic and Nondeterministic Finite Automata – Equivalence of NFA and DFA – Finite Automata with Outputs –Finite Automata with Null Moves – Finite Automata and Sequential Circuits

UNIT-III

Chomsky classification of grammars –Regular Expression – Relation between Regular languages and Finite Automata- Closure Properties – Automata for Union, Intersection and Difference of Languages – Context free grammars – Normal forms for Context Free Grammar – Parse Trees – Ambiguity Grammars – Removing Ambiguity from Grammars

UNIT-IV

Basic Structure – Types of Acceptance by PDA – Correspondence between PDA and

CFL – Parsing and PDA - Languages of PDA – Equivalence of PDA and CFG – Deterministic PDA

UNIT-V

Basic structure of TM – Instantaneous Description of Turing Machine – Language of TM – Turing Machine as Computer for Positive Integer- Universal Turing Machine – Turing Machine for 1's Complement, 2's Complement- TM for Well Formed Parenthesis – TM for Unary addition and Multiplication – TM for Palindrome Recognition – TM for GCD – TM for $0n1n$

TEXT BOOKS:

1. C.K. Nagpal“ Formal Languages and Automata Theory” , Oxford University Press,FourthEdition, 2013
2. HopcroftandUllman,“IntroductiontoAutomataTheory,LanguagesandComputation”,NarosaPublishingHouse,Delhi,2002
3. E.V. Krishnamurthy “Theory of Computer Science” East West Press Pvt. Ltd.

REFERENCES:

1. JurajHromkovic,“Theoretical ComputerScience”, SpringerIndianReprint, 2010.
2. John E.Hocroft, “Introduction to Automata Theory, Languages and Computation”, Paperback, 2008.
3. K.V.N. Sunitha, “Formal Languages and Automata Theory”, Paperback, 2015.
4. A.A Puntambekar, “Formal Languages and Automata Theory for JNTU”, Paperback, 2015.

MCS 12	ADVANCED JAVA PROGRAMMING	Lecture	Practical	Credit
SEM I – Main		4	0	3

LEARNING OBJECTIVES

1. Using Graphics, Animations and Multithreading for designing Simulation and Game based applications.
2. Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
3. Design and develop Web applications
4. Designing Enterprise based applications by encapsulating an application's business logic.
5. Designing applications using pre-built frameworks.

After completing this course, the students will be able to

1. Create a full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) & Swings
2. Apply event handling on AWT and Swing components for handling the complex problems
3. Learn to access database through Java programs, using Java Data Base Connectivity (JDBC)
4. Create dynamic web pages, using Servlets and JSP.
5. Make a reusable software component, using client and server side programming.
6. Invoke the remote methods in an application using Remote Method Invocation (RMI) control to solve real world problems.

SYLLABUS

UNIT-I

Design Patterns: Introduction to Design patterns – Catalogue for Design Pattern – Factory Method Pattern, Prototype Pattern, Singleton Pattern, Adapter Pattern, Proxy Pattern, Decorator Pattern, Command Pattern, Template Pattern, Mediator Pattern; Collection Framework – ArrayList class – LinkedList class – ArrayList vs Linked List – List Iterator interface – HashSet class, Linked HashSet class, TreeSet class Priority Queue class – Map interface, Hash Map class, LinkedHashMap class, TreeMap class – Comparable interface, Comparator interface, Comparable vs Comparator

UNIT-II

Applet Fundamentals- Applet Class – Applet lifecycle- Steps for Developing Applet Programs- Passing Values through Parameters- Graphics in Applets; GUI Application - Dialog Boxes – Creating Windows – Layout Managers – AWT Component classes – Swing component classes- Borders – Event handling with AWT components – AWT

Graphics classes – File Choosers – Color Choosers – Tree – Table –Tabbed panels– Progressive bar – Sliders.

UNIT-III

JDBC – Introduction - JDBC Architecture – JDBC Classes and Interfaces – Database Access with MySQL -Steps in Developing JDBC application – Creating a New Database and Table with JDBC – Working with Database Metadata; Java Networking Basics of Networking – Networking in Java- Socket Program using TCP/IP – Socket Program using UDP- URL and InetAddress classes.

UNIT-IV

Servlet: Advantages over Applets – Servlet Alternatives – Servlet Strengths – Servlet Architecture – Servlet Life Cycle – GenericServlet, HttpServlet – First Servlet – Invoking Servlet – Passing Parameters to Servlets – Retrieving Parameters – Server-Side Include – Cookies; JSP : JSP Engines – Working with JSP – JSP and Servlet – Anatomy of a JSP Page.

UNIT-V

Client-Side Programming: Client-side programming technologies – Form design using HTML, XHTML and DHTML and CSS – Client side validation Using JavaScript – Content Structuring using XML – Adding Interactivity with AJAX – JQuery Framework; Server-side Programming: Web Servers – Handling request and response – Handling Form data – Session management – Database Access.

TEXT BOOKS:

1. Dr.S.Sagayaraj, R.Denis, P.Karthik&D.Gajalakshmi, “Java Programming“, Universities Press, 2017.

REFERENCES:

1. Patrick Naughton& Herbert Schildt, “The Complete Reference: Java 2”, Tata McGraw Hill, 1999
2. Bruce W.Perry, “Java Servlet and JSP CookBook”, O’Reilly, 2004.

MCS 13	WEB APPLICATION USING C#	Lecture	Practical	Credit
SEM I – Main		4	0	3

LEARNING OBJECTIVES

1. Understand how ASP.NET web forms run and use ASP.NET basic controls for particular purpose.
2. Design web forms by using ASP.NET controls.
3. Use ASP.NET data controls to show and manage data sets.

After completing this course, the students will be able to

1. Students understand the architecture of DOT NET platform.
2. Students understand C# language constructs syntax.
3. Learn to create an ASP.NET Website.
4. Students able to create web form with ASP.NET controls and understand the page code using code-behind pages.
5. Display dynamic data from a data source by using ADO.NET and data binding.

SYLLABUS

UNIT – I

Introduction to ASP.NET: Evolution of .NET – Benefits of .NET – Overview of .NET - ASP.NET overview: Exploring new features of ASP.NET - ASP.NET Technologies- Exploring a ASP.NET 4.0 Web Application – Creating a ASP.NET website.

UNIT – II

Developing a Web Application: Specifying a location for a web application – File types in ASP.NET - Exploring ASP.NET Web pages – ASP.NET Coding Models – Application Structure and State: Structure of an application- The Global.asax Application file – States.

UNIT – III

ASP.NET Controls : Standard Controls: The Control Class – The Web Control class- The Label Control- The Button Control – The Text Box Control – The Image Control – The List Box Control – Navigation Controls: The Tree View Control – Creating Static Menus - Validation Controls: Using the RequiredFieldValidator Control- Using the RangeValidator Control – HTML Controls: HTML Server Controls – HTML Form Class.

UNIT - IV

Accessing Data in ASP.NET : Working with Database Controls: The Grid View Control The Data list control-The Details view control- LINQ Queries: Introducing LINQ Queries- Data Structures in LINQ – Deferred Query Execution and Immediate Execution LINQ and

Generic Types – ADO.NET Entity Framework: Exploring ADO.NET Entity Framework – Exploring the features of Entity Framework – Working with Files and Streams: Introducing the System.IO Namespace – Working with Drives and Directories- Exploring the Directory class.

UNIT – V

ASP.NET Web Services : Introduction – Infrastructures of ASP.NET web services – Web Service Properties – Security in ASP.NET : Working with Login Controls – Working with User Profiles – Crystal Reports : Understanding Crystal Reports.

TEXT BOOKS:

1. KOGENT Learning Solutions, “ASP.NET 4.0 (Covers C# 2010 and VB 2010 codes) Black Book”, Dream-Tech Press

REFERENCES:

1. Pankaj Agarwal “Principles of .NET Framework”, Vayu Education of India.
2. Mathew MacDonald, Adam Freeman and Mario Szpuszta, “ Pro ASP.NET 4 in C# 2010”, Fourth Edition. Apress.
3. Scott Millett, “Professional ASP.NET Design Patterns”,Paperback, 2011.
4. ShivprasadKoriala and Rajesh Pillai, “C# and ASP.NET Projects ”,Paperback,2007.

MCS 14	DATABASE MANAGEMENT SYSTEMS	Lecture	Practical	Credit
SEM I – Main		4	0	3

LEARNING OBJECTIVES

1. To describe a sound introduction to the discipline of database management systems.
2. To give a good formal foundation on the relational model of data and usage of Relational Algebra.
3. To introduce the concepts of basic SQL as a universal Database language.
4. To enhance knowledge to advanced SQL topics like embedded SQL, procedures connectivity through JDBC.
5. To demonstrate the principles behind systematic database design approaches by covering conceptual design, logical design through normalization.
6. To provide an overview of physical design of a database system, by discussing Database indexing techniques and storage techniques.

After completing this course, the students will be able to

1. Differentiate between file system and data base management system
2. Describe the fundamental elements of relational database management systems
3. Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
4. Design ER-models to represent simple database application scenarios Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
5. Estimate with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.

SYLLABUS

UNIT-I

File System vs. DBMS- Database System Applications- View of Data- Data base language- Database design-ER Mode l_ Relational Model-Network Data Model-Hierarchical Data Model-Data Storage & Querying- Data Architecture.

UNIT-II

Relational Model-Structure of Relational Databases - Relational Algebra and Calculus-SQL - Basic Structure- Set Operations- Aggregate Functions- Null Values- Nested Queries-Complex Queries-Views - Modification of the Database - Advanced SQL-Triggers.

UNIT-III

Functional Dependencies – Features of Relational designs-Decomposition and Normalisation using Functional Dependencies and Multi valued Dependencies-Join dependencies-Domain key Normal form.

UNIT-IV

Overview of Physical Storage Media- Magnetic disks-RAID- Tertiary Storage-File Organization – Organization of records in Files- Indexing and Hashing-Ordered Indices-B+ -Tree Index Files - B-Tree Index Files – multiple Key Access - Static and Dynamic Hashing-QueryProcessing-TransactionManagement-Transactions-Concurrency.

UNIT-V

Distributed Data bases - Homogeneous and Heterogeneous Databases-Distributed Data Storage - Distributed Transactions-Commit Protocols - Concurrency Control - Object Based Databases-ComplexDatatypes-StructuredTypesandInheritanceinSQL-Object identity and Reference-Types in SQL-XML-structure of XML data- XML Document - Schema - Querying and Transformation - Data Mining and Data Ware housing.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F.Korth and S.Sudarshan, “Database System Concepts”, Fifth Edition, McGraw-Hill, 2006.

REFERENCES:

1. Raghu Rama Krishnan and Johannes Gehrke, “Database Management Systems”, Tata McGraw-Hill Publishing Company, 2003.
2. RamezElmasriandShamkantB.Navathe,“FundamentalDatabaseSystems”,Third Edition,PearsonEducation,2003.
3. Hector Garcia–Molina,Jeffrey D.Ullmanand Jennifer Widom- “Database System Implementation”-PearsonEducation-2000.
4. Narang,“DatabaseManagementSystems”,2nd ed.,PHI.

MCS 15 A	OBJECT ORIENTED ANALYSIS AND DESIGN	Lecture	Practical	Credit
SEM I – Elective		4	0	3

LEARNING OBJECTIVES

After completing this course, the students will be able to

SYLLABUS

UNIT - I

System Development - Object Basis - Development life cycle – Methodologies - Patterns - Frame works - Unified Approach - UML.

UNIT - II

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

UNIT - III

Design Process – Design Axioms – Class Design - Object storage- Object Interpretability - Case Studies.

UNIT - IV

User interface design - View layer classed - Micro-level processes - View Layer Interface- Case Studies.

UNIT - V

Quality Assurance Tests - Testing strategies - Object Oriented on Testing - Test Cases - Test Plans - Continuous Testing – Debugging Principles – System usability – Measuring user satisfaction-Case Studies.

TEXT BOOKS:

1. Ali Bahrami, "Object Oriented Systems Development", McGraw Hill International Edition, 1999

REFERENCES:

1. Grady Booch, "Object Oriented Analysis and Design", Pearson Education-2nd Edition
2. Oriented Analysis and Design using UML", PHI.
3. Carol Britton and Jill Doake, "Object – Oriented System Development: A Gentel Introduction", Paperback, 2012.
4. David West and Brett McLaughlin, "Head First Object-Oriented Analysis and Design", Kindle Edition, 2011.

MCS 15 B	CLOUD COMPUTING	Lecture	Practical	Credit
SEM I – Elective		4	0	3

LEARNING OBJECTIVES

1. To understand the fundamentals of cloud computing and its functioning.
2. To know the architecture, service models, deployment models and Characteristics.
3. To know the deployment of cloud application using popular cloud platforms.
4. To access the various cloud services which provided by the popular cloud platforms.
5. Understand the grid computing and its architecture and infrastructure.

After completing this course, the students will be able to

1. Ability to experience the highly scalable cloud based applications by creating and configuring virtual machines and building private cloud.
2. Ability to deal with various services offered by the clouds
3. Ability to understand how cloud is utilized by the corporate and community.
4. Ability to collaborate with various centralize applications.
5. Ability to understand the Open Grid Service Architecture and the Globus Tool kit.

SYLLABUS

UNIT - I

Fundamentals – Cloud computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why cloud computing Matters – Advantages of Cloud computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services

UNIT- II

Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2- Google App Engine – IBM Clouds.

UNIT -III

Centralizing Email communications –collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation.

UNIT -IV

Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications–Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing –

Collaborating on Databases – Storing and Sharing Files – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis.

UNIT -V

OGSA – Sample Use Cases – OGSA Platform Components – OGSi – OGSA Basic Services. Globus Toolkit – Architecture – Programming Model – High Level Services – OGSi.Net. Middleware Solutions.

TEXT BOOKS:

1. Michael Miller, “Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online”, Que Publishing, 2008.

REFERENCES:

1. Haley Bear, “Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs”, Que Publishing, 2009.
2. Thomas Erl, “Cloud Computing”, Paperback, 2014.
3. Arshdeep Bahga, Vijay Madisetti, “Cloud Computing: A Handa-on Approach”, Universities Press, August 2014.
4. Rajkumar Buyya and James Broberg, “ Cloud Computing: Principles and Paradigms”, Paperback, 2013

MCS 15 C	PRINCIPLES OF PROGRAMMING LANGUAGES	Lecture	Practical	Credit
SEM I – Elective		4	0	3

LEARNING OBJECTIVES

After completing this course, the students will be able to

SYLLABUS

UNIT - I

Language design Issues: Reasons for studying concepts of programming language – language evaluation criteria-influences on language design-structure and operation of computer virtual computers and binding times-language paradigms.

UNIT - II

Data types: Properties of types and objects-elementary data types- structured data types .Abstraction: Abstract data types- encapsulation by sub programs – type definition-storage management.

UNIT - III

Sequence Control: Implicit and explicit sequence control – sequencing with arithmetic and non-arithmetic expressions – sequence control between statements. Subprograms control: subprogram sequence control – attributes of data control shared data in subprograms.

UNIT - IV

Inheritance: Inheritance - polymorphism; Language Translation Issues: Programming language syntax – stages in translation – formal translation models.

UNIT - V

Advances in language design: variations on subprogram control – language constructors for parallel processing language semantics – software architecture.

TEXT BOOKS:

1. Terrance W.Pratt, Marvin V Zelkowitz, “Programming Languages, Design and Implementation”, PHI, 2002, (4thedition).

REFERENCES:

1. Ravi Sethi, “Programming Languages Concepts &Constructs”, Addison Wesley,(2ndedition),1996.
2. E.Horowitz,“Fundamentalsofprogramminglanguages”,GalgotiaPublishers,1984.

3. A.B.Tucker,“Robert,Noonan,ProgrammingLanguages”,McGrawHill,2002.
4. D.Appleby,J.J.VandeKopple,“Programming languages Paradigm and practice”, McGrawHill, International Editions,(2ndedition),1997.

MCS 16	ADVANCED JAVA PROGRAMMING LAB	Lecture	Practical	Credit
SEM I – Practical		3	0	2

LEARNING OBJECTIVES

1. Using Graphics, Animations and Multithreading for designing Simulation and Game based applications.
2. Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
3. Design and develop Web applications
4. Designing Enterprise based applications by encapsulating an application's business logic.
5. Designing applications using pre-built frameworks.

After completing this course, the students will be able to

1. Create a full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) & Swings
2. Build application using Network programming to handle client-server model for real world problem
3. Learn to access database through Java programs, using Java Data Base Connectivity (JDBC)
4. Create dynamic web pages, using Servlets and JSP to handle complex problem.
5. Make a reusable software component, using client and server side programming.
6. Invoke the remote methods in an application using Remote Method Invocation (RMI) control to solve social problems.

SYLLABUS

List of Experiments:

1. Collections using Set, List and Map interfaces
2. Applet programs
3. AWT Controls
4. CRUD operation Using JDBC
5. Displaying Query Results in a JTable
6. TCP Socket
7. UDP Socket
8. Web application using Servlet and JDBC
9. Cookies and Session tracking
10. Web application using JSP and JDBC

MCS 17	WEB APPLICATION USING C# LAB	Lecture	Practical	Credit
SEM I – Practical		3	3	2

LEARNING OBJECTIVES

1. Create, compile, run and debug C# programs using visual studio 10.
2. Create a website using ASP.NET basic controls.
3. Know the importance of namespaces of .NET Framework.

After completing this course, the students will be able to

1. Create user interactive web pages using ASP.NET C#.
2. Understand the concepts of Front-End and Back-end (3 Tier-Architecture)
3. Learn to develop data binding application using ADO.NET.
4. Perform database operations for web applications using SQL
5. Learn to use validation controls in the web forms.

SYLLABUS

List of Experiments:

1. Web Configuration File
2. HTML Control Classes, Control Events, Container and Input Control Classes,
3. HTTP Request Classes & Response Classes
4. Web Control Classes & Control Tags
5. Validation Controls
6. Rich Controls
7. Data Access
8. Components
9. Custom Controls
10. User Controls

MCS 18	DATABASE MANAGEMENT SYSTEMS LAB	Lecture	Practical	Credit
SEM I – Practical		3	3	2

LEARNING OBJECTIVES

1. Relate, appreciate and effectively explain the underlying concepts of database Technologies.
2. Design and implement a database schema for a given problem-domain Normalize a database
3. Write query a database using SQL DML/DDDL commands.
4. Formulate and enforce integrity constraints on a database using a state-of-the-art RDBMS
5. Build Programming PL/SQL including stored procedures, stored functions, cursors, packages.

After completing this course, the students will be able to

1. The objective of dbms lab is to provide a strong formal foundation in database concepts, technology and practice to the participants to groom them into well-informed database application developers.
2. To provide a sound introduction to the discipline of database management as a subject in its own right, rather than as a compendium of techniques and product-specific tools.
3. To familiarise the participant with the nuances of database environments towards an information-oriented data-processing oriented framework
4. To present SQL and procedural interfaces to SQL comprehensively
5. To give an introduction to systematic database design approaches covering conceptual design, logical design and an overview of physical design

SYLLABUS

List of Experiments:

1. Creating data base tables and using data types. - Create table- Modify table - Drop table
2. Practical Based on Data Manipulation- Adding data with Insert - Modify data with Update -Deleting records with Delete
3. Practical Based on Implementing the Constraints - NULL and NOT NULL - Primary Key and Foreign Key Constraint - Unique, Check and Default Constraint
4. Practical for Retrieving Data Using following clauses - Simple select clause - Accessing specific data with Where - Ordered By - Distinct and Group By
5. Practical Based on Aggregate Functions - AVG –COUNT – MAX –MIN –SUM -CUBE
6. Practical Based on implementing all String functions and Date and Time Functions, union, intersection, set difference.
7. Implement Nested Queries & JOIN operation.

8. Practical Based on performing different operations on a view.
9. Practical Based on implementing use of triggers, cursors & procedures.
10. Make Database connectivity with front end tools MS-Visual Studio with C# programming.

MHR 20	Human Rights	Lecture	Practical	Credit
SEM II – Compulsory		4	0	4

LEARNING OBJECTIVES

After completing this course, the students will be able to

SYLLABUS

UNIT-I

Definition of Human Rights - Nature, Content, Legitimacy and Priority - Theories on Human Rights - Historical Development of Human Rights.

UNIT-II

International Human Rights - Prescription and Enforcement upto World War II - Human Rights and the U.N.O. - Universal Declaration of Human Rights - International Covenant on Civil and Political Rights - International Covenant on Economic, Social and Cultural Rights and Optional Protocol.

UNIT-III

Human Rights Declarations - U.N. Human Rights Declarations - U.N. Human Commissioner.

UNIT-IV

Amnesty International - Human Rights and Helsinki Process - Regional Developments - European Human Rights System - African Human Rights System - International Human Rights in Domestic courts.

UNIT-V

Contemporary Issues on Human Rights: Children's Rights - Women's Rights - Dalit's Rights - Bonded Labour and Wages - Refugees - Capital Punishment.
Fundamental Rights in the Indian Constitution - Directive Principles of State Policy - Fundamental Duties - National Human Rights Commission.

TEXT BOOKS:

1. International Bill of Human Rights, Amnesty International Publication, 1988.
2. Human Rights, Questions and Answers, UNESCO, 1982
3. Mausice Cranston - What is Human Rights
4. Desai, A.R. - Violation of Democratic Rights in India
5. Pandey - Constitutional Law.
6. Timm. R.W. - Working for Justice and Human Rights.

MCS 21	COMPILER DESIGN	Lecture	Practical	Credit
SEM II – Main		4	0	4

LEARNING OBJECTIVES

The Objectives of this course is to explore the principles, algorithms, and data structures involved in the design and construction of compilers. Topics include context-free grammars, lexical analysis, parsing techniques, symbol tables, error recovery, code generation, and code optimization.

After completing this course, the students will be able to

1. Identify tokens of a typical high-level programming language; define regular expressions for tokens and design; implement a lexical analyzer using a typical scanner generator.
2. Describe the major phases of compilation and to understand the knowledge of Lex tool and YACC tool
3. Apply an algorithm for a top-down or a bottom-up parser construction; construct a parser for a small context-free grammar.
4. Explain the role of different types of runtime environments and memory organization for implementation of typical programming languages.
5. Apply for various optimization techniques for dataflow analysis

SYLLABUS

UNIT-I

Lexical analysis : Regular expression- Nondeterministic automata-deterministic automata Equivalent to NFAs-minimizing the states of DFA-implementation of lexical analyzer.

UNIT-II

Syntax analysis: Top down parsing concepts-recursive descent parsing - predictive parsers- non recursive predicate parsing- bottom-up parsing- handle pruning- shift reduce parsing-operator parsing - LR parsers-parser generators -YACC.

UNIT-III

Intermediate code generation: Syntax directed definitions - construction of syntax trees-top down translation - bottom up evaluation of inherited attributed - recursive evaluators-assigning space at compiler construction time – type checking - overloading of functions and operators –polymorphic function.

UNIT-IV

Storage organization: Storage organization – storage allocation strategies-parameter

passing-symboltables-dynamicstorageallocation-intermediatelanguages representation of declarations - assignment statement - Boolean expression - back patching-procedure calls.

UNIT-V

Code generation and Code optimization: Design of code generators –run time storage management-basic blocks – flow graphs – register allocation and assignment-DAG representation of basic blocks - peep hole optimization - code optimization - the principle sources of optimization - optimization of basic blocks - global data flow analysis-loop optimizations.

TEXT BOOKS:

1. AlfredAho, RaviSethi, Jeffy D. Ullman, “Compilers - Principles,Techniques andTools”, Pearson,1986.

REFERENCES:

1. Chattopadhyay Santhanu,“Compiler Design”,PHI,2006.
2. HolubAllen,“CompilersinC”,PHI,1997.
3. Alfred V.Acho, “Compiler Design”, Paperback, 2012.
4. Punatmberkar A, “Compiler Design”, Paperback, 2013

MCS 22	ENTERPRISE JAVA PROGRAMMING	Lecture	Practical	Credit
SEM II – Main		4	0	4

LEARNING OBJECTIVES

1. To understand the concepts and capabilities of NetBeans.
2. To understand the database techniques and its applications
3. To know the language like JSP, Servlet, Session, Bean, Struts and Hibernate
4. To be able to implement MVC applications based on user perspective.

After completing this course, the students will be able to

1. Implement MVC applications using Java persistent API (JPA) and Java Database Connectivity (JDBC).
2. Build synchronous and asynchronous server side business logic using stateless and stateful session bean EJBs.
3. Design and develop sophisticated enterprise applications using a variety of Java related technologies like J2EE, EJB, STRUTS & HIBERNATE.
4. Discuss session tracking using a variety of techniques and be able to select the most appropriate method based on the design to reduce to increase the execution time
5. Integrate server-side logic with the web tier components using legacy server-side and more modern RESTFUL API approaches that include JSON and XML to give solution for complex.
6. Develop dynamic component based web application using struts and hibernate to solve real world problems.

SYLLABUS

UNIT-I

Introduction -Enterprise Architecture Styles - J2EE Architecture - Containers - J2EE Technologies - Developing J2EE Applications - Naming and directory services - Using JNDI - JNDI Service providers Application Servers - Implementing the J2EE Specifications - J2EE packaging and Deployment - J2EE packaging overview - Configuring J2EE packages

UNIT-II

JSP Benefits - Framework roles - Simple JSF application - User Interface Component Model - Navigational Model - Life Cycle of JSF page - Using JSF in JSP Pages – Setting up a page, using core tags - using HTML tags - using localized messages - Using converters.

UNIT-III

Introduction to Enterprise Beans - Session Bean - Entity Bean - Message driven Bean - defining clients access with interfaces - contents of an enterprise Bean - life cycle of enterprise Bean - creation of Enterprise Bean - application client - web client - other

Enterprise Bean features- handling exceptions.

UNIT-IV

Struts Architecture - Struts classes - Action Forward, Action Form, Action Servlet, Action classes - Understanding struts - config.xml, Understanding Action Mappings, Struts flow with an example application.

UNIT-V

Hibernate - Architecture of Hibernate - Life cycle of Hibernate Entities- Exploring HQL - Understanding Hibernate O/R Mapping - Collection Mapping - Association Mapping - Relationships in Java and Databases.

TEXT BOOKS:

1. Marty Hall, Larry Brown., "Core Servlets and Java Server Pages", 2nd Edition, Pearson Education, 2004
2. Stephanie Bodoffetl., "The J2EE™ Tutorial", Pearson Education, Second Edition, 2005.
3. Minter Dave, Linwood Jeff, "Beginning Hibernate, From Novice to Professional", Apress, Second Edition, 2006
4. <http://www.tutorialspoint.com/hibernate/>

REFERENCES:

1. Patrick Naughton& Herbert Schildt, "The Complete Reference: Java 2", Tata McGraw Hill, 1999
2. Bruce W.Perry, "Java Servlet and JSP CookBook", O'Reilly, 2004.

MCS 23	ENTERPRISE APPLICATION USING C#	Lecture	Practical	Credit
SEM II – Main		4	0	4

LEARNING OBJECTIVES

1. Get knowledge of Dot Net Frameworks along with Enterprise Application using C# environment.
2. To understand the concepts of Caching and Profiling.
3. To be able to implement the security requirements.
4. To understand the deployment tool techniques and its applications

After completing this course, the students will be able to

1. To develop, implement, and demonstrate Component Services by creating reference file.
2. Learn about user control and their limitations
3. Be able to understand the use of profiling and types of caching
4. To apply the concepts of Security in the .NET framework and Deployment in the .NET
5. To discuss on developing application using enterprise library and deployment tool

SYLLABUS

UNIT – I

Introduction – Creating a Simple Component – Properties and State – Database Components – Consuming the Data base Component – Enhancing the Component with Error Handling – Aggregate Information – Data Objects.

UNIT - II

User Controls – Creating a Simple User Control – Visual Studio .NET Custom Control Support – Independent User Controls –Integrated User Controls –User Control Events– Limitations–Deriving Custom Controls.

UNIT - III

Designing for Scalability – Profiling – Caching – Output Caching – Client Side – Query Structuring – Events – Custom Caching Control – Caching with HTTP Cache Policy Class – Fragment Caching – Data Caching – A Simple Cache Test – Caching to Provide Multiple Views.

UNIT – IV

Determining Security Requirements – Restricted File Types – Security Concepts – ASP.NET Security Model – Security Strategies – Certificates – SSL – Forms

Authentication – Web.Config Settings – Login Page – User Lists – Protecting User Passwords with Encryption – Custom Roles – Windows Authentication – IISSettings – Web.Config Setting – A windows Authentication Test.

UNIT – V

Enterprise Library – Developing Applications with Enterprise Library – Design Blocks – Caching – Cryptography – Data Access – Exception Handling – Logging – Policy Injection – Security – Unity – Validation – Deployment Tools – Development of Deployment Tools – Choosing a Deployment Strategy – Click once Update Strategy – Deployment and Security.

TEXT BOOKS:

1. Matthew Mac Donald, “TheCompleteReference–ASP.NET”, Tata McGraw Hill, 2002.

REFERENCES:

1. StephenWalther,“ASP.NET2.0Unleashed”,SAMSPublishing,2006.
2. ImarSpaanjaars, “Beginning ASP.NET 4.5 in C# and VB”,Paperback, 2012.
3. Scott Millett, “ Professional ASP.NET Design Patterns”,Paperback, 2011.
4. ShivprasadKoriala and Rajesh Pillai, “C# and ASP.NETProjects ”,Paperback,2007.

MCS 24	UNIX NETWORKING PROGRAMMING	Lecture	Practical	Credit
SEM II – Main		4	0	4

LEARNING OBJECTIVES

1. To understand the fundamentals and overview of UNIX operating system.
2. To learn the UNIX process and Command line arguments
3. To understand the message passing in UNIX
4. To understand the layers and Sockets in UNIX and Multiplexing
5. To know the Client Server application and Debugging.

After completing this course, the students will be able to

1. Evaluate the performance of UNIX operating System.
2. Illustrate the UNIX process and command line arguments.
3. Describe the message passing and various techniques.
4. Ability to understand the layers and sockets.
5. Describe the debugging techniques.

SYLLABUS

UNIT-I

Overview of UNIX OS – File I/O – File Descriptors – File sharing – Files and directories - File types –File access permissions – File systems - Symbolic links - Standard I/O library- Streams and file objects – Buffering – System data files and information - Password file – Group file – Login accounting –system identification.

UNIT-II

Environment of a UNIX process - Process termination - command line arguments - Process control-Process identifiers – Process relationships terminal logins – Signals - threads.

UNIT-III

Introduction –Message passing(SVR4) – pipes – FIFO – message queues - Synchronization (SVR4)-Mutexes - condition variables – read – write locks – file locking – record locking – semaphores –Shared memory(SVR4).

UNIT-IV

Introduction – transport layer – socket introduction – TCP sockets – UDP sockets - raw sockets –Socket options - I/O multiplexing – Name and address conversions.

UNIT-V

Application – Debugging techniques – TCP echo client server – UDP echo client server – Ping –Trace route – Client server applications like file transfer and chat.

TEXT BOOKS:

1. W.RichardStevens, Advanced programming in the UNIX environment, Addison Wesley,999.(Unit1,2 &3)
2. W. Stevens, BillFenner, Andrew Rudoff, "Unix Network Programming", Volume 1, The Sockets Networking API, 3rd Edition, Pearson education, Nov2003.(unit4&5)

REFERENCES:

1. MeetaGandhi,TilakShetty and Rajiv Shah – The 'C' Odyssey Unix –The open BoundlessC,1stEdition,BPBPublishations1992.
1. Stvens,"UnixNetworkProgramming:INterprocessCommunications",Vol2,2nd ed., PHI.
2. Bill Fenner, "Unix Network Programming : The Sockets Networking", Vol 1, 3rd ed.,Paperback,2012.
3. Mark G.Sobell, "A Practical Guide to Linux Commands, Editors and Shell Programming",Paperback, 2012.

MCS 25A	SOFTWARE TESTING	Lecture	Practical	Credit
SEM II – Elective		4	0	4

LEARNING OBJECTIVES

After completing this course, the students will be able to

SYLLABUS

UNIT - I

Introduction - Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs. Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT - II

Transaction Flow Testing:-transaction flows, transaction flow testing techniques. Dataflow testing: - Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT - III

Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability. Paths, Path products and Regular expressions: - path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

UNIT - IV

Logic Based Testing:- overview, decision tables, path expressions, kv charts, specifications. State, State Graphs and Transition testing:- state graphs, good & bad state graphs, state testing, Testability tips.

UNIT - V

Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Winrunner).

TEXT BOOKS:

1. BarisBeizer, Dreamtech, "Software Testing techniques ",second edition, Paperback,2002.
2. Dr.K.V.K.K.Prasad, Dreamtech, "Software Testing Tools", Paperback, 2004.

REFERENCES:

1. Brian Marick , “The craft of software testing” , Pearson Education.
2. P.C.Jorgensen, “Software Testing”,3rd edition, Aurbach Publications
3. Edward Kit,“Software Testing in the Real World”, Pearson.

MCS 25B	WEB SERVICES	Lecture	Practical	Credit
SEM II – Elective		4	0	4

LEARNING OBJECTIVES

After completing this course, the students will be able to

SYLLABUS

UNIT – I

Overview of Distributed Computing. Introduction to web services – Industry standards, Technologies and concepts underlying web services – their support to web services. Applications that consume web services.

UNIT – II

XML–its choice for web services – network protocols to backend databases – technologies – SOAP, WSDL – exchange of information between applications in distributed environment – locating remote web services – its access and usage. UDDI specification – an introduction.

UNIT - III

A brief outline of web services–conversation–static and interactive aspects of system interface and its implementation, workflow–orchestration and refinement, transactions, security issues – the common attacks – security attacks facilitated within web services quality of services – Architecting of systems to meet users requirement with respect to latency, performance, reliability, QOS metrics, Mobile and wireless services– energy consumption, network bandwidth utilization, portals and services management.

UNIT - IV

Building real world enterprise applications using web services–sample source codes to develop web services–steps necessary to build and deploy web services and client applications to meet customers requirement–Easier development, customization, maintenance, transactional requirements, seamless porting to multiple devices and platforms.

UNIT - V

Deployment of Web services and applications onto Tomcat application server and axis SOAP server–Web services platform as a set of enabling technologies for XML based distributed computing.

TEXT BOOKS:

1. Sandeep Chatterjee, James Webber, “Developing Enterprise WebServices: An

Architects Guide”, PrenticeHall, Nov2003.

REFERENCES:

1. KirkZurell- “CProgramming for EmbeddedSystems” R&D, Books- 2000.
2. David.E,Simon,“Anembeddedsoftwareprimer”,PearsonEducationAsia-AddisonWesley Longman(Singapore), LowPriced Edition, 2001,ISBN- 81- 7808-045- 1.
3. Michael Barr, “Programming Embedded Systems in C and C++”, Shroff Publishers &DistributorsPvt.Ltd., Calcutta., March 2001, ISBN- 81- 7366 - 076 – X.
4. Andreas Witting, Michael Wittig, “Amazon Web services in Action”, Paperback,2015

MCS 25C	CRYPTOGRAPHY AND NETWORK SECURITY	Lecture	Practical	Credit
SEM II – Elective		4	0	4

LEARNING OBJECTIVES

To develop basic skills of secure network architecture and explain the theory behind the security of different cryptographic algorithms and explore the requirements of real-time communication security and issues related to the security of web services.

After completing this course, the students will be able to

1. To develop, implement, and demonstrate Component Services by creating reference file.
2. Learn about user control and their limitations
3. Be able to understand the use of profiling and types of caching
4. To apply the concepts of Security in the .NET framework and Deployment in the .NET
5. To discuss on developing application using enterprise library and deployment tool

SYLLABUS

UNIT - I

Security Problems: Security problem in computing- Security Attacks – Security Services – Security Mechanisms – OSI security attack-Standards and standard setting organizations

UNIT - II

Data Security: Basic encryption and decryption-Substitution-Transposition-Block ciphers Data encryption standard encryption and decryption-Differential and linear crypto analysis Advanced encryption–Standard encryption and decryption-Block cipher models-Triple DES with two keys-Stream cipher-RC4- RSA algorithm – Diffie-Hellman key exchange algorithm.

UNIT - III

Message Authentication: Hash Functions – MD5-Hash algorithm - SHA 512 logic - Authentication Protocols-Digital signature standards

UNIT - IV

Network Security: IP security overview, IP security architecture, Authentication header, Encapsulating security pay load, combining security association, Key management-Web security considerations, Secure socket layer, Secure electronic transaction.

UNIT - V

System Security: Intruders and intrusion detection-Malicious software, Viruses and related threats, virus counter measures, distributed denial of services attack-Firewalls design principles-Trusted systems.

TEXT BOOKS:

1. William Stallings, "Cryptography and Network Security – Principles & Practice", Third Edition Pearson Education.

REFERENCES:

1. Charles P. Pleege, "Security in Computing", PHI Learning, 1998.
2. Prakash C. Gupta, "Cryptography and Network Security", Paperback, 2005.
3. Alfred J. Menezes and Paul C. Van Oorschot, "Handbook of Applied Cryptography", Kindle edition, 1996.
4. Nicholar J. Daras and Michael Th. Rassias, "Computation, Cryptography and Network Security", Hard cover, 2015.

MCS 26	ENTERPRISE JAVA PROGRAMMING LAB	Lecture	Practical	Credit
SEM II – Practical		4	0	4

LEARNING OBJECTIVES

The objective is to equip the students with the advanced feature of contemporary java which would enable them to handle complex programs relating to managing data and processes over the network. The major objective of this course is to provide a sound foundation to the students on the concepts, precepts and practices, in a field that is of immense concern to the industry and business.

After completing this course, the students will be able to

1. To build multi-tier web-based enterprise applications using Enterprise JavaBeans (EJB).
2. Develop Stateful, Stateless and Entity Beans.
3. Apply struts frameworks with reusability of the codes for quick development.
4. Map Java classes and object with relational database tables using Hibernate
5. Design and develop platform independent applications using component based frameworks to solve complex problems
6. Implement the concepts of Hibernate, XML& EJB for building enterprise applications for real world problems.

SYLLABUS

List of Experiments:

1. Simple JSF application using JSP in JSF
2. HTML render kit in JSF
3. Core render kit in JSF
4. Creating Enterprise Bean
5. Creating Web Client
6. Using Session Bean
7. Struts Action
8. Struts Forward Action
9. Object Relational Mapping
10. Collection Mapping

MCS 27	ENTERPRISE APPLICATION USING C# LAB	Lecture	Practical	Credit
SEM II – Practical		4	0	4

LEARNING OBJECTIVES

To build enterprise application using C#, design client-side and server-side (web form, data access) programs.

After completing this course, the students will be able to

1. To understand the development and deployment cycles of enterprise applications.
2. To be able to implement the secured web services using RSA or SHA algorithm
3. To understand the enterprise library tool techniques with features (Data Access, Logging, exception handling)
4. To create cache for output of page, data content of webpage, fragment cache for webpage portion
5. To understand the 3-tier software architecture (presentation/client tier, application tier, data tier) .

SYLLABUS

List of Experiments:

1. Creation and consumption of a simple component and data base component and components using aggregate functions.
2. Creation of a Custom control which includes the following operation - A text boxes that parses the separator and identifies the first name and last name.
3. Create a popup calendar control that consists of a text box and calendar control. The calendar control pops up only by clicking the calendar control
4. Cache the output of the page for a specified time using Output Caching
5. Cache the data content of the web page using the Data Caching
6. Cache portion of a web page using Fragment caching
7. Create a simple profile and provide customized settings for the user.
8. Using the Forms Authentication, authenticate the user and encrypt the password using either SHA or RSA algorithm.
9. Implementation of deployment tools (XCOPY or Web Setup wizard)
10. Working with enterprise library tool with various features (Data access, exception, Cryptography, logging).

MCS 28	UNIX PROGRAMMING LAB	Lecture	Practical	Credit
SEM II – Pracctical		4	0	4

LEARNING OBJECTIVES

This course introduces basic understanding of UNIX OS, UNIX commands and File system and to familiarize students with the Linux environment. To make student learn fundamentals of shell scripting and shell programming. Emphases are on making student familiar with UNIX environment and issues related to it.

After completing this course, the students will be able to

Students will be able to run various UNIX commands on a standard UNIX/LINUX Operating system. Describes to do the shell programming on UNIX OS.

SYLLABUS

List of Experiments:

1. Write a shell script to copy, rename and print multiple files using choice menus.
2. Write a shell script to display logged in users who are using high CPU percentage.
3. Write a shell script to list processes based on CPU percentage and memory un usage.
4. Write a shell script to display total used and free memory space.
5. Write a shell script that takes as command – line input a number and a word. The program should then print the word times, one word per line.
6. Write a shell scripts using the following statements.
a) While-loop b) For-loop c) If-then-else d) Switch
7. Write a shell script using grep statement.
8. Write a shell script that can search all immediate sub-directories of the current-directory for a given file and then quit if it finds one.
9. Write a shell script program to include verbose Debug option for debugging.
10. Write a shell script program to include trace Debug option for debugging.

MCS 31	DISTRIBUTED OPERATING SYSTEMS	Lecture	Practical	Credit
SEM III – Main		4	0	4

LEARNING OBJECTIVES

1. To understand the fundamentals and knowledge of the architectures of distributed systems.
2. To gain knowledge of working components and fault tolerance of distributed systems
3. To make students aware about security issues and protection mechanism for distributed environment.
4. To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols.
6. To know the components and management aspects of concurrency management.

After completing this course, the students will be able to

1. Understand the principles and desired properties of distributed systems based on different application areas.
2. Understand and apply the basic theoretical concepts and algorithms of distributed systems in problem solving.
3. Recognize the inherent difficulties that arise due to distributed-ness of computing resources.
4. Identify the challenges in developing distributed applications

SYLLABUS

UNIT-I

Evolution –Models – Popularity - Distributed Operating System – Issues – Distributed Computed Environment - Features of a Good Message Passing – Issues- Synchronization – Buffering - – Multidatagram Messages – Encoding and Decoding of Message Data – Process Addressing – Failure Handling – Group Communication.

UNIT-II

The RPC Model –Transparency – Implementation – Stub – Messages – Marshaling - Server Management –Parameter Passing Semantics – Call Semantics – Communication protocols – Complicated – Client server Binding – Exception Handling – Security – Special types – Heterogeneous – Light Weight – Optimization

UNIT-III

Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock – Election Algorithms - Process Migration – Threads.

UNIT-IV

Meet Hadoop: Data - Data Storage and Analysis - Comparison with Other Systems - A Brief History of Hadoop - The Apache Hadoop Project – MapReduce: A Weather Dataset - Analyzing the Data with Unix Tools - Analyzing the Data with Hadoop - Scaling Out - Hadoop Streaming - Hadoop Pipes

UNIT-V

The Configuration API - Configuring the Development Environment - Running Locally on Test Data - Running on a Cluster - The MapReduce Web UI - Using a Remote Debugger - Tuning a Job - MapReduce Workflows

TEXT BOOKS:

1. Pradeep K. Sinha, "Distributed Operating System Concepts and Design ", PHI, New Delhi, 2007.
2. Tom White,"Hadoop: The Definitive Guide", Published by O'Reilly Media, Third Edition, 2009

REFERENCES:

1. Andrew S Tanaenbaum, "Modern Operating System", PHI, New Delhi, 2001
2. D.M. Dhamdhare , 2002, Operating System, Tata McGraw-Hill, New Delhi.
3. A.S. Tanenbaum , Operating Systems: Design and Implementation, Prentice-Hall of India, New Delhi.
4. Nutt, 2005, Operating Systems, 3 rd Edition, Pearson Education, Delhi.

MCS 32	SOFTWARE PROJECT MANAGEMENT	Lecture	Practical	Credit
SEM III – Main		4	0	4

LEARNING OBJECTIVES

1. To understand the basic concepts of Software Project Management.
2. To know how to plan for a Software Project Development.
3. To know about various Software Metrics and its types.
4. To get knowledge on various ERP Packages.
5. To know about Decision Structure and Support Systems.

After completing this course, the students will be able to

1. Able to explain the basics of Software Project Management.
2. Able to deliver the plan for Software Project Development.
3. Able to get knowledge on various software metrics
4. Able to get knowledge on ERP Packages and its usages.
5. Able to understand the functionality and importance of Decision Structure and Support Systems.

SYLLABUS

UNIT-I

Project Management-Introduction to Project and Project management- problems with software projects - Project Management Knowledge Area and Framework- Stages of project - Feasibility study -cost-benefit analysis - Planning - project execution - project and product lifecycle - Project Stakeholders - All Parties of project - role of project manager - Exploration of Open Source Software tools for project management Checkpoints And Processes of Project -Major Milestones- Minor Milestones- Periodic status assessments. Project Processes- Initiating Processes- Planning Processes- Control Processes- Executing Processes- Closing Processes- Process Groups- Process Interactions.

UNIT-II

Project Planning -Integration Management - Introduction - Project plan development – Plan Execution - Scope Management - Introduction - methods for selecting projects - project charter - scope statement - work breakdown structure - Stepwise Project Planning -Overview - Main steps in project planning. Project Scheduling-Time Management- Importance of project schedules- Schedules and activities - Sequencing and scheduling activity - Project Network Diagrams -Network planning models-Duration Estimating and schedule development- Critical path analysis- Program evaluation and review Techniques.

UNIT-III

Technical Metrics For Software-Software Process and Project Metrics- Size Oriented Metrics- Function-Oriented Metrics- Extended Function Point Metrics- A Framework for Technical Software Metrics- Metrics for Requirement Specification Quality- Metrics for Analysis- Metrics for Design- Metrics for Source Code- Metrics for Testing- Metrics for Maintenance. Technical Metrics For Object-Oriented Systems-Intent of Object-Oriented Metrics- Characteristics of Object-Oriented Metrics - Metrics for OO Design Model- Class-Oriented Metrics- Operation-Oriented Metrics- Metrics for Object-Oriented Testing- Metrics for Object-Oriented Projects.

UNIT-IV

Overview- Benefits- Technologies related to ERP- E R P packages- Business Process Re-engineering- Implementation Life Cycle of ERP- Training - Team Training- End User Training- Post Implementation (Maintenance Mode) - Implementation in large-scale organization- Applications of ERP in functional areas- Marketing- Personnel- Financial & Production.

UNIT-V

Decision structure- Decision Support Trends- DSS Components- Using DSS- What-if analysis- sensitivity analysis- Goal Seeking Analysis- Optimization Analysis- Executive Information Systems- Enterprise portals and decision support- knowledge management systems.

TEXT BOOKS:

1. James A o'Brien, George M maracas, Ramesh Behl: Management Information Systems, McGraw Hill.
2. Walker Royce : Pearson Education, 2005: Software Project Management.
3. Indu Chhabra, " Software Engineering : A Concise Study", Publishers, 1st Edition.

REFERENCES:

1. A Guide to the Project Management Body of Knowledge (PMBOK), Project Management Institute, PA, (2004).
2. Harold Kerzner, Frank P. Saladis, Project Management Workbook and PMP/CAPM Exam Study Guide , Wiley Publishers (2006)
3. Claudia M. Baca, Patti, PMP: Project Management Professional Workbook, Sybex, Workbook (2003).
4. Joel Henry, Pearson Education: Software Project Management. Pankaj Jalote , Pearson Education, 2005: Software Project Management.

MCS 33	MOBILE COMPUTING	Lecture	Practical	Credit
SEM III – Main		4	0	4

LEARNING OBJECTIVES

Basic knowledge on the concept of mobile computing and wireless communication technological growth. To enable compare and contrast multiple division techniques, mobile communication systems, and existing wireless networks.

After completing this course, the students will be able to

1. Ability to gain knowledge on basis of mobile computing and MAC.
2. Apply knowledge of TCP/IP extensions for mobile and wireless networking.
3. Get the Knowledge of mobile communication standard, its architecture, logical channels, advantages and limitations.
4. Implement Ad-hoc networks with routing protocols
5. Explain the working of MANET and VANET
6. Use mobile operating systems in developing mobile applications

SYLLABUS

UNIT-I

Mobile Computing – Mobile Computing Vs wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes.

UNIT-II

Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP - Adaptation of TCP Window – Improvement in TCP Performance.

UNIT-III

Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS).

UNIT-IV

Ad-Hoc Basic Concepts – Characteristics – Applications – Design Issues – Routing – Essential of Traditional Routing Protocols – Popular Routing Protocols – Vehicular Ad Hoc networks (VANET) – MANET Vs VANET – Security.

UNIT-V

MOBILE PLATFORMS AND APPLICATIONS Mobile Device Operating Systems – Special Constrains & Requirements – Commercial Mobile Operating Systems – Software

Development Kit: iOS, Android, BlackBerry, Windows Phone – MCommerce – Structure – Pros & Cons – Mobile Payment System – Security Issues.

TEXT BOOKS:

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

REFERENCES:

1. Jochen H. Schller, “Mobile Communications”, Second Edition, Pearson Education, New Delhi, 2007.
2. 2. Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
3. UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, 2003.
4. William.C.Y.Lee,“Mobile Cellular Telecommunications-Analog and Digital Systems”, Second Edition,TataMcGraw Hill Edition ,2006.
5. C.K.Toh, “AdHoc Mobile Wireless Networks”, First Edition, Pearson Education, 2002.
6. Android Developers : <http://developer.android.com/index.html>
7. Apple Developer : <https://developer.apple.com/>
8. Windows Phone DevCenter : <http://developer.windowsphone.com>
9. BlackBerry Developer : <http://developer.blackberry.com/>

MCS 34	DESIGN AND ANALYSIS ALGORITHMS	Lecture	Practical	Credit
SEM III – Main		4	0	4

LEARNING OBJECTIVES

The objective of the course is to teach techniques for effective problem solving in computing. The use of different paradigms of problem solving will be used to illustrate clever and efficient ways to solve a given problem. In each case emphasis will be placed on rigorously proving correctness of the algorithm. In addition, the analysis of the algorithm will be used to show the efficiency of the algorithm over the naive techniques.

After completing this course, the students will be able to

1. Analyze the asymptotic performance of algorithms.
2. Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it.
3. Formulate and solve recurrences describing the performance of divide-and-conquer algorithms.
4. Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate.
5. Write rigorous correctness proofs for algorithms.
6. Apply important algorithmic design paradigms and methods of analysis.

SYLLABUS

UNIT-I

Algorithm Analysis – Time Space Tradeoff – Asymptotic Notations – Conditional asymptotic notation – Removing condition from the conditional asymptotic notation - Properties of big-Oh notation – Recurrence equations – Solving recurrence equations – Analysis of linear search.

UNIT-II

Divide and Conquer: General Method – Binary Search – Finding Maximum and Minimum – Merge Sort – Greedy Algorithms: General Method – Container Loading – Knapsack Problem.

UNIT-III

Dynamic Programming: General Method – Multistage Graphs – All-Pair shortest paths – Optimal binary search trees – 0/1 Knapsack – Travelling salesperson problem .

UNIT-IV

Backtracking: General Method – 8 Queens Problem – sum of subsets – graph coloring – Hamiltonian problem – knapsack problem.

UNIT-V

Graph Traversals – Connected Components – Spanning Trees – Biconnected components – Branch and Bound: General Methods (FIFO & LC) – 0/1 Knapsack problem – Introduction to NP-Hard and NP-Completeness.

TEXT BOOKS:

1. Ellis Horowitz, SartajSahni and SanguthevarRajasekaran, Computer Algorithms/ C++, Second Edition, Universities Press, 2007. (For Units II to V)
2. K.S. Easwarakumar, Object Oriented Data Structures using C++, Vikas Publishing House pvt. Ltd., 2000 (For Unit I)

REFERENCES:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.
2. T. H. Cormen, C. E. Leiserson, R.L.Rivest, and C. Stein, "Introduction to Algorithms", Second Edition, Prentice Hall of India Pvt. Ltd, 2003.
3. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education, 1999.

MCS 35A	SOFTWARE QUALITY ASSURANCE	Lecture	Practical	Credit
SEM III – Elective		4	0	4

LEARNING OBJECTIVES

After completing this course, the students will be able to

SYLLABUS

UNIT-I

The Role of SQA – SQA Plan – SQA considerations – SQA people – Quality Management – Software Configuration Management

UNIT-II

Managing Software Organizations – Managing Software Quality – Defect Prevention – Software Quality Assurance Management

UNIT-III

Software Quality – Total Quality Management (TQM) – Quality Metrics – Software Quality Metrics Analysis

UNIT-IV

Software Quality Program Concepts – Establishment of a Software Quality Program – Software Quality Assurance Planning – An Overview – Purpose & Scope.

UNIT-V

Software Standards–ISO 9000 Quality System Standards - Capability Maturity Model and the Role of SQA in Software Development Maturity – SEI CMM Level 5 – Comparison of ISO 9000 Model with SEI's CMM

TEXT BOOKS:

1. Watts S Humphrey, "Managing the Software Process", Pearson Education Inc
2. Mordechai Ben-Menachem / Garry S Marliss, "Software Quality", Vikas Publishing House, Pvt, Ltd., New Delhi

REFERENCES:

1. Gordon G Schulmeyer, "Handbook of Software Quality Assurance", Third Edition, Artech House Publishers 2007
2. Nina S Godbole, "Software Quality Assurance: Principles and Practice", Alpha Science International, Ltd, 2004

MCS 35B	BIG DATA	Lecture	Practical	Credit
SEM III – Elective		4	0	4

LEARNING OBJECTIVES

1. To provide an overview of an exciting growing field of big data analytics.
2. To introduce the tools required to manage and analyze big data like Hadoop, NoSql MapReduce.
3. To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
4. To enable students to have skills that will help them to solve complex real-world problems in for decision support.

After completing this course, the students will be able to

1. Understand the key issues in big data management and its associated applications in intelligent business and scientific computing.
2. Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics.
3. Interpret business models and scientific computing paradigms, and apply software tools for big data analytics.
4. Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.

SYLLABUS

UNIT-I

Big Data in the Enterprise: Search at Scale – Multimedia Content - Sentiment Analysis – Enriching and Contextualizing Data – Data Discovery and Exploratory Analytics – Operational Analytics or Exploratory Analytics – Realizing opportunities from Bid Data – Taming the “Big Data” – New Information Management Paradigm: New Approach to enterprise Information management for Big Data – Implications of Big Data to Enterprise IT – Big Data Implications for Industry: Big Data uses cases by Industry Vertical.

UNIT-II

Scale-Out architecture – Database Workloads – Database Technologies for managing the workloads – Columnar Database - Polyglot persistence: The next generation architecture - Big Data warehouse and analytics – How Hadoop Works – Additional consideration for BDW – Data Quality implications for Big Data.

UNIT-III

Understanding Data Integration Patterns – Big Data Workload Design Approaches – Map reduce patterns, algorithms and use cases, NoSQL Modeling Techniques.

UNIT-IV

Challenges in Big Data Analysis – Big Data Analytics Methodology – Analyze and Evaluate Business Usecase – Develop Business Hypotheses – Setting up Big Data Analytics System – Gathering Data with Apache Flume.

UNIT-V

In-Memory Computing Technology: Guidelines – Real Time Analytics and CAP Theorem – Hadoop and NoSQL Conundrum – Using an In-Memory Data Grid for Real time Data Analysis – Map Reduce and real Time Processing – Big Data Workflow – Design Principles for Contextualizing Big Data.

TEXT BOOKS:

1. Soumendra Mohanty, Madhu Jagadeesh, and Harsha Srivatsa, “Big Data Imperatives: Enterprise Big Data Warehouse, BI Implementations and Analytics”, Apress Publication.

REFERENCES:

1. Bid Data Now 2012 Edition”, O’Reilly, First Edition, 2012
2. Paul Zikopoulos, Thomas Deutsch, Dirk Deroos, David Corrigan, Krishnan Parasuraman and James Giles, “Harness the power of Big Data”, McGrawHill, 2013

MCS 35C	SOFT COMPUTING	Lecture	Practical	Credit
SEM III – Elective		4	0	4

LEARNING OBJECTIVES

After completing this course, the students will be able to

SYLLABUS

UNIT-I

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set – Theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

UNIT-II

Derivative based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton’s Method – Step Size Determination – Derivative Free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

UNIT-III

Supervised Learning Neural Networks – Perceptrons – Adaline Backpropagation Multilayer perceptrons – Radial Basis Function Networks – Unsupervised Learning and Other Neural Networks – Competitive Learning Networks – Kohonen Self – Organizing Networks – Learning Vector Quantization – Hebbian Learning.

UNIT-IV

Adaptive Neuro – Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework – Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

UNIT-V

Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

TEXT BOOKS:

1. J.S.R. Jang, C.T. Sun and E. Mizutani, “Neuro Fuzzy and Soft Computing”, PHI, Pearson Education, 2004.

REFERENCES:

1. Timothy J. Ross, "Fuzzy Logic with Engineering Application, " McGraw Hill, 1977.
2. Davis E. Goldberg, "Genetic Algorithms Search, Optimization and Machine Learning", Addison Wesley, 1989.
1. S. Rajasekaran and G.A.V. Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003. Emereo Pty Limited, July 2008.
4. Ahmar, Abbas, "Grid Computing A Practical Guide to technology and Applications", Charles River media, 2003.

MCS 36	MOBILE COMPUTING LAB	Lecture	Practical	Credit
SEM III – Practical		0	4	4

LEARNING OBJECTIVES

Android Application Development course is designed to quickly get you up to speed with writing apps for Android devices. The student will learn the basics of Android platform and get to understand the application lifecycle.

After completing this course, the students will be able to

1. Create a mobile application using the application.
2. Apply essential Android Programming concepts.
3. Design and develop User Interfaces for the Android platform
4. Develop various Android applications related to mobile related server-less database
5. Gain knowledge of installing Android Studio and Cross Platform Integrated Development Environment.
6. Develop ability to develop Android Application

SYLLABUS

List of Experiments:

1. Creation of simple application using Button, TextView and EditText
2. Creating an application which uses Radio buttons & Option Group
3. Creating an application with Alert Dialog box
4. Creating an application with DatePicker Widget
5. Creating an application which creates Progress Bar
6. Creating an application with Spinner
7. Creating an application with Menus and Intents
8. Creating an application with File I/O
9. Creating an application which connects RDBMS (SQLite / MySQL)
10. Creating an application with Phone services (SMS, Call etc.)

MCS 37	DESIGN AND ANALYSIS OF ALGORITHMS LAB	Lecture	Practical	Credit
SEM III – Practical		4	0	4

LEARNING OBJECTIVES

1. Analyze the asymptotic performance of algorithms.
2. Apply important algorithmic design paradigms and methods of analysis.
3. Identify the problem given and design the algorithm using various algorithm design techniques.
4. Investigate various algorithms in a high level language.
5. Analyze the performance of various algorithms.
6. Compare the performance of different algorithms for same problem

After completing this course, the students will be able to

The objective of the course is to teach techniques for effective problem solving in computing. Learn how to analyze a problem and design the solution for the problem. Design and implement efficient algorithms for a specified application. Strengthen the ability to identify and apply the suitable algorithm for the given real world problem.

SYLLABUS

List of Experiments:

1. Linear & Binary search using Divide and Conquer
2. Quick sort using Divide and Conquer
3. Merge Sort using Divide and Conquer
4. Selection Sort using Divide and Conquer
5. Maximum and Minimum using Divide and Conquer
6. 0/1 knapsack using Dynamic Programming
7. All pairs of Shortest path algorithm
8. Minimum Cost Spanning Tree using Prim's Algorithm & Kruskal Algorithm
9. N-Queens Problem using Backtracking
10. Sum of Subset of numbers

MCS 38	Mini Project	Lecture	Practical	Credit
SEM III – Practical		4	0	4

LEARNING OBJECTIVES

1. Identifying the research problem;
2. Performing a literature review & writing a theoretical/conceptual framework;
3. Researching the design or approach to the problem;
4. Collecting and analyzing the data and/or designing and validating the design;
5. Drawing conclusions and giving recommendations.

After completing this course, the students will be able to

Describe how to find the research and application problem and give the solution to the problem.

REGULATIONS

- a) Students should do their Mini Project work in the College during 3rd semester.
- b) The Candidate should submit the filled in format as given in **Annexure-I** to the department for the approval during the 2nd week of July.
- c) Each internal guide shall have maximum of eight Students.
- d) Periodically the project should be reviewed minimum three times by the advisory committee.
- e) The Students should prepare three copies of the project work and submit the same on the date fixed by the Department for the evaluation. After evaluation one copy is to be retained in the College Library and one copy is to be submitted to the University (Registrar) and the student can hold one copy.
- f) A Sample format of the project work is enclosed in **Annexure-II**.
- g) Format of the **Title page** and **certificate** are enclosed in **Annexure III**.
- h) The Students should use Presentation during their Mini Project Viva voce Examinations.
- i) To pass the Mini Project and viva-voce a candidate should secure 50% marks. The candidate should compulsorily attend viva-voce examination to secure pass in that paper.

The evaluation of Mini Project is as follows

The maximum mark for each Mini Project is 100 with 25 for Continuous Internal Assessment (CIA) and 75 for Semester Examination.

CIA Project Work		
I	First Review	10 Marks
II	Second Review	10 Marks
III	Report Preparation	5 Marks
Total		25 Marks
Semester Project Work		
1.	Evaluation of Project Work Document	55 Marks
2.	Viva - Voce	20 Marks
Total		75 Marks

MCS 41	PROJECT WORK	Lecture	Practical	Credit
SEM III – Project		4	0	4

LEARNING OBJECTIVES

1. Identifying the research problem;
2. Performing a literature review & writing a theoretical/conceptual framework;
3. Researching the design or approach to the problem;
4. Collecting and analyzing the data and/or designing and validating the design;
5. Drawing conclusions and giving recommendations.

After completing this course, the students will be able to

Describe how to find the research and application problem and give the solution to the problem.

REGULATIONS

- a. Students should do their four months Project work in Company / Institutions during fourth semester.
- b. The Candidate should submit the filled in format as given in **Annexure-IV** to the department for approval during the 1st Week of January.
- c. Each internal guide shall have maximum of eight Students.
- d. Periodically the project should be reviewed minimum three times by the advisory committee.
- e. The Students should prepare three copies of the project work and submit the same on the date fixed by the Department for the evaluation. After evaluation one copy is to be retained in the College Library and one copy is to be submitted to the University (Registrar) and the student can hold one copy.
- f. A Sample format of the dissertation is enclosed in **Annexure-V**.
- g. Format of the **Title page** and **certificate** are enclosed in **Annexure VI**.
- h. The Students should use Presentation during their Project Viva voce Examinations.
- i. For the project work and viva-voce a candidate should secure 50% of the marks for pass. The candidate should compulsorily attend viva-voce examination to secure pass in that paper.

The evaluation of project is as follows

The maximum mark for each Project is 200 with 80 for Continuous Internal Assessment (CIA) and 120 for Semester Examination.

CIA Project Work		
I	First Review	25 Marks
II	Second Review	25 Marks
III	Report Preparation	30 Marks
Total		80 Marks
Semester Project Work		
1.	Evaluation of Project Work Document	80 Marks
2.	Viva - Voce	40 Marks
Total		120 Marks