SCHOOL OF ENGINEERING

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY AND MEDICAL SCIENCES

Outcome based Curriculum for

Postgraduate Degree Course in Software Engineering

Department of Computer Science & Engg.

(1) Vision: Creating knowledge of fundamental principles and innovative technologies through research within the core areas of computer science and also in inter-disciplinary topics. Serving the communities to which we belong at local and national levels, combined with a deep awareness of our ethical responsibilities to our profession and to society.

(2) Mission:

- To provide quality education to meet the need of profession and society.
- Provide a learning ambience to enhance innovations, problem solving skills, leadership qualities, team-spirit and ethical responsibilities.
- Establish Industry Institute Interaction program to enhance the entrepreneurship skills
- Provide exposure of latest tools and technologies in the area of engineering and technology.
- Promote research based projects/activities in the emerging areas of technology convergence.

(3) Program Educational Preambles (PEO's):

PEO1: To produce engineering graduates who shall excel in a career utilizing their education in computer engineering.

PEO2: Pursue higher education for professional development.

PEO3: Exhibit leadership qualities with demonstrable attributes in lifelong learning to contribute to the societal needs.

(4) Programme Outcomes (PO's) :

PO01. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and engineering . Specialization to the solution of complex engineering problems.

PO02. Problem analysis: Identify, formulate, research literature, and analyze engineering problems to arrive at substantiated conclusions using first principles of mathematics, natural, and engineering sciences.

PO03. Design/development of solutions: Design solutions for complex engineering problems and design system components, processes to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO04. Conduct investigations of complex problems: User research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO05. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO06. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO07. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO08. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO09. Individual and team work: Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively with the engineering community and with society at large. Be able to comprehend and write effective reports documentation. Make effective presentations, and give and receive clear instructions.

PO11. Project management and finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

(5) Program Specific Outcomes (PSOs)

PSO-1 Apply standard Software Engineering practices and strategies in real-time software project development using open-source programming environment or commercial environment to deliver quality product for the organization success.

PSO- 2 Design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design, cloud computing, IoT and data analytics of varying complexity.

(06) Programme PO's and PSO's Mapping

Program	Courses Category	PO1 Comp. Knowledge	PO 2 Prob. Analysis	PO3 Design Sol	PO4 Invest. Probl	PO5 Tools	PO6 Ethics	PO7 Learn	PO8 Proj. Mgt	PO9 Comm	PO10 Soc, Enviro	PO11 Team Work	PO12 Entrepreneurship	PSO1	PSO2
MTECH (SE)	Foundation Courses	*						*		*			*		
	Professional Core	*	*	*	*	*	*	*	*		*	*		*	*
	Professional Electives	*	*	*	*	*	*	*	*		*	*		*	*
	Employability Enhancement Courses	*					*	*		*		*	*		

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(07) Semester wise PO's and SPO's Mapping

Semester	Name of the Course	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
		Engineering Knowledge	Problem Analysis	Design/ Development of Solution	Investigation	Modern Tool Usage	The Engineer and Society	Environment and Sustainability	Ethics	Individual and Team Work	Communication	Project Management	Life-Long Learning		
Semester-Ist	Advanced Mathematics	*	*	*	*							*			
	Programming System	*	*	*	*	*	*			*		*	*		
	Object Oriented Technology & UML	*	*	*	*	*				*		*	*		
	Advanced D.B.M.S.	*	*	*	*	*	*			*		*	*		
	Computer Graphics & Multimedia	*	*	*	*	*				*	*	*	*	*	
Semester-IInd	Software Verification Validation & Testing	*	*	*	*	*	*			*		*	*		
	Advance Distributed System	*	*	*	*	*		*		*		*	*		
	Soft Computing	*	*	*	*	*	*			*		*	*	*	
	Advance Data Structures & Algorithms	*	*	*	*	*				*		*	*		*
	Software Project Management	*	*	*	*	*	*			*		*	*		*
Semester-IIIrd	Web Engineering	*	*	*	*	*	*			*		*	*		
	Parallel Computation and Applications	*	*	*	*	*	*			*		*	*		*
	Wireless LAN and Mobile Computing	*	*	*	*	*				*		*	*		*
	Cloud Computing	*	*	*	*	*	*	*	*	*		*	*		
	Data Mining and Warehousing	*	*	*	*	*	*	*	*	*		*	*		

	Software Configuration Management	*	*	*	*	*	*			*		*	*		*
	Dissertation Part- I	*	*	*	*	*						*			
Semester-IV	Dissertation Part- II	*	*	*	*	*						*			

(08) Structure of Programme: To fulfill the need of development of all the POs/ GAs, as per above mapping, the following semester wise programmed structure are as under.

[L= Lecture, T = Tutorials, P = Practical's & C = Credits]

Total Credits*= 104

Structure of Post Graduate Engineering program:

S. No.	Course Category	Credits of the Curriculum
1.	Foundation Courses	**8**
2.	Professional Core	**20**
3.	Professional Electives	**16**
4.	Employability Enhancement Courses	**60**
	Total	**104**

***Definition of Credit:**

1 Hr. Lecture (L) per week	1 Credit
1 Hr. Tutorial (T) per week	1 Credit
1 Hr. Practical (P) per week	1Credit

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(09) Scheme of Exanimation

I Semester

S.No.	Subject Code	Subject Name	Periods per week			Credits	Maximum marks (Theory Slot)			Maximum Marks (Practical		Total Marks
			L	T	P		End Sem. *Exam.*	Tests (Two)	Assignments/ Quiz	End Sem. Practical / Viva	Practical Record/ assignment/Quiz/Presentation	
1.	**MSE 101**	**Advanced Mathematics**	3	1	-	4	70	20	10	-	-	100
2.	**MSE 102**	**Programming System**	3	1	-	4	70	20	10	-	-	100
3.	**MSE 103**	**Object Oriented Modeling & UML**	3	1	-	4	70	20	10	-	-	100
4.	**MSE 104**	**Advanced D.B.M.S.**	3	1	-	4	70	20	10	-	-	100
5.	**MSE 105**	**Computer Graphics & Multimedia**	3	1	-	4	70	20	10	-	-	100
6.	**MSE 106**	**Lab-I (MSE-103 & MSE - 105)**	-	-	6	6	-	-	-	90	60	150
7.	**MSE 107**	**Lab-II (MSE-102 & MSE-104)**	-	-	6	6	-	-	-	90	60	150
		Total	**15**	**5**	**12**	**32**	**350**	**100**	**50**	**180**	**120**	**800**

L: Lecture- T: Tutorial- P: Practical ***w.e.f. July- 2015***

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II Semester

S.No.	Subject Code	Subject Name	Periods per week			Credits	Maximum marks (Theory			Maximum Marks		Total Marks
			L	T	P		End Sem. Exam.	Tests (Two)	Assignments/ Quiz	End Sem. Practical / Viva	Practical Record/ assignment/Quiz/ Presentation	
1.	MSE 201	Software Verification Validation & Testing	3	1	-	4	70	20	10	-	-	100
2.	MSE 202	Advance Distributed System	3	1	-	4	70	20	10	-	-	100
3.	MSE 203	Soft Computing	3	1	-	4	70	20	10	-	-	100
4.	MSE 204	Advance Data Structures & Algorithms	3	1	-	4	70	20	10	-	-	100
5.	MSE 205	Software Project Management	3	1	-	4	70	20	10	-	-	100
6.	MSE 206	Lab-III (MSE-203 & MSE-205)	-	-	6	6	-	-	-	90	60	150
7.	MSE 207	IV (MSE-202 & MSE-204)	-	-	6	6	-	-	-	90	60	150
		TOTAL	15	5	12	32	350	100	50	180	120	800

L: Lecture- T: Tutorial- P: Practical ***w.e.f. July- 2015***

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III SEMESTER

S.No.	Subject Code	Subject Name	Periods per week			Credits	Maximum marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. *Exam*.	Tests (Two)	Assignments/ Quiz	End Sem. Practical / Viva	Practical Record/ assignment/Quiz/Presentation	
1.	**MSE 301**	**Elective I**	3	1	-	4	70	20	10	-	-	100
2.	**MSE 302**	**Elective II**	3	1	-	4	70	20	10	-	-	100
3.	**MSE 303**	**Seminar**	-	-	4	4	-	-	-	-	100	100
4.	**MSE 304**	**Dissertation Part- I**	-	-	8	8	-	-		120	80	200
		Total	**6**	**2**	**12**	**20**	**140**	**40**	**20**	**120**	**180**	**500**

L: Lecture- **T: Tutorial-** **P: Practical** ***w.e.f. July- 2015***

Elective – I (MSE 301)

(A) Web Engineering (B) Parallel Computation and Applications
(C) Wireless LAN and Mobile Computing (D) Cloud Computing

Elective-II (MSE 302)

(A) Data Mining and Warehousing (B)Software Configuration Management

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Fourth Semester

S.No.	Sub Code	Subject Name	Periods per Week			Credits	Max Marks Theory			Max. Marks Practical		Total Marks
			L	T	P		End Sem Exam	Mid Sem	TW	End Sem Practical / Viva	Practical Record/Quiz /Assignment / Presentation	
1	MSE 401	Dissertation Part- II	-	-	20	20	-	-	-	300	200	500
TOTAL			-	-	20	20	-	-	-	300	200	500

L: Lecture- **T: Tutorial-** **P: Practical** ***w.e.f. July- 2015***

(10) Course Content

Semester- I

MSE-101-

ADVANCED MATHEMATICS

MSE-101	**Advanced Mathematics**	**3L:1T:0P**	**4 credits**	**3hrs/week**

Objective:- Mathematics majors will be able to learn and explain mathematics on their ownatics (e.g., Lp-spaces as an example in linear algebra) and identify and explain cases in which major results of one branch of mathematics rely nontrivially on results from another branch (e.g., the application of linear algebra to solving systems of differential equations).

OUTCOMES- Describe several areas of mathematics beyond calculus, Solve problems using mathematics in unfamiliar settings, Solve equations and inequalities, both algebraically and graphically, and Solving and model applied problems

Total 40 Hours

Unit 1 : Partial Differential Equation **8 Hrs.**

Solution of Partial Differential Equation (P DE) by separation of variable method, Numerical solution of PDE (Laplace, Poisson's, Parabola) using finite difference Methods.

Unit 2 : Matrices And Linear System Of Equations **8 hrs**

Solution of linear simultaneous equations by Gaussian elimination and its modification, Crout's triangularization method, Iterative methods-Jacobins method, Gauss-Seidal method, Determination of Eigen values by iteration.

Unit 3 : Calculus Of Variations **9 Hrs.**

Euler-Lagrange's differential equation, The Brachistochrone problems and other applications. Isoperi-metric problem, Hamilton's Principle and Lagrange's Equation, Rayleigh-Ritz method, Galerkin method.

Unit 4 : Fuzzy Logic **8 Hrs.**

Operations of fuzzy sets, fuzzy arithmetic & relations, fuzzy relation equations, fuzzy logics.MATLAB introduction, programming in MATLAB scripts, functions and their application.

Unit 5 : Reliability **7 Hrs.**

Introduction and definition of reliability, derivation of reliability functions, Failure rate, Hazardrate, mean time t future & their relations, concepts of fault tolerant analysis.

Reference Books:

1. Higher Engineering Mathematics - by Dr. B.S. Grewal; Khanna Publishers
2. Calculus of Variations - by Elsgole; Addison Wesley.
3. Applied Numerical Methods with MATLAB by Steven C Chapra, TMH.
4. Introductory Methods of Numerical Analysis by S.S. Shastry,
5. Calculus of Variations - by Galfand & Fomin; Prentice Hall.

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MSE- 102

PROGRAMMING SYSTEM

MSE-102	Programming System	3L:1T:0P	4 CREDIT	3 hrs/week

Objective:-

The essential objective is to familiarize you with modern programming languages and paradigms. ... Understand the concepts and terms used to describe languages that support the imperative, functional, object-oriented, and logic programming paradigms. Also 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.

Outcomes:-

Specify and analyze the lexical, syntactic and semantic structures of advanced language features. Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.

Total 40 Hours

UNIT-1 **06 Hours**

Overview of language processors, Elements of assembly level pr ogramming, Design of assembler , Macro definition, Design of Macro preprocessor , Relocating and linking concepts , Design of linker , Programming Environments .

UNIT-II **08 Hours**

Aspects of Compilation, overview of the various phases of compiler , Scanning, Syntax error handling , Symbol table conceptual design , Intermediate Code conceptual Design , Intermediate code interfaces , Dynamic storage allocation techniques , Dynamic Programming code generation algorithm ,Principal sources of optimization . Register allocation techniques.

UNIT –III **10 Hours**

Motivation and overview, Structure of a Parallelizing compiler. Paralle lism detection: data dependence, direction vectors, loop carried and loop independent dependences.Compilation for Distr ibuted Machines Data partitioning, instruction scheduling, register allocation, machine optimization. Dynamic compilation. Introduction to code optimisation. Classical theory of data flow analysis. Bi-directiona l data flows. Unified algorithms for data flow analysis. Program representation for optimisation - SSA form, etc.Efficient code generation for expressions. Code generator generators (CGGs). Code generation for pipelined machines.

UNIT-IV **08 Hours**

Design Issues in distributed operating system, Networking Issues , Communication Protocols , Message Passing , RPC in heterogeneous environment , Resource allocation ,Algorithms for Distributed control . Distributed Deadlock detection ,Mechanism for building Distributed File System, Distributed shared memory , Distributed scheduling.

UNIT-V **08 Hours**

Resource Security and Protection: The Access Matrix model , Advanced models of protection,. Cryptography, Authentication, Multiprocessor System Architecture , Structure of multi-processor operating systems , Process synchronization, scheduling , Memory management, Fault tolerance.

Case studies: Unix Operating system, Amoeba, Andrew.

References:

1.Dhamdhere, Systems Programming and Operating systems, TMH

2. Keith Cooper , Engineering a Compiler , Elsevier Pub

3.Singhal & Shivaratri , Advanced concepts in Operating Systems, TMH

4.Sinha , Distributed operating system , PHI

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MSE-103

-OBJECT ORIENTED TECHNOLOGY & UML

MSE-103	**Object Oriented Technology & UML**	**3L:1T:0P**	**4 Credits**	**3 hrs/week**

Objective: This course teaches students the basic principles of object orientation and OO analysis and design. We will use the Unified Process and the Unified Modeling Language (UML) as tools. Illustrative programming examples use the Java language, but Java programming experience is not required.

Outcome: student will be able to:

1. Describe the three pillars of object-orientation and explain the benefits of each.
2. Create use case documents that capture requirements for a software system.
3. Create class diagrams that model both the domain model and design model of a software system.
4. Create interaction diagrams that model the dynamic aspects of a software system.
5. Explain the facets of the Unified Process approach to designing and building a software system.
6. Describe how design patterns facilitate development and list several of the most popular patterns.

Total 40 hours

UNIT-I **6 hours**

C++ preliminaries :- Tokens, Keywords, Variable, scope of variables, Data type, pointers, operators- scope resolution, member de -referencing operators, memory management operators, manipulators, type castoperators; Symbolic constants, Type compatibility, Dynamic initialization, Reference variable, Call by reference.

UNIT-II **8 hours**

Objects & Classes:- abstract & declaration syntax, visibility label-private, public, protected, Inline concept, Static data member & member function, Array of objects, P ointer to objects & members, Array of pointers to objects.
Functions :- Declaration & definition, exploring arrays & strings, function overloading, const function, P assing & returning object through function, The Friend function.

UNIT-III **9 hours**

Constructors & Destructors :- Default constructors, default argument constructor, parameterized constructor, Copy constructor, Destructor. Inheritance and Polymorphism:- Visibility modes, Single Inheritance, Multi-level Inheritance, Hierarchical Inheritance, Multiple Inheritance, Hybrid Inheritance, Virtual base class, abstract class. Function Overloading, Operator overloading, overloading unary, binary, string manipulation using operators. Run time - Virtual function, pointer to object, this pointer, pure virtual function.

UNIT-IV **9 hours**

Object Modeling technique (OM T):- object model, function model, relationship among models, object diagrams, state diagrams, data flow diagrams , analysis. Object oriented Design: Overview of object design, Combination the models, Designing algorithms, design optimization, Implementation of control, Adjustment, Design of association

UNIT-V **8 hours**

Unified Modeling Language (UML): Class diagram sequence diagram Use case diagram, Collaboration, diagram, state, chart diagram, Activity diagram, component diagram, deployment diagram, Object oriented Database: Relational Vs .object oriented database, the architecture of object oriented database, query language for Object Oriented database.

Reference Books :

1. Rambaugh, James Michael, Blaha - "Object Oriented Modelling and Design" - P rentice Hall India/ P earson Education
2. Jana, C++ & Object Oriented P rogramming, P HI
3. OOP in C++ by La fore, Galgotia P ub.

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MSE-104-ADVANCE DATABASE MANAGEMENT SYSTEM)

MSE- 104	**Advance Database Management System**	**3L:1T:0P**	**4 credits**	**3 hrs/week**

Objective:

This course is intended to provide you with an understanding of the current theory and practice of database management systems. To help you more fully appreciate their nature, the course provides a solid technical overview of database management systems, using a current database product as a case study. In addition to technical concerns, more general issues are emphasized. These include data independence, integrity, security, recovery, performance, database design principles, and database administration.

Outcome:

Students should be able to do the following:

1. Understand the role of a database management system in an organization.
2. Understand basic database concepts, including the structure and operation of the relational data model.
3. Construct simple and moderately advanced database queries using Structured Query Language (SQL).
4. Understand and successfully apply logical database design principles, including E-R diagrams and database normalization.
5. Design and implement a small database project using Microsoft Access.
6. Understand the concept of a database transaction and related database facilities, including concurrency control, journaling, backup and recovery, and data object locking and protocols.

Total 40 hours

UNIT-I **8 hours**

Basic Concepts: - DBMS Concepts and architecture Introduction, Review of file organization techniques, Database approach v/s Traditional file, accessing approach, Advantages of database systems, Data models, Schemas and instances, Data independence, Data Base Language and interfaces, Overall Database Structure, Functions of DBA and designer.

UNIT-II **8 hours**

E-R Model: - Entitles and attributes, Entity types, Value, Sets, Key attributes, Relationships, Defining the E-R diagram of database. Concept of Generalization, Aggregation and Specialization. Transforming ER diagram into the tables. Various other data models object oriented data Model, Network data model, and Relational data model.

RELATIONAL DATA MODELS:- Domains, Tuples, Attributes, Relations, Characteristics of relations, Keys, Key attributes of relation, Relational database, Schemas, Integrity constraints. Referential integrity.

UNIT-III **7 hours**

Structured Query Language: - Relational Query languages: Relational algebra and relational calculus, Relational algebra operations like select, Project, Join, Division, outer union.

Functional Dependencies & Normalization:- Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and losless join, problems with null valued and dangling tuples, multivalued dependencies.

UNIT-IV **9 hours**

Transaction, Concurrency& Recovery:- basic concepts, ACID properties, Transaction states, implementation of atomicity and durability, concurrent executions, basic idea of serializability, basic idea of concurrency control, basic idea of deadlock, failure classification, storage structure types, stable storage implementation, data access, recovery and atomicity- log based recovery, deferred Database modification, immediate Database modification, checkpoints.

UNIT-V **8 hours**

Advance Concepts: - Introduction to Distributed databases, protection, security and integrity constraints. Object Technology and DBMS, Comparative study of OODBMS Vs DBMS. Temporal, Deductive, Multimedia, Web & Mobile database.

References:-

1. Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill
2. Atul Kahate , " Introduction to Database Management System", Pearson Educations
3. Ashutosh Dubey"DataBase Management concepts" kataria publication

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MSE-105 -COMPUTER GRAPHICS & MULTIMEDIA

MSE-105	**Computer Graphics & Multimedia**	**3L:1T:0P**	**4 credits**	**3hrs/week**

Objective:

This course will introduce students to all aspects of computer graphics including hardware, software and applications. Students will gain experience using a graphics application programming interface (OpenGL) by completing several programming projects.

Outcome: Students should:

1. Have a basic understanding of the core concepts of computer graphics.
2. Be capable of using OpenGL to create interactive computer graphics.
3. Understand a typical graphics pipeline.
4. Have made pictures with their computer

Total 40 hours

UNIT-I **8 hours**

Introduction to Compute r Graphics & Graphics systems : - Overview of computer graphics, introduction to Raster scan displays, Storage tube displays, refreshing, flicking, interlacing, color monitors, display processors resolution, working principle of dot matrix, inkjet laser printers, working principles of keyboard, mouse scanner, digitizing camera, track ball , tablets and joysticks, graphical input techniques, positioning techniques, rubber band techniques, dragging etc.

UNIT-II **9 hours**

Ge ome try and line Ge ne ration: P oints, Lines, P lanes, P ixels and frame buffers, types of display devices, DDA and Brasenham's Line Algorithms, Brasenham's algorithms for circle generation, algorithm for ellipse generation, character generation, Aliasing and Antialiasing.

UNIT-III **7 hours**

2 -D Trans formation: Translation, Rotation, Scaling, Shearing, Reflection. Inverse Transformation, Homogenous coordinate system, Matrices Transformation, Composite Transformation. Windowing & Clipping : World Coordinate System, Screen Coordinate System, Viewing Transformation, Line Clipping & P polygon Clipping Algorithms

UNIT-IV **9 hours**

3 -D VIEWING: Three-dimensional concepts, 3D display techniques, 3D representation polygon & curved surfaces. Design of curves & surfaces - Bezier's Method, B-spline methods, 3D transformation transition, scaling, composite transformation rotation about arbitr ary axis, projections: P arallel & P erspective, Hidden surface and line removal; back face removal, depth buffer and scan line methods.

UNIT-V **7 hours**

Multimedia: Characteristics of a multimedia presentation , Uses of Multimedia, Text –Types, Unicode Standard ,text Compression, Text file formats, Audio - Components of an audio system, Digital Audio, Digital Audio processing, Sound cards, Audio file formats ,Audio P rocessing software ,Vide o -Video color spaces, Digital Video, Digital Video processing, Video file formats.

Reference Books:

1.Rogers, "P rocedural Elements of Computer Graphics", Tata McGraw Hill

2. Donald Hearn and M.P auline Baker, "Computer Graphics C Version", P earson Education, 2003.

3. P rabhat K. Andleigh & Kiran Thakur "Multimedia System Design", P H

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LABI

MSE -106

MSE -106	**Lab-I (MSE-103, MSE-105)**	**0L:0T:6P**	**6 Credits**	**6 Hrs/week**

LIST OF EXPERIMENT

1. To know the concepts of current project and define SRS according to SDLC
2. Metrics help us understand the technical process that is used to develop a product. The process is measured to improve it and the product is measured to increase quality.
3. Size-oriented metrics are not universally accepted. The use of LOC as a key measure is the center of the conflict. Proponents of the LOC measure claim.
4. Design: To understand the concept of designing models in software projects with the help of DFD and UML diagrams.
5. Project development consists of various phases of SDLC. An example is illustrated below that deals with various phases that are involved in development of software and a project starts with analyzing its domain.
6. To implement Cohen–Sutherland 2D clipping and window–viewport mapping.
7. To perform 3D Transformations such as translation, rotation and scaling.
8. To visualize projections of 3D images and Hidden Surface Elimination.
9. To convert between color models.
10. To implement text compression algorithm
11. To implement image compression algorithm

LAB II

MSE -107

MSE -107	**Lab-II (MSE-102, MSE-104)**	**0L:0T:6P**	**6 Credits**	**6 Hrs/week**

LIST OF EXPERIMENT

1. Write a pl/sql statements for rollback commit and savepoints .
2. Write a pl/sql for select, insert, update and delete statements
3. Write a pl/sql block to delete a record. If delete operation is successful return1 else return 0.
4. Display name, hire date of all employees using cursors.
5. Display details of first 5 highly paid employees
6. Write a program to implement the lexical analyzer.
7. Write a Lexical Analyzer (using lex utility for UNIX
8. Write a program to left factor the given grammar.
9. Write a program to remove the Left Recursion from a given grammar
10. Write a program which generates Quadruple Table for the given postfix String

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MSE-201-SOFTWARE VERIFICATION VALIDATION AND TESTING

MSE 201	**Software Verification Validation & Testing**	**3L:1T:0P**	**4 credits**	**3hrs/week**

Objective: -

The Verification & Validation process and related documentation for software are defined and maintained to ensure that
(1) The software correctly performs all its intended functions; and that
(2) the software does not perform any adverse unintended function.

Outcome: - On successful completion of the course students will be able to:

1. Apply the concepts and theory related to software verification and validation.
2. Identify different testing techniques and design test plans, develop test suites, and evaluate test suite coverage
3. Use testing frameworks and testing tools.

Total 40 hours

UNIT-I **8 Hrs**

Software Testing Fundamentals –Testing objectives, Testing lifecycles, Test cases, human error, testing and debugging, general principles of testing, test metrics, Agile methodology and Its Impact on Testing, Verification and Validation. Failure, Error, Fault, and Defect

UNIT-II **8 Hrs**

Testing Approaches - Static testing, structured group examination static analysis, Control flow and data flow Testing, Determining Metrics, Dynamic Testing, Black Box testing, equivalence Class Partioning , Boundary Value Analysis, state transition test, cause effect graphing and decision table technique and used case testing and Advanced black box and white box techniques Gray box testing, intuitive and Experience based

UNIT-III **8 Hrs**

Software Reliability-Reliability models, Reliability measures, verification and validation planning, Top down versus bottom up Testing Functional Vs Structured Testing, mutation testing, Test planning and Management, Testing process, Maturity Models.

UNIT-IV **8 Hrs**

Types of Testing- Concept of Unit Testing, Domain testing, Concept of Integration Testing. System testing acceptance testing, Alpha &Beta testing, Installation Testing, Usability Testing, Regression testing, Performance testing, Load testing, Stress testing, Security testing, Gorilla testing, Syntax Based Testing .

UNIT-V **8 Hrs**

System Tests- Functionality Tests ,Robustness Tests, Interoperability Tests, Scalability Tests, Documentation Tests, Testing Tools-Automation of Test execution, Requirement Tracker, Win Runner, Load Runner, Test Director, Test Process , Test Plans ,

Reference Books:

1. Limaye , Software Testing , TMH Pub
2. Naik,Software Testing and Quality Assurance, Wiley India pub.
3. Ammann & Offutt, Introduction to Software Testing, Cambridge Univ Press
4. k.v.k.k.prasad, Software testing concepts Tools, Dreamtech press

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MSE-202-ADVANCE DISTRIBUTED SYSTEM

MSE- 202	ADVANCE DISTRIBUTED SYSTEM	3L:1T:0P	4 credits	3 hrs/week

Objective:

This course provides an introduction to the fundamentals of distributed computer systems, assuming the availability of facilities for data transmission.

Outcome: Students will be able to:

1. Define distributed systems.
2. Explain why you would design a distributed system and what the desired properties of such a system are.
3. List the principles underlying the functioning of distributed systems, describe the problems and challenges associated with these principles, and evaluate the effectiveness and shortcomings of their solutions.
4. Discuss how the principles are applied in contemporary distributed systems and specific distributed infrastructure such as cloud infrastructure and cloud platforms.

Total 40 hours

UNIT-I **7 hours**

Introduction: Characterization of Distributed Systems - Examples - Resource Sharing and the Web -Challenges - System Models - Architectural and Fundamental Models - Networking and Internetworking - Types of Networks - Network Principles - Internet Protocols – Case Studies.

UNIT-II **8 hours**

Processes And Distributed Objects: Interprocess Communication - The API for the Internet Protocols - External Data Representation and Marshalling - Client-Server Communication - Group Communication- Case Study - Distributed Objects and Remote Invocation - Communication Between Distributed Objects - Remote Procedure Call - Events and Notifications - Java RMI -Case Study.

UNIT-III **8 hours**

Operating System Issues – I: The OS Layer - Protection - Processes and Threads - Communication and Invocation –OS Architecture - Security - Overview - Cryptographic Algorithms - Digital Signatures -Cryptography Pragmatics - Case Studies - Distributed File Systems - File Service Architecture - Sun Network File System - The Andrew File System

UNIT-IV **9 hours**

Operating System Issues – II: Name Services -Domain Name System - Directory and Discovery Services – Global Name Service - X.500 Directory Service - Clocks, Events and Process States - Synchronizing Physical Clocks - Logical Time And Logical Clocks - Global States - Distributed Debugging – Distributed Mutual Exclusion – Elections – Multicast Communication Related Problems.

UNIT-V **8 hours**

Distributed Transaction Processing: Transactions - Nested Transactions - Locks - Optimistic Concurrency Control - Timestamp Ordering - Comparison - Flat and Nested Distributed Transactions – Atomic Commit Protocols - Concurrency Control in Distributed Transactions – Distributed Deadlocks – Transaction Recovery - Overview of Replication And Distributed Multimedia Systems.

Reference Books:

1. G Coulouris, J Dollimore, T Kindberg, Distributed Sys Concept- Design, Pearson
2. Sape Mullender, Distributed Systems, Addison Wesley,
3. A Fleishman, Distributed Systems- Software Design and Implementation, S Verlag
4. M.L.Liu, Distributed Computing Principles and Applications, Pearson Education

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MSE- 203-SOFT COMPUTING

MSE 203	Soft Computing	3L:1T:0P	4 credits	3 hrs/week

Objective: -

The main objective of the course is to expose the students to soft computing, various types of soft computing techniques, and applications of soft computing. .Upon completion of this course, the student should be able to get an idea on :

1. Artificial Intelligence, Various types of production systems, characteristics of production systems.
2. Neural Networks, architecture, functions and various algorithms involved.
3. Fuzzy Logic, Various fuzzy systems and their functions.
4. Genetic algorithms, its applications and advances.

OUTCOMES:-

1. Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.
2. Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic
3. To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations.

Total hours-40

UNIT-I **8 Hrs.**

Introduction of soft computing, soft computing vs hard computing. Soft computing techniques. Computational Intelligence and applications, problem space and searching: Graph searching, different searching algorithms like breadth first search, depth first search techniques, heuristic searching Techniques like Best first Search, A* algorithm, AO* Algorithms. Game Playing**:** Minimax search procedure, adding alpha-beta cutoffs.

UNIT-II **6 Hrs.**

Fuzzy systems: Introduction, Need, classical sets (crisp sets) and operations on classical sets Interval Arithmetic ,Fuzzy set theory and operations, Fuzzy set versus crisp set, Crisp relation & fuzzy relations, Membership functions, Fuzzy rule base system

UNIT-III **8 Hrs.**

Neural Network: Introduction, Biological neural network: Structure of a brain, learning methodologies. Artificial Neural Network(ANN): Evolution of, Basic neuron modeling , Difference between ANN and human brain, characteristics, McCulloch-Pitts neuron models, Learning (Supervised &Unsupervised) and activation function, Applications of Neural network.

UNIT-IV **10 Hrs.**

Unsupervised learning in Neural Network: Counter propagation network, architecture, functioning & characteristics of counter Propagation network, Associative memory, hope field network and Bidirectional associative memory. Adaptive Resonance Theory: Architecture, classifications, Implementation and training. Introduction to Support Vector machine, architecture and algorithms, Introduction to Kohanan's Self organization map, architecture and algorithms.

UNIT-V **8 Hrs.**

Genetic algorithm: Introduction, working principle, Basic operators and Terminologies like individual, gene, encoding, fitness function and reproduction, Genetic modeling: Significance of Genetic operators, Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, GA optimization problems.

References:-

1. S.N. Shivnandam, “Principle of soft computing”, Wiley India.
2. David Poole, Alan Mackworth “Computational Intelligence: A logical Approach” Oxford.
3. Russell &Yuhui, “Computational Intelligence: Concepts to Implementations”, Elsevier.
4. Eiben and Smith “Introduction to Evolutionary Computing” Springer
5. Janga Reddy Manne; "Swarm Intelligence and Evolutionary Computing"; Lap Lambert Academic Publishing

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MSE-204-ADVANCE DATA STRUCTURES AND ALGORITHMS

MSE 204	Advance Data Structures & Algorithms	3L:1T:0P	4 credits	3 hrs/week

Objective: -

1. Understand and apply linear data structures-List, Stack and Queue.
2. Understand the graph algorithms.
3. Learn different algorithms analysis techniques.
4. Apply data structures and algorithms in real time applications
5. Able to analyze the efficiency of algorithm

Outcome: -

1: Describe, explain and use abstract data types including stacks, queues and lists
2: Design and Implement Tree data structures and Sets
3: Able to understand and implement non linear data structures - graphs
4: Able to understand various algorithm design and implementation

Total hours-40

UNIT-I **6 Hrs.**

Introduction: Basic Terminology, Data types and its classification, Algorithm complexity notations like big Oh, Array Definition, Representation and Analysis of Arrays, Single and Multidimensional Arrays, Address calculation, Array as Parameters, Ordered List and operations, Sparse Matrices, Storage pools, Garbage collection.

UNIT-II **8 Hrs.**

Recursion:-Recursion- definition and processes, simulating recursion, Backtracking, Recursive algorithms, Tail recursion, Removal of recursion. Tower of Hanoi Problem. Linear Data Structure:- Stack, Array Implementation of stack, Linked Representation of Stack, Application of stack, Queue, Array and linked implementation of queues, Circular queues, D -queues and Priority Queues.

UNIT-III **10 Hrs.**

Introduction of Linked list, Implementation of Singly Linked List, Two-way Header List, Doubly linked list, Linked List in Array. Generalized linked list, Non Linear Data Structure :-Trees: Basic terminology, Binary Trees, , algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees, Binary Search Tree(BST) , Height-balanced and weight-balanced trees, B-trees, B+ -trees.

UNIT-IV **8 Hrs.**

Se arching, Sorting And Design Techniques: -Searching Techniques, Sorting-Internal Sorting, Bubble Sort, Insertion Sort, Quick Sort, Heap Sort, Bin Sort, Radix Sort, External Sorting, Merge Sort, Multi-way Merge Sort ,Design Techniques -Divide and Conquer, Dynamic Programming, Greedy Algorithm, Backtracking, Local Search Algorithms.

UNIT-V **8 Hrs.**

Memory Management: -Issues -Managing Equal Sized Blocks, Garbage Collection Algorithms for Equal Sized Blocks, Storage Allocation for Objects with Mixed Sizes, Buddy Systems, Garbage collection and compaction.

Reference Books:

1. Aho, Hopcroft, Ullman, “Data Structures and Algorithms”, Pearson Education P

2. Lipschutz; Data structure (Schaum); TMH

3. R. Kruse et al, “Data Structures and Program Design in C”, Pearson Education Asia, Delhi-2002

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MSE-205-SOFTWARE PROJECT MANAGEMENT

MSE 205	**Software Project Management**	**3L:1T:0P**	**4 credits**	**3 hrs/week**

Objective: -

Project management objectives are the successful development of the project's procedures of initiation, planning, execution, regulation and closure as well as the guidance of the project team's operations towards achieving all the agreed upon goals within the set scope, time, quality and budget standards.

Outcome: -

1. Manage the scope, cost, timing, and quality of the project, at all times focused on project success as defined by project stakeholders.
2. Apply project management practices to the launch of new programs, initiatives, products, services, and events relative to the needs of stakeholders.
3. Appraise the role of project management in organization change.

Total 40 Hours

UNIT-I **8 hours**

Introduction to Software project Management: Software projects, Contract management and technical project management, Activities covered by software project management, key objectives of effective management, plans, methods & methodologies, problems associated with software projects management control.

UNIT-II **10 hours**

Project Planning: Business Planning: determining objectives; forecasting demand for product proposal writing requirement analysis, legal issues; Technical Planning: Lifecycle models, types of plans, plan documentation methods: PERT & CPM, Gantt charts, work breakdown structures. Standards, planning for risk management and control Capacity planning.

UNIT-III **8 hours**

Software Estimation Techniques, Expert judgment, estimating by analogy, Albrecht function point analysis, COSMIC Full Function Points, COCOMO-a parametric model. Risk Identification, Risk Assessment, Risk Planning & Risk Management, Evaluating risks to the schedule, Critical chain concepts.

UNIT-IV **8 hours**

Monitoring & Control: Creating the framework, collecting the data, Visualizing progress, Cost monitoring, Earned value analysis, Prioritizing monitoring, Change control. Managing people & organizing teams: Team organization, recruiting and staffing, Technical leadership, avoiding obsolescence training.

UNIT-V **6 hours**

Future Software Project Management: Modern Project Profiles, Next generation Software economics, modern process transitions.
Case Study: The command Center Processing and Display system- Replacement (CCPDS-R)

Reference Books:

1. Bob Hughes and Mike Cotterell, Software Project Management, Tata McGraw-Hill Edition.
2. Thayer, Software Engineering Project Management, 2ed, wiley India
3. Conway, Software Project Management, Wiley India
4. Pankaj Jalote, Software Project Management in practice Pearson Education.

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LABIII

MSE -206

MSE -206	Lab-III (MSE-203, MSE-205)	0L:0T:6P	6 Credits	6 Hrs/week

LIST OF EXPERIMENT

1. To Study the ADALINE NET and their training algorithm
2. To study the MADALINE NET and their training algorithm
3. Learn pattern, target output, learning rate and activation function
4. Obtain the output of the neuron Y for the network shown in fig: Using activation function as:
   a| binary sigmoidal b| binary sigmoidal [x1 x2 x3] = [0.8 0.6 0.4] [y1 y2 y3] = [0.1 0.3 -0.2] b=0.35
5. To implement AND function using Mc-Culloch Pitts neuron model
6. Case study based approach (Minimum 5), which covers various aspects of Software Project Management or one project with documentation which covers most of the aspects of SPM.
7. Study and use of at least 1 Software Project Management tool.
8. Software testing methods.
9. Study and use of at least 1 Software testing tools.

LABIV

MSE -207

MSE -207	Lab-IV (MSE-202, MSE-204)	0L:0T:6P	6 Credits	6 Hrs/week

LIST OF EXPERIMENT

1. Implement concurrent echo client-server application.
2. Incrementing a counter in shared memory
3. Create CORBA based server-client application
4. WSDL based: Implement Arithmetic Service that implements add, and subtract operations
5. To write Program multi-threaded client/server processes.
6. To write Program to demonstrate process/code migration
7. Write a program to insert node from a link list.
8. Write a program to delete node from a link list.
9. Write a program to infix to postfix Expression.
10. Write a program to doubly link list and to perform traverse & insertion in it.
11. Write a program to implementing stack Operation push, pop & display.

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MSE-301(A)-Web Engineering

MSE 301(A)	**Web Engineering**	**3L:1T:0P**	**4 credits**	**3 hrs/week**

Objective:

Web Engineering introduces a structured methodology utilized in software engineering to Web development projects. The course addresses the concepts, methods, technologies, and techniques of developing Web sites that collect, organize and expose information resources. Topics covered include requirements engineering for Web applications, design methods and technologies, interface design, usability of web applications, accessibility, testing, metrics, operation and maintenance of Web applications, security, and project management. Specific technologies covered in this course include client-side (HTML, JavaScript, and CSS) and server-side (ASP.NET).

Outcome:

Learning Outcomes Upon completion of the course, students should be able to: • Employ techniques to analyze and evaluate software architectures on a real-world large-scale web-based software systems. Create and document a reference architecture for a non-trivial Web- based technological product.

Total hours-40

UNIT I **8 Hrs**

Introduction to Web Engineering : History, Web Applications, layering, DNS - encapsulation, de-multiplexing, client /server model, port numbers, standardization process, the Internet. Link layer: introduction, Ethernet and IEEE 802 encapsulation, trailer encapsulation, SLIP, PPP- Loop back interface, MTU.

Internet protocol: introduction, IP header, IP routing, subnet addressing, subnet Mask special case of IP addresses, a subnet example.

UNIT II **8 Hrs**

Binding Protocol Address- Address Resolution Protocol & RARP, ARP & RARP, packet format, Encapsulation, Internet protocol: Introduction, Ipv4 header, Ipv4Datagrams, Encapsulation, Fragmentation and Reassembly, IP routing, Subnet addressing, Subnet mask, Super-netting- special case of IP addresses, Ipv6-Motivation, frame format and addressing, comparison of Ipv4 and Ipv6.

UNIT III **8 Hrs**

ICMP: Introduction, ICMP Header, ICMP message types , ICMP timestamp request and reply, trace route, ping program, Intra & inter domain routing-distance vector routing, RIP, Link State Routing, OSPF, Path Vector Routing, BGP, Unicast Routing protocols, IGMP-IGMP message, operation, encapsulation.

UNIT IV **8 Hrs**

UDP: introduction,UDP Operation , header, checksum, IP Fragmentation, UDP Server design. DNS Introduction- basics, message format, simple example, pointer quires, resource records, caching, UDP. TFTP: introduction, protocol, security. BOOTP: introduction, packet format, server design, through router.

UNIT V **8 Hrs.**

TCP: Introduction, TCP services, headers, connection establishment and termination, timeout of connection establishment- maximum segment size- half, close, state transition diagram, reset segments, simultaneous open and close- options, server design.

SNMP Introduction, protocol, structure of management information, object identifiers, management information base, instance identification. Telnet: rlogin protocols, examples, telnet protocol and examples. FTP, protocol, examples, SMTP protocols, examples, NFS, TCP/IP Applications.

Reference Books :

1. W. Richard Stevens, TCP/IP Illustrated Volume-I "The Protocols ", Addison W 2
2. Jaiswal .S, TCP\IP Principles, Architecture, Protocols And Implementation, First Edition, Galgotia Publications Pvt Ltd.

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MSE-301(B)-Parallel Computation and Applications

MSE 301(B)	**Parallel Computation and Applications**	**3L:1T:0P**	**4 credits**	**3 hrs/week**

Objective:

This course provides a basic, in-depth look at techniques for the design and analysis of parallel algorithms and for programming them on commercially available parallel platforms. Principles of parallel algorithms design and different parallel programming models are both discussed. MPI, POSIX threads, and Open MP all are discussed. This course is for anyone wanting to gain proficiency in all aspects of parallel and distributed programming.

Outcome:

Students learn:

1. To develop an understanding of various basic concepts associated with parallel computing environments.
2. To understand the effects that issues of synchronization, latency and bandwidth have on the efficiency and effectiveness of parallel computing applications.
3. To gain experience in a number of different parallel computing paradigms including memory passing, memory sharing, data-parallel and other approaches.
4. To earn experience in designing and testing parallel computing solutions to programming problems.

Total hours-40

UNIT I **8 Hrs**

Parallel Processing- Evolution of Parallel architectures-Applications of architectural Parallelism- Architectural classification schemes- parallelism in algorithms- Parameters characterizing algorithm parallelism- speedup and efficiency of parallel algorithms-architectures- interconnection networks.

UNIT II **8 Hrs**

Array Processors -SIMD array processors: SIMD computer organization- SIMD interconnection networks: static v/s dynamic, mesh connected ILLIAC network, MIMD Computers and Multiprocessors, Shared memory and message passing architecture – overview of shared memory multiprocessor programming- pipelined MIMD- multithreading.

UNIT III **8 Hrs**

Multiprocessor Architecture -Functional structures, UMA and NUMA multiprocessors. Interconnection Networks: Time shared or common buses, Cross bar switch and multiport memories, Comparison of multiprocessor interconnection structure, multistage networks for multiprocessors.

UNIT IV **10 Hrs**

Data dependence and Parallelism: Discovering parallel operations in sequential code- variables with complex names-sample compiler techniques - data flow principles-data flow architectures- Implementing Synchronization and Data Sharing: The character of information conveyed by synchronization - synchronizing different kinds of cooperative computations-waiting mechanisms- mutual exclusion using atomic read and write.

UNIT V **6 Hrs**

Parallel Programming: Shared memory programming, distributed memory programming, object oriented programming, data parallel programming, functional and dataflow programming.

References:

1. Harry F. Jordan and Gita Alaghband, "Fundamentals Of Parallel Processing", Pearson Education, 2003.
2. Kaihwang and Faye A. Briggs, "Computer Architecture and Parallel Processing", McGraw Hill Series.
3. Kaihwang, "Advanced Computer Architecture – Parallelism, Scalability, Programmability".
4. Michael J. Quinn, "Parallel Computing – Theory and Practice", McGraw Hill Publication

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MSE-301(C)-Wireless LAN and Mobile Computing

MSE 301(C)	**Wireless LAN and Mobile Computing**	**3L:1T:0P**	**4 credits**	**3 hrs/week**

Objective:

The objective of this course is to learn about the concepts and principles of mobile computing; to explore both theoretical and practical issues of mobile computing; to develop skills of finding solutions and building software for mobile computing applications.

Outcomes:

Student will be able to:

1. Describe the basic concepts and principles in mobile computing
2. Understand the concept of Wireless LANs, PAN, Mobile Networks, and Sensor Networks
3. Explain the structure and components for Mobile IP and Mobility Management
4. Understand positioning techniques and location-based services and applications
5. Describe the important issues and concerns on security and privacy Professional Skill
6. Design and implement mobile applications to realize location-aware computing

Total hours-40

UNIT I **8 Hrs**

Wireless Systems: Overview of Paging Systems, Cordless Phones, Cellular Telephone Systems, Satellite Communication, Wireless LANs, Bluetooth. Modern Wireless Communication Systems 2G/2.5G/3G/4G Wireless Networks and Standards, Wireless in Local loop & LMDS Cellular Concepts.

Introduction to cellular mobile systems: Basic cellular system, performance, criteria, Uniqueness of mobile Radio environment, operation of cellular systems, marketing Image of Hexagonal shaped cells, planning of cellular system, Analog cellular systems, digital cellular systems, cell splitting.

UNIT II **8 Hrs**

Cell coverage for signal & Traffic: Introduction, obtaining the mobile point to point model, Propagation over water or flat open areas, Foliage loss, Propagation in near in distance, long distance Propagation obtain path less from a point to point Prediction model, call-site antenna Heights & Signal coverage calls, mobile to mobile Propagation.

UNIT III **8 Hrs**

Co Channel Interference Reduction: Co channel interference , exploring co channel interference area, in a system, Real time co channel interference measurement at mobile radio Transceivers, Decision of an Omni directional antenna system, Design of a directional antenna system,. Lowering the antenna height, reduction of co channel interference by mean of a notech in the tilted antenna Pattern, Power control.

UNIT IV **8 Hrs**

Frequency management & channel Assignment: Frequency management, Frequency spectrum utilization, set up channels definition of channel assignment, fixed channel assignment, non fixed channel assignment algorithms How to operate north additional spectrum, Traffic & channel assignment, Perception of call blocking from the subscribers.

UNIT V **8 Hrs**

Handoffs and Dropped calls: Value of Implementing Handoffs, initiation of a hand off, Delaying a handoff, Forced Handoffs, Queuing of Handoffs, power difference handoff , Mobile assisted handoff & soft Handoff, call site Handoff only, intersystem Handoff, introduction to dropped call rate, Formula of Dropped call rate, Finding the values of g & u.

Reference Books:

1. J. Schiller, Mobile Communication, Pearson Press.
2. Wireless Network, Kaveh Pahalwan
3. Adhoc Networking by Charles E. Perkins, Addison Wisely
4. Mobile cellular Telecommunications by William C.Y. Lee TMH

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MSE 301(D) CLOUD COMPUTING

MSE 301(D)	Cloud Computing	3L:1T:0P	4 credits	3 hrs/week

Objective :-

Objective of this course is to gives students the skills and knowledge to understand how Cloud Computing can enable transformation, business development and agility in an organization. Also introducing and researching state-of-the-art in Cloud Computing fundamental issues, technologies, applications.

Outcomes :-

Learn about the the core issues of cloud computing such as security, privacy, and interoperability. choose the appropriate technologies, algorithms, and approaches for the related issues. identify problems, and explain, analyze, and evaluate various cloud computing solutions.

Total hours-40

UNIT I **6 Hrs**

Introduction: Historical development, Vision of Cloud Computing, Characteristics of cloud computing as per NIST, Cloud computing reference model, Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure, Cloud Adoption and rudiments.

UNIT II **8 Hrs**

Cloud Computing Architecture: Cloud Reference Model, Types of Clouds, Cloud Interoperability & Standards, Scalability and Fault Tolerance, **Cloud Solutions:** Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management. **Cloud Offerings**: Cloud Analytics, Testing Under Control, Virtual Desktop Infrastructure.

UNIT III **10 Hrs**

Cloud Management & Virtualization Technology: Resiliency, Provisioning, Asset management, Concepts of Map reduce, Cloud Governance, High Availability and Disaster Recovery. Virtualization: Fundamental concepts of compute ,storage, networking, desktop and application virtualization, .Virtualization benefits, server virtualization, Block and file level storage virtualization Hypervisor management software, Infrastructure Requirements , Virtual LAN(VLAN) and Virtual SAN(VSAN) and their benefits .

UNIT IV **8 Hrs**

Cloud Security: Cloud Information security fundamentals, Cloud security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Security Architecture.

UNIT V **8 Hrs**

Market Based Management of Clouds, Federated Clouds/Inter Cloud: Characterization & Definition, Cloud Federation Stack, Third Party Cloud Services. Case study: Google App Engine, Microsoft Azure, Hadoop, Amazon, Aneka.

Reference Books:

1. Krutz, Vines, “Cloud Security “, Wiley Pub
2. Velte, “Cloud Computing- A Practical Approach” TMH Pub
3. Sosinsky, “Cloud Computing”, Wiley Pub
4. Kumar Saurabh, “Cloud Computing”, Wiley Pub

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MSE-302(A)-Data Mining and Warehousing

MSE-302(A)	**Data Mining & Warehousing**	**3L:1T:0P**	**4 credits**	**3 hrs/week**

Objectives:

The objective of this course is to familiar with mathematical foundations of data mining tools, Understand and implement classical models and algorithms in data warehouses and data mining, Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.

Outcomes :

Students will be able to:

1. Understand Data Warehouse fundamentals, Data Mining Principles
2. Design data warehouse with dimensional modeling and apply OLAP operations.
3. Identify appropriate data mining algorithms to solve real world problems
4. Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining
5. Describe complex data types with respect to spatial and web mining

TOTAL: 40 HOURS

UNIT I **6 Hrs**

Data Mining: Basic concept ,technology and rules, application of data mining, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.

UNIT II **10 Hrs**

Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori,Partition, Pincer search etc., Generalized association rules. Clustering paradigms; Partitioning algorithms like K- Method, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS.

UNIT III **10 Hrs**

Data mining techniques: Exploration of data mining methodologies, decision tables, decision trees, classification rules, association rules, clustering, statistical models &linear models.

Web mining: Introduction to web mining techniques, web basics and HTTP, data sources on the web, personalization, working with logs, forms and cookies, user identification and path analysis. E-Metrics.

UNIT IV **8 Hrs**

Data Mining of Image and Video : A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

UNIT V **8 Hrs**

Data Warehousing : Data ware house, OLAP and Data mining. OLTP vs. OLAP. Data Warehouse Design Identifying facts & dimensions, designing fact tables, dimension tables, star flake schema query redirection. OLAP operations Data ware house High Performance Computing architecture, Multidimensional schemes:1 partitioning strategy, aggregation, data marting, metadata. Capacity planning, tuning the data warehouse testing the data warehouse: developing test plan, testing operational environment Distributed and virtual data warehouses.

Reference Books :

1. Data Mining Techniques ; Arun K.Pujari ; University Press.
2. Data Mining; Adriaans & Zantinge; Pearson education.
3. Mastering Data Mining; Berry Linoff; Wiley.
4. Data Mining; Dunham; Pearson education.

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MSE 302(B) Software Configuration Management

MSE-302(B)	**Software Configuration Management**	**3L:1T:0P**	**4 credits**	**3 hrs/week**

Objective :-

Software configuration is defined, maintained, and controlled until the software is retired.

Criteria:

1. Software configuration items are identified, baselined and controlled.
2. A baseline labeling system is established and implemented.
3. In addition, for Level A or Level B custom developed safety software, periodic configuration audits and reviews are conducted and documented.
4. Proposed software changes are documented, evaluated, and approved.
5. Only approved changes are implemented.

Outcomes:-

The students should be able to Verify the existence of documented processes to control, uniquely identify, describe, and document the configuration of each version or update of safety software and its related documentation. This documented evidence may be in either SCM plan or embedded in another software or system level document.

TOTAL: 40 HOURS

UNIT I **8 Hrs**

Overview To Software Configuration Management: SCM: Concepts and definitions – SCM Plan – Software development life cycle models – SDLC Phases – Need and importance of Software configuration management – Increased complexity and demand – Changing nature of software and need for change management – Lower maintenance costs and better quality assurance – Faster problem identification and bug fixes - SCM: Basic concepts – Baselines – Check-in and Check-out-Versions and Variants –System Building- Releases.

UNIT II **8 Hrs**

Different Phases Of Software Configuration Management: Different Phases Of Scm – SCM System design - SCM Plan preparation-SCM Team organization – SCM Infrastructure organization – SCM Team training – Project team training – Configuration identification – Configuration Control – Configuration status accounting – Configuration and its.

UNIT III **8 Hrs**

Configuration Audits And Management Plans When, what and who of auditing- Functional Configuration audit – Physical Configuration audit – Auditing the SCM System – Role of SCM Team in configuration audits – SCM plan and the incremental approach – SCM Plan and SCM
Tools – SCM Organization.

UNIT IV **8 Hrs**

Software Configuration Management Tools And Implementation Advantages of SCM tools – Reasons for the increasing popularity of SCM tools – SCM Tools and SCM Functions – SCM tool selection – Role of Technology – Selection criteria – Tool implementation – SCM implementation plan – implementation strategy – SCM Implementation team.

UNIT V **8 Hrs**

Trends In Scm: FUTURE DIRECTIONS SCM in different scenarios – SCM and project size –SCM in integrated development environments – SCM In distributed environments – SCM and CASE Tools - Trends in SCM - Hardware and Software Management – Better integration with IDE'S and CASE environments – Customization – Better decision making capabilities – Reduction in SCM Team size – Market snapshot.

References

1.Jessica Keyes,Software Configuration Management,Auerbach Publications, 2008.

2.Alexis Leon,Software Configuration Management Handbook,Artech Print on Demand; 2 edition,2009.

3.Robert Aiello and Leslie SachsConfiguration Management Best Practices: Practical Methods that work in Real World, , Addison(Wesley Professional; 1 edition, 2010.

4.Stephen P. Berczuk, Brad Appleton and Kyle Brown , "Software Configuration Management Patterns: Effective Teamwork and Practical Integration", Addison(Wesley , 2003)

(11) Assessment

PO/Course Assesment Tools Types	PO/Course Assesment Tools	PO 1	PO 2	PO3	PO4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO 12
		Engineering Knowledge	Problem Analysis	Design/Development of Solution	Investigation	Modern Tool Usage	The Engineer and Society	Environment and Sustainability	Ethics	Individual and Team Work	Communication	Project Management	Life-Long Learning
Direct Tools	Test	*	*	*	*				*		*	*	
	Assignments	*	*			*				*			
	lab /seminar/industrial training/projects(Rubrics)	*	*	*		*		*	*	*	*	*	*
Indirect Tools	Course end survey	*				*		*					
	Exit survey	*	*										*
	Faculty Survey	*	*	*	*			*					
	Alumni Survey	*			*		*		*	*	*		*
	Program Statistics	*			*				*			*	