SCHOOL OF ENGINEERING

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY AND MEDICAL SCIENCES

Outcome based Curriculum for

Postgraduate Degree Courses in Engineering & Technology

Department of Computer Science & Engineering.

(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 engg. 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) <u>Program Specific Outcomes (PSOs)</u>

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 (CSE)	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		
I	Advanced Mathematics	*	*	*	*							*			
	Internet Technology	*	*	*	*	*				*		*	*		
	Object Oriented Technology & UML	*	*	*	*	*				*		*	*		
	Computer Graphics & Multimedia	*	*	*	*	*				*	*	*	*		
	Advance Database Management System	*	*	*	*	*	*			*		*	*		
II	Information Security, Coding & Cryptography	*	*	*	*	*	*		*	*			*		
	Advanced Computer Architecture	*	*	*			*			*		*	*		
	Soft Computing	*	*	*	*	*	*			*		*	*	*	
	Cloud Computing	*	*	*	*	*	*	*	*	*		*	*		
	Advance Data Structures & Algorithm	*	*	*	*	*				*		*	*		
III	Data Mining and Warehousing	*	*	*	*	*	*	*	*	*		*	*		
	Simulation and Modeling	*	*	*	*	*	*			*		*	*		

	High Performance Computing	*	*	*		*				*		*	*		
	Wireless LAN and Mobile Computing	*	*	*	*	*				*		*	*		
	Ad. Distributed System	*	*	*	*	*		*		*		*	*		
	Parallel Computation and Applications	*	*	*	*	*	*			*		*	*		
	Dissertation Part- I	*	*	*	*	*						*			
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	1 Credit

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(09) Scheme of Exanimation (Mtech-CSE)

I 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.	**MCSE 101**	**Advanced Mathematics**	3	1	-	4	70	20	10	-	-	100
2.	**MCSE 102**	**Internet Technology**	3	1	-	4	70	20	10	-	-	100
3.	**MCSE 103**	**Object Oriented Technology & UML**	3	1	-	4	70	20	10	-	-	100
4.	**MCSE 104**	**Computer Graphics & Multimedia**	3	1	-	4	70	20	10	-	-	100
5.	**MCSE 105**	**Advance Database**	3	1	-	4	70	20	10	-	-	100
6.	**MCSE 106**	**Lab-I MCSE-103, MCSE- 105**	-	-	6	6	-	-	-	90	60	150
7.	**MCSE 107**	**Lab-II MCSE-102, MCSE-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 wee			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/ Q	
1.	MCSE 201	Information Security, Coding & Cryptography	3	1	-	4	70	20	10	-	-	100
2.	MCSE 202	Advanced Computer Architecture	3	1	-	4	70	20	10	-	-	100
3.	MCSE 203	Soft Computing	3	1	-	4	70	20	10	-	-	100
4.	MCSE 204	Cloud Computing	3	1	-	4	70	20	10	-	-	100
5.	MCSE 205	Advance Data Structures & Algorithms	3	1	-	4	70	20	10	-	-	100
6.	MCSE 206	Lab-III (MCSE-202,MCSE-205)	-	-	6	6	-	-	-	90	60	150
7.	MCSE 207	Lab-IV (MCSE-203, MCSE-204)	-	-	6	6	-	-	-	90	60	150
		TOTAL	**15**	**5**	**12**	**32**	**350**	**100**	**50**	**180**	**180**	**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			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.	MCSE-301	Elective I	3	1	-	4	70	20	10	-	-	100
2.	MCSE-302	Elective II	3	1	-	4	70	20	10	-	-	100
3.	MCSE-303	Seminar	-	-	4	4	-	-	-	-	100	100
4.	MCSE-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 (MCSE- 301)

(A) Data Mining and Warehousing

(B) Simulation and Modeling

(C) High Performance Computing

Elective-II (MCSE- 302)

(A) Wireless LAN and Mobile Computing

(B) Ad. Distributed System

(C) Parallel Computation and Applications

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IV 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	MCSE 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

MCSE-101- ADVANCED MATHEMATICS

MCSE-101	Advanced Mathematics	3L:1T:0P	4 Credits	3 Hrs/week

Objective:- Mathematics majors will be able to learn and explain mathematics on their own. incorporate specific examples from one branch of mathematics into their study of another branch of mathematics (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 (PDE) 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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MCSE-102-INTERNET TECHNOLOGY

MCSE-102	Internet Technology	3L:1T:0P	4 Credits	3 Hrs/week

Objective: This course is intended to teach the basics involved in publishing content on the World Wide Web. This includes the 'language of the Web' – HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting. This will also expose students to the basic tools and applications used in Web publishing.

Outcomes: The student will be able to:

- Analyze a web page and identify its elements and attributes.
- Create web pages using XHTML and Cascading Style Sheets.
- Build dynamic web pages using JavaScript (Client side programming).
- Create XML documents and Schemas.
- Build interactive web applications using AJAX.

Total 40 Hours

UNIT-I **8 hours**

Introduction to Internet, History of Internet, Internet Standards, internetworking concepts, architecture, switch, router, protocols for internetworking, internet address and domains. Introduction World Wide Web (WWW), working of web browser and web server, Web server and its deployment, N-tier architecture, services of web server.

UNIT-II **9 hours**

Protocol layering principles, Multiplexing and DE multiplexing, 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 **7 hours**

TCP: Introduction, services, headers, connection establishment and termination, timeout of connection establishment, maximum segment size- half, close, state transition diagram, port no. and socket addresses, TCP timers.

UDP: Introduction, UDP header, UDP checksum,UDP operations , encapsulation & decapsulation, queuing ,SCTP-Services ,transmission sequence number,stream identifier ,stream sequence number,packet format.

UNIT-IV **8 Hours**

DNS, Working of DNS, DNS Header, Type of Records in DNS, forward and Reverse lookup, Configuration of Open Source (OS) DNS, working of DDNS - DHCP , DHCP header, Working of DHCP , Configuration of OS DHCP - FTP , Working of FTP , Understanding IP v6, CIDR, Hierarchical Routing, and Routing Protocol over internet. Multimedia over Internet, Voice over IP , Virtual private network.

UNIT-V **8 hours**

Intra & inter domain routing-distance vector routing, Routing information protocol (RIP),Link State Routing, OSPF,Path ,Vector Routing ,BGP, Unicast Routing protocols, Application layer protocols, TELNET protocols, File transfer protocols (FTP), Simple mail transfer protocol (SMTP), X-Window system protocol, Remote procedure call, Network file system.

References:-

1. Computer Networks and Internets with Internet Applications by Douglas E Comer, Pearson
2. "TCP/IP-Protocol suite", Forouzan, TMH 3rd edition
3. "Computer Networks and Internets", D.E.Comer, Pearson

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MCSE-103-OBJECT ORIENTED TECHNOLOGY & UML

MCSE-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:

- Describe the three pillars of object-orientation and explain the benefits of each.
- Create use case documents that capture requirements for a software system.
- Create class diagrams that model both the domain model and design model of a software system.
- Create interaction diagrams that model the dynamic aspects of a software system.
- Explain the facets of the Unified Process approach to designing and building a software system.
- 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, Pointer to objects & members, Array of pointers to objects.

Functions :- Declaration & definition, exploring arrays & strings, function overloading, const function, Passing & 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 (OMT):- 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" - Prentice Hall India/ Pearson Education
2. Jana, C++ & Object Oriented Programming, PHI
3. OOP in C++ by Lafore, Galgotia Pub.
4. Balagurusamy; Object oriented programming with C++; TMH

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COMPUTER GRAPHICS & MULTIMEDIA

MCSE-104

MCSE-104	Computer Graphics & Multimedia	3L:1T:0P	4 Credits	3 Hrs/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:

- Have a basic understanding of the core concepts of computer graphics.
- Be capable of using OpenGL to create interactive computer graphics.
- Understand a typical graphics pipeline.
- 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 mattix, 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**

Geometry and line Generation: Points, Lines, Planes, Pixels 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 Transformation: 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 & Ppolygon 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 arbitrary axis, projections: Parallel & Perspective, 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 Processing software ,**Vide o**-Video colr spaces, Digital Video, Digital Video processing, Video file formats.

Reference Books:

1. Rogers, "Procedural Elements of Computer Graphics", Tata McGraw Hill
2. Donald Hearn and M.Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003.
3. Prabhat K. Andleigh & Kiran Thakur "Multimedia System Design", PH

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ADVANCE DATABASE MANAGEMENT SYSTEM

MCSE-105

MCSE-105	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:

- Understand the role of a database management system in an organization.
- Understand basic database concepts, including the structure and operation of the relational data model.
- Construct simple and moderately advanced database queries using Structured Query Language (SQL).
- Understand and successfully apply logical database design principles, including E-R diagrams and database normalization.
- Design and implement a small database project using Microsoft Access.
- Understand the concept of a database transaction and related database facilities, including concurrency control, journaling, backup and recovery, and data object locking and protocols.
- Describe and discuss selected advanced database topics, such as distributed database systems and the data warehouse.
- Understand the role of the database administrator.

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:- Entities 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 **9 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 **7 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

LABI

MCSE -106

MCSE -106	**Lab-I (MCSE-103, MCSE105)**	**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. Write a pl/sql statements for rollback commit and savepoints .
7. Write a pl/sql for select, insert, update and delete statements
8. Write a pl/sql block to delete a record. If delete operation is successful return1 else return 0.
9. Display name, hire date of all employees using cursors.
10. Display details of first 5 highly paid employees

LABII

MCSE -107

MCSE -106	**Lab-II MCSE-102, MCSE-104**	**0L:0T:6P**	**6 Credits**	**6 Hrs/week**

LIST OF EXPERIMENT

1. Configure IP static routing.
2. Configure IP routing using RIP
3. Configuring OSPF.
4. Generate Network Traffic and examine the functionality of UDP and TCP.
5. Run different SCTP commands.
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

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MCSE- 201- INFORMATION SECURITY, CODING AND CRYPTOGRAPHY

MCSE- 201	**INFORMATION SECURITY, CODING AND CRYPTOGRAPHY**	**3L:1T:0P**	**4 Credits**	**3 Hrs/ week**

Objective: The objectives of this course are to understand the fundamentals of Cryptography, to acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity, to understand the various key distribution and management schemes, to understand how to deploy encryption techniques to secure data in transit across data networks, to design security applications in the field of Information technology.

Outcome: The students at the end of the course will be able to:

- Understand and explain the basic concepts of information theory, source coding, channel and channel capacity, channel coding and relation among them.
- Describe the real life applications based on the fundamental theory.
- Calculate entropy, channel capacity, bit error rate, code rate, steady-state probability and so on.
- Implement the encoder and decoder of one block code or convolutional code using any program language

Total 40 hours

UNIT-I **7 hours**

Information Theory, Probability and Channel: Introduction, Information Measures, Review probability theory, Random variables, Processes, Mutual Information, Entropy, Uncertainty, Shannon's theorem, redundancy, Huffman Coding, Discrete random Variable. Gaussian random variables, Bounds on tail probabilities.

UNIT-II **7 hours**

Error Control Coding: Channel Coding: Linear Block Codes: Introduction, Matrix description, Decoding, Equivalent codes, Parity check matrix, Syndrome decoding, Perfect codes Hamming Codes ,Optimal linear codes ,.Maximum distance separable (MDS) codes.

UNIT-III **8 hours**

Cyclic Codes: Introduction, generation, Polynomials, division algorithm, Matrix description of cyclic codes, burst error correction, Fire Codes, Golay Codes, and CRC Codes. BCH Codes: Introduction, Primitive elements, Minimal polynomials, Generator Polynomials in terms of Minimal Polynomials, Decoding of BCH codes.

UNIT-IV **9 hours**

Coding for Secure Communications: Review of Cryptography, Introduction, Encryption techniques and algorithms, DES, IDEA , RC Ciphers ,RSA Algorithm ,Diffi-Hellman, PGP, Chaos Functions, Cryptanalysis, Perfect security, Unicity distance, Diffusion and confusion, McEliece Cryptosystem.

UNIT-V **9 hours**

Advance Coding Techniques: Reed-Solomon codes, space time codes, concatenated codes, turbo coding and LDPC codes (In details), Nested Codes, block (in Details), Convolutional channel. Coding: Introduction, Linear convolutional codes, Transfer function representation & distance properties, Decoding convolutional codes (Soft-decision MLSE, Hard-decision MLSE),

References:

1. Rajan Bose "Information Theory, Coding and Cryptography", TMH, 2002.
2. Kishor S. Trivedi "Probability and Statistics with Reliability, Queuing and Computer Science Applications", Wiley India, Second Edition.
3. J.C.Moreira, P.G. Farrell "Essentials of Error-Control Coding", Willey Student Edition
4. San Ling and Chaoping "Coding Theory: A first Course", Cambridge University Press, 2004.
5. G A Jones J M Jones, "Information and Coding Theory", Springer Verlag, 2004.
6. Cole, "Network Security", Bible, Wiley INDIA, Second Addition

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MCSE-202-ADVANCED COMPUTER ARCHITECTURE

MCSE- 202	**Advanced Computer Architecture**	**3L:1T:0P**	**4 Credits**	**3 Hrs/week**

Objective: The objective of this course is to make students know about the Parallelism concepts in Programming, to give the students an elaborate idea about the different memory systems and buses, to introduce the advanced processor architectures to the students, to make the students know about the importance of multiprocessor and multicomputers, to study about data flow computer architectures.

Outcome: Students will be able to:

- Demonstrate concepts of parallelism in hardware/software.
- Discuss memory organization and mapping techniques.
- Describe architectural features of advanced processors.
- Interpret performance of different pipelined processors.
- Explain data flow in arithmetic algorithms
- Development of software to solve computationally intensive problems

Total 40 hours

UNIT-I **8 hours**

Basic functional blocks of a computer: CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU - registers, instruction execution cycle, addressing modes, instruction set, Static interconnection networks, Dynamic interconnection Networks: Bus Systems, Crossbar Switch, Multiport Memory, Multistage and Combining Networks.

UNIT-II **7 hours**

Flynn's Classification, System Attributes to Performance, Parallel computer models - Multiprocessors and multicomputer, Multi-vector and SIMD Computers. Data and resource dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain size and latency, Control flow, dataflow and Demand driven mechanisms

UNIT-III **9 hours**

Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, pipeline hazards, Dynamic instruction scheduling - score boarding and Tomosulo's algorithm, Branch handling techniques, Arithmetic Pipeline Design, Static arithmetic pipeline, Multifunctional arithmetic pipelines. Superscalar pipeline design, Super pipeline processor design**.**

UNIT-IV **8 hours**

Cache coherence, Snoopy protocols, Directory based protocols. Message routing schemes in multicomputer network, deadlock and virtual channel. Vector Processing Principles, Vector instruction types, Vector-access memory schemes. Vector supercomputer Architecture.

UNIT- V **8 hours**

SIMD organization: distributed memory model and shared memory model. Principle s of Multithreading: Multithreading Issues and Solutions, Multiple-Context Processors. Parallel Programming Mode ls: - Shared-Variable Model, Message-Passing Model, Data Parallel model.

REFERENCES:

1. KaiHwang, "Advanced computer architecture", TMH.
2. Hwang and Briggs, "Computer Architecture and ParallelProcessing"; MGH.
3. V.Rajaranam&C.S.R.Murthy, "Parallel computer"; PHI Learnin
4. J.P.Hayes, "computer Architecture and organization"; MGH.

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MCSE- 203-SOFT COMPUTING

MCSE- 203	Soft Computing	3L:1T:0P	4 Credits	3 Hrs/week

Objective: The primary objective of this course is to provide an introduction to the basic principles, techniques, and applications of soft computing. Upon successful completion of the course, students will have an understanding of the basic areas of Soft Computing including Artificial Neural Networks, Fuzzy Logic and Genetic Algorithms. Provide the mathematical background for carrying out the optimization associated with neural network learning. Aim of this course is to develop some familiarity with current research problems and research methods in Soft Computing by working on a research or design project.

Outcomes: The student will be able to:

- Describe human intelligence and AI
- Explain how intelligent system works.
- Apply basics of Fuzzy logic and neural networks.
- Discuss the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience
- Relate with neural networks that can learn from available examples and generalize to form appropriate rules for inference systems
- Describe with genetic algorithms and other random search procedures useful while seeking global optimum in self-learning situations
- Develop some familiarity with current research problems and research methods in Soft Computing Techniques.

Total 40 hours

UNIT-I **7 hours**

Introduction of soft computing, soft computing vs hard computing. Soft computing techniques. Computational Intelligence and applications, problem space and searching: Graph searching, differentsearching 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 **8 hours**

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

UNIT-III **9 hours**

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 hours**

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 **6 hours**

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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MCSE-204-CLOUD COMPUTING

MCSE- 204	**Cloud Computing**	**3L:1T:0P**	**4 Credits**	**3 Hrs/week**

Objective: The key objectives of this course are for participants to be able to: Understand the concepts, characteristics, delivery models and benefits of cloud computing. Understand the key security and compliance challenges of cloud computing. Understand the key technical and organizational challenges.

Outcome: Students should be able to:

articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing and Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.

Total 40 hours

UNIT-I **7 hours**

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 hours**

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 **9 hours**

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 **9 hours**

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 **7 hours**

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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MCSE-205-ADVANCE DATA STRUCTURES AND ALGORITHMS

MCSE- 205	**Advance Data Structures and Algorithms**	**3L:1T:0P**	**4 Credits**	**3 Hrs/week**

Objective: The objective of this course is to impart the basic concepts of data structures and algorithms, to understand concepts about searching and sorting techniques, to Understand basic concepts about stacks, queues, lists, trees and graphs, to understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures.

Outcome: Students will be able to :

- Ability to analyze algorithms and algorithm correctness.
- Ability to summarize searching and sorting techniques
- Ability to describe stack, queue and linked list operation.
- Ability to have knowledge of tree and graphs concepts

Total 40 hours

UNIT-I **7 hours**

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 hours**

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 **9 hours**

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 hours**

Searching, 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 hours**

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 Structure

LAB III

(MCSE-206)

MCSE -106	**Lab-III MCSE-202, MCSE-205**	**0L:0T:6P**	**6 Credits**	**6 Hrs/week**

LIST OF EXPERIMENT

1. Write a program to insert node from a link list.
2. Write a program to delete node from a link list.
3. Write a program to infix to postfix Expression.
4. Write a program to doubly link list and to perform traverse & insertion in it.
5. Write a program to implementing stack Operation push, pop & display.
6. Write a program to find the average to two temperature name HI-TEMP and LO- TEMP and puts the result in the memory location AV-TEMP.
7. Find out the largest number from an unordered array of sixteen 8-bit numbers stored sequentially in the memory locations starting at offset 0500H in the segment 2000H
8. Move a byte string, 16 bytes long, from the offset 0200H to 0300H in the segment 7000H.
9. Write a program to add a profit factor to each element in a cost array and puts the result in a PRICES array, where profit factor is 15H and COST =20H, 28H, 15H, 26H, 19H, 27H, 16H, 29H.
10. Write a program to find out the number of positive numbers and negative numbers from a given series of signed numbers.

LAB IV

(MCSE-207)

MCSE -106	**Lab-IV (MCSE-203, MCSE-204)**	**0L:0T:6P**	**6 Credits**	**6 Hrs/week**

LIST OF EXPERIMENT

1. Setting up service for running hadoop daemons on windows 7.
2. Create and Deploy a Cloud Service.
3. Study of Eucalyptus.
4. Installation of Eucalyptus Cloud.
5. Study of Cloudsim..
6. To Study the ADALINE NET and their training algorithm.
7. To study the MADALINE NET and their training algorithm.
8. Learn pattern, target output, learning rate and activation function.
9. 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
10. To implement AND function using Mc-Culloch Pitts neuron model

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MCSE-301(A)-Data Mining and Warehousing

MCSE-301(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:

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

TOTAL: 4

UNIT I **5 Hours**

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 **8 hours**

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 **9 hours**

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 hours**

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 **10 hours**

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.

List Of 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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MCSE-301(B)-Simulation and Modeling

MCSE-301(B)	**Simulation and Modeling**	**3L:1T:0P**	**4 Credits**	**3 Hrs/ week**

Objective: The aim of this course is to introduce various system modeling and simulation techniques, and highlight their applications in different areas. It includes modeling, design, simulation, planning, verification and validation. After learning the simulation techniques, the students are expected to be able to solve real world problems which cannot be solved strictly by mathematical approaches. This course begins by demonstrating the usefulness of simulation as a tool for problem solving in business, industry, government, and society.

Outcome: Student will be able to:

- Ability to model deterministic systems and differentiate between nonlinear and linear models.
- Ability to numerically simulate linear and non-linear ordinary differential equations and deterministic systems.
- Ability to estimate and validate a model based upon input and output data.
- Ability to create a model prediction based upon new input and validate the output data.
- Ability to comprehend and apply advanced theory-based understanding of engineering fundamentals and specialist bodies of knowledge in the selected discipline area to predict the effect of engineering activities.
- Ability to apply underpinning natural, physical and engineering sciences, mathematics, statistics, computer and information sciences to engineering applications.

TOTAL: 40 HOURS

UNIT I **8 hours**

Modeling and simulation: Models types, principles used in modeling, Modeling and simulation methodology, system modeling , concept of simulation, continuous and discrete time simulation, steps in computer simulation, advantages and disadvantages of simulation, simulation study, classification of simulation languages.

UNIT II **8 hours**

Probability concepts in simulation: Basic concept of probability, discrete and continuous probability function, continuous and discrete random variables, distribution of random variables: discrete and continuous, Compartmental models: linear, nonlinear and stochastic models.

UNIT III **7 hours**

Simulation of Queueing System: Queuing system, Characteristics of queuing system, Poisson arrival patterns, birth- death system, equilibrium of queuing system, analysis of M/M/1 queues. Application of queuing theory in computer system like operating systems, computer networks etc.

UNIT IV **9 hours**

System Dynamics & Probability concepts in Simulation: Exponential growth and decay models, logistic curves ,Generalization of growth models ,System dynamics diagrams, Multi segment models, Representation of Time Delays. Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform Continuously Distributed Random Numbers, Rejection Method.

UNIT V **8 hours**

Verification and validation: Design of simulation experiments, validation of experimental models, testing and analysis. Simulation languages comparison and selection, study of Simulation sw -SIMULA, DYNAMO, STELLA, POWERSIM.

List of Books :

1. Gorden G., System simulation, Printice Hall.

2. Payer T., Introduction to system simulation, McGraw Hill.

3. Seila, Applied Simulation Modeling, Cengage

4. Spriet, Computer Aided Modeling and Simulation, W.I.A.

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MCSE-301(C)-High Performance Computing

MCSE 301(C)	High Performance Computing	3L:1T:0P	4 Credits	3 Hrs/week

Objective: This course deals with two interrelated issues in high-performance computing: 1. fundamental concepts and techniques in parallel computation structuring and design, including parallelization methodologies and paradigms, parallel programming models, their implementation, and related cost models; 2. architectures of high-performance computing systems, including shared memory multiprocessors, distributed memory multicomputers, clusters, and others.

Outcomes: The student will be able to:

- Describe the High performance Computing environments like Parallel, Distributed, Clusters, etc.
- Compare the Static as well as Dynamic Interconnection networks for Parallel Computing.
- Create new algorithms for real-life problems for any given High Performance architecture.
- Apply the algorithms using MPI/ Open MPI and Compute the efficiency of the designed algorithm.

TOTAL: 40 HOURS

UNIT-I

10 hours

Introduction to high performance computing: cluster, grid, meta-computing, middleware etc., examples of representative applications. Programming models: shared memory, message passing, peer-to- peer, broker-based. Introduction to PVM and MPI. Architecture of cluster-based systems, Issues in cluster design: performance, single-system-image, fault tolerance, manageability, programmability, load balancing, security, storage.

UNIT-II

10 hours

High performance sequential computing: Effects of the memory hierarchy, Out-of-order execution, superscalar processors, Vector processing. Shared-memory processing: Architectures (extensions of the memory hierarchy), Programming paradigms, OpenMP Distributed-memory processing: Architectural issues(networks and interconnects), Programming paradigms, MPI (+MPI2).

UNIT-III

6 hours

Grids: Computational grids, Data grids ,Architecture of Grid systems, Grid security infrastructure. Examples of Grids: Globus etc.

UNIT-IV

6 hours

Performance issues and measurement: Profiling and development tools, Sustained versus peak performance, Performance libraries and packages

UNIT-V **8 hours**

The productivity crisis & future directions: Development overheads, Petaflops programming, New parallel languages: UPC, Titanium, Co-Array FORTRAN

BOOKS:

1. Charles Severance, Kevin Dowd "High Performance Computing", Second Edition by, O'reilly, Second Edition July 1998
2. David j. Kuck "High Performance Computing" Oxford Univ Pr, 1996
3. Gary W. Sabot "High Performance Computing " Add ison-Wesley, 1995

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MCSE-302(A)-Wireless LAN and Mobile Computing

MCSE 302(A)	**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:

- Describe the basic concepts and principles in mobile computing
- Understand the concept of Wireless LANs, PAN, Mobile Networks, and Sensor Networks
- Explain the structure and components for Mobile IP and Mobility Management
- Understand positioning techniques and location-based services and applications
- Describe the important issues and concerns on security and privacy Professional Skill
- Design and implement mobile applications to realize location-aware computing
- Design algorithms for location estimations based on different positioning techniques and platforms
- Acquire the knowledge to administrate and to maintain a Wireless LAN Attitude
- Recognize the important issues and concerns on security and privacy

TOTAL: 40 HOURS

UNIT-I **9 hours**

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 **7 hours**

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 hours**

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 hours**

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 hours**

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 TM

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MCSE-302(B)-ADVANCE DISTRIBUTED SYSTEM

MCSE 302(B)	**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:

Define distributed systems. Explain why you would design a distributed system and what the desired properties of such a system are. 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. 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 **8 hours**

Introduction to distributed System: comparison of distributed and centralized systems, Characterization of Distributed Systems , Resource Sharing and the Web -Challenges ,System Models , Architectural and Fundamental Models , Networking :-- Types of Networks , Network Principles - Internet Protocols – Case Studies.

UNIT-II **7 hours**

Interposes 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 , RPC, RPC Architecture, 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: introduction, security techniques, cryptographic algorithms, authentication and access control, 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 **9 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
5. AS Tanenbaum, Maartenvan, ,Distibuted System Principles Paradigms, Pearson
6. M Singhal, Niranjan, Shivaratri, Advanced Concept in Operating System, TMH

(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	*			*				*			*	