

MTSE-101**SOFTWARE ENGINEERING PRINCIPLES**

L	T	P		Marks	Credits
4	-	-	Exam	: 100	4
			Sessional	: 50	2
			Total	: 150	6
			Duration of Exam	: 3 hrs	

Note: Eight questions of equal marks to be set taking two from each UNIT. The student is to attempt any five questions selecting at least one from each UNIT.

UNIT - I

Software Engineering: Introduction, Importance, Evaluation, Characteristics, Components, Software Application, Software Crisis Problem And Causes, Layered Technology Of Software Engineering.

UNIT –II

Software Development Process Models: Waterfall Model, Prototyping Model, Spiral Model, Rad Model, Problem Analysis, Requirement Verification, Requirement Validation, Problem Partitioning, Abstraction, Top Down And Bottom Up Approach, Cohesiveness, Coupling, Modularing.

UNIT - III

Software Project Scheduling And Designing: Software Project Management, Cost Estimation, Project Scheduling, Project Staffing, Software Configuration Management, Risk Management, Quality Assurance, Project Monitoring.

UNIT – IV

Coding And Testing: Coding, Top Down And Bottom Up Approach Of Programming, Structure Programming, Information Hiding, Programming Style, Internal documentation, Verification-Static And Dynamic Verification, Monitoring And Control Of Coding. Testing: Level Of Testing, Test Cases, Test Criteria And Test Oracle, Black Box Testing, White Box Testing, Test Process, Test Plan, Software Testing Strategies- Unit Testing, Integrating Testing, Verification & Validation, Alpha And Beta Testing, System Testing And Debugging.

Software Maintenances: Maintenances Characteristics, Maintainability, Maintenances Tasks, Maintenances Side Effects.

References: -

1. Pressman S. Roger, “Software Engineering”, Tata Mac Graw Hill.
2. Jalot Pankaj, “An Integrated Approach to S/W Engg.”Narosa Publishing House.
3. Sommerville Ian, “Software Engineering 5th Addition”, Addition Wesley 2002.
4. Fairly Richard, “Software Engineering Concepts”, Tata Mc Graw Hill.
5. Software Engg. By Nasib Singh Gill, Khanna Pub.

MTSE-102**SOFTWARE ARCHITECTURE**

L	T	P		Marks	Credits
4	-	-	Exam	: 100	4
			Sessional	: 50	2
			Total	: 150	6
			Duration of Exam	: 3 hrs	

Note: Eight questions of equal marks to be set taking two from each UNIT. The student is to attempt any five questions selecting at least one from each UNIT.

UNIT - I

Software Architecture terms: Component, Relationship, View, Architectural Styles, Frameworks, Patterns, Methodologies, Processes, Functional and Non-functional Properties of Software Architectures

UNIT - II

Enabling Techniques for Software Architecture: Abstraction, Encapsulation, Information Hiding, Modularization Separation of Concerns, Coupling and Cohesion, Sufficiency, Completeness and Primitiveness Separation of Policy and Implementation, Separation of Interface and Implementation

UNIT - III

Architectural Styles: Pipes and Filters, Data Abstraction and Object-Oriented, Event-Based, Implicit Invocation, Layered Systems, Repositories, Interpreters, Process Control, Heterogeneous Architectures

UNIT - IV

Software Implementation - development environment facilities: code generation, reverse engineering, profiling, software libraries, testing and debugging

Software Quality: Changeability, Efficiency, Interoperability, Reliability, Testability, Reusability, Fault tolerant software

References:

1. M. Shaw: Software Architecture Perspectives on an Emerging Discipline, Prentice-Hall.
2. Len Bass, Paul Clements, Rick Kazman: Software Architecture in Practice, Pearson Education Asia.

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4	-	-	Exam	: 100	4
			Sessional	: 50	2
			Total	: 150	6
			Duration of Exam	: 3 hrs	

Note: Eight questions of equal marks to be set taking two from each UNIT. The student is to attempt any five questions selecting at least one from each UNIT.

UNIT-I

Introduction: - Operating systems classification, simple monitor, multiprogramming, time-sharing, real time systems, interrupt based systems, operating systems services, system calls, system programs, systems generation.

UNIT -II

File Systems: - File support access methods, allocation methods contiguous, linked and indexed allocation, directory systems single level, tree structures, a cyclic graph and general graph directories, file protection.

UNIT -III

CPU Scheduling:- basic scheduling concepts, process overviews, process states, suspend/resume operations, multitasking and multithreading, scheduler and scheduling algorithms, multiple process scheduling.

UNIT -IV

Memory Management:- Bare machine approach , resident monitor, partition, Paging and segmentation, Virtual memory, Overlays, demand paging, performance of demand paging, Page replacement algorithm, m-thrashing.
Deadlocks: - Deadlock characterization, deadlock prevention, avoidance, detection and recovery.

References:

1. James L Peterson "Operating Systems Concept" John Wiley & Sons Inc; 6Rev Ed edition
2. Deitel H.M., "An Introduction to Operating Systems", Addison-Wesley.
3. Stallings William: "Operating Systems", PHI New Delhi – 1997.
4. Madnick and Donavon: "Operating Systems", McGraw-Hill International Editions, Computer science series, New York (1996).

MTSE-104**PROGRAMMING LANGUAGES**

L	T	P		Marks	Credits
4	-	-	Exam	: 100	4
			Sessional	: 50	2
			Total	: 150	6
			Duration of Exam	: 3 hrs	

Note: Eight questions of equal marks to be set taking two from each UNIT. The student is to attempt any five questions selecting at least one from each UNIT.

UNIT-I

Program Development: Introduction, task of program development, problem definition, program design, coding, Debugging, testing, documentation, maintenance, extension and redesign, conclusion

Flowchart: Introduction, developing and algorithm for solution, flowchart and their purpose, flowchart symbols, basic symbols, specialized input/out symbols, specialized input symbols, additional symbol, type of flowchart, system flowchart, modular program flowchart, detail program flowchart, constructing flowchart, example of flowchart, General programming consideration, error in programming,

UNIT-II

Structured Programming: Introduction, design consideration, objective and principles, program structure, structuring of control flow, modular programming, top-down approach, constrained use of go to, programming consideration, structured flowcharts,

UNIT -III

Pseudo code: Introduction, management control of system development process, the system steering committee, purpose system steering committee, structure of system steering committee, Membership, project task forces, benefit system steering committee, planning for information system, project management system, bar chart, program evaluation review techniques, summary.

UNIT -IV

System Development Process: Introduction, methodology and standard, expression of a need, preliminary investigation and feasibility study, request clarification, feasibility study, system study report, request approval, handling of infeasible project, specification of requirements, system proposal, system design, programming, system testing, implementation.

References:

1. Programming Languages design and implementation by T.W. Pratt.,PHP
2. Programming Languages by Allen B. Tucker TMH.
3. Programming Languages by Herbert G. Mayer. Macmillan Pub. Co.

MTSE-105**DATA STRUCTURES USING C**

L	T	P	Marks	Credits
4	-	-	Exam : 100	4
			Sessional : 50	2
			Total : 150	6
			Duration of Exam : 3 hrs	

Note: Eight questions of equal marks to be set taking two from each UNIT. The student is to attempt any five questions selecting at least one from each UNIT.

UNIT - I

Introduction Lexical Elements, Entering and Executing Program, I/O Operation and Expressions, Control Structures, Functions, Arrays and Strings.

Pointers, Structures and Unions, Recursion, Files, Preprocessors and Commandline Arguments.

UNIT - II

Introduction and Theoretical Concepts of Data Types, Elementary Data Structure, List, Stacks, Queues, Trees, Searching, Sorting.

UNIT - III

Introductory Practical Approach to List Data Structure, Manipulation of Linear Linked List, Circular And Doubly Linked List, Doubly Linked Circular List.

UNIT - IV

What is Algorithms, Algorithm for Breadth First Traversal, Depth First Traversal, 8-Puzzal Problem, Sorting Algorithms- (Insertion, Bubble, Merge, Radix, Quick, Heap), Searching Algorithms – (Linear, Binary).

References:

1. Data Structures and Algorithms , Aho, Hopcroft and Ullman, Pearson, 2001.
2. Data Structures and Algorithm Analysis, Allen Weiss, Pearson, 2001.
3. Fundamentals of Data Structures by Ellis Horowitz & Sartaj Sahni, Pub. 1983 AW.
4. Theory and problems of data structures by Jr Seymour Lipschetz ,Schaum's outline Series.
5. C And Data Structures , E. Balagurusamy. Tata McGraw-Hill

MTSE-106**DSA LAB**

		Marks	Credits
L	T	P	
-	-	3	
	Exam	: 50	2
	Sessional	: 50	2
	Total	: 100	4
	Duration of Exam	: 3 hrs	

The experiments will be based on the topics covered in the corresponding theory subject.

MTSE-107

OPERATING SYSTEMS & DESIGN LAB

		Marks	Credits
L	T	Exam	
-	-	: 50	2
	3	Sessional	
		: 50	2
		Total	
		: 100	4
		Duration of Exam	
		: 3 hrs	

The experiments will be based on the topics covered in the corresponding theory subject.

			Marks	Credits	
L	T	P	Exam	: 100	4
4	-	-	Sessional	: 50	2
			Total	: 150	6
			Duration of Exam	: 3 hrs	

Note: Eight questions of equal marks to be set taking two from each UNIT. The student is to attempt any five questions selecting at least one from each UNIT.

Unit - I

Introduction to Software Engineering: Software Engineering Development, Software Life Cycle Models, Standards for developing life cycle models.

Object Methodology & Requirement Elicitation: Introduction to Object Oriented Methodology, Overview of Requirements Elicitation, Requirements Model-Action & Use cases, Requirements Elicitation Activities, Managing Requirements Elicitation

Unit - II

Architecture: Model Architecture, Requirements Model, Analysis Model, Design Model, Implementation Model, Test Model

Modeling with UML: Basic Building Blocks of UML, A Conceptual Model of UML, Basic Structural Modeling, UML Diagrams

Unit -III

System Analysis: Analysis Model, Dynamic Modelling & Testing, System Design: Design concepts & activities, Design models, Block design, Testing,

Unit -IV

Testing Object Oriented Systems: Introduction, Testing Activities & Techniques, The Testing Process, Managing Testing

Case Studies

References:

1. Stephen R. Scach, "Classical & Object Oriented Software Engineering with UML and Java", McGraw Hill, 1999.

MTSE-202**ANALYSIS & DESIGN OF ALGORITHMS**

L	T	P	Exam	Marks	Credits
4	-	-	Exam	: 100	4
			Sessional	: 50	2
			Total	: 150	6
			Duration of Exam	: 3 hrs	

Note: Eight questions of equal marks to be set taking two from each UNIT. The student is to attempt any five questions selecting at least one from each UNIT.

UNIT - I

ANALYZING ALGORITHMS & PROBLEMS:Introduction to algorithms, Time, and Space Complexity, Basic elements of data structures like linked lists, stacks and queues, trees, graphs, recursion. Different types of sorting algorithms and their complexities

DYNAMIC SETS, SEARCHING AND GRAPHS:Introduction, Array, amortized time analysis, red black trees, hashing, heaps, dynamic equivalence relations and union-find programs, priority queues with decrease key operations, traversing graphs, DFS, strongly connected components, bioconnected complaints, minimum spanning tree algo., single source shortest paths, all pair shortest paths.

UNIT - II

GREEDY AND DYNAMIC METHODS:Introduction to greedy and dynamic methods, their algorithms and comparative study.

UNIT - III

BACKTRACKING AND BRANCH-AND-BOUND:General backtracking and Branch and Bound Methods, 8 queen, sum of subset, graph coloring, Hamilton cycles, 0/1 knapsack problem

UNIT - IV

NP HARD AND NP COMPLETE PROBLEMS:Basic Concepts, cooks theorem, NP - Hard graph problems, NP hard Scheduling

References:

1. Computer Algorithms: Introduction to Design and Analysis (3rd Edition) by Sara Baase and Allen Van Gelder, Pearson, 2000
2. Fundamentals of Algorithmics by Gilles Brassard and Paul Bratley
3. Design and Analysis of Algorithms (Computer Science Series) by Jeffrey D. Smith
4. Fundamental of Computer algorithms, Ellis Horowitz and Sartaj Sahni, 1978, Galgotia Publ.
5. Algorithm Design (Pie) by Eva Tardos and Jon Kleinberg, Person
6. Introduction To Algorithms, Thomas H Cormen, Charles E Leiserson And Ronald Lrivest: 1990, TMH

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Note: Eight questions of equal marks to be set taking two from each UNIT. The student is to attempt any five questions selecting at least one from each UNIT.

UNIT – I

Introduction to Data Communications and Networking: Introduction; Fundamental Concepts; Data communications; Protocols; Standards; Standards Organizations; Signal Propagation; Analog and Digital Signals; Bandwidth of a signal and a medium; The data transmission rate and the bandwidth.

Modes of Data Transmission and Multiplexing : Introduction; Parallel And Serial Communication, Asynchronous, Synchronous And Isochronous Communication; Simplex,, Half-Duplex Communication, Multiplexing; Types of Multiplexing; FDM Versus TDM.

UNIT – II

Network Topologies, Switching and Routing Algorithms: Introduction; mesh Topology; Star Topology; Tree Topology; Ring Topology; Bus Topology; Hybrid Topology; Switching Basics; Circuit Switching; Packet Switching; Message Switching; Router and Routing; Factors Affecting Routing Algorithms; Routing Algorithms; Approaches to Routing.

UNIT – IV

Transmission Errors: Detection and Correction: Introduction; Error Classification; Type of Error; Error Detection; Error control; Flow Control; Parity check, Longitudinal redundancy check, cyclic redundancy check, recovery from errors, CSMA.

UNIT - IV

Networking Protocols and OSI Model: Introduction; Protocols in Computer Communications; OSI Model; OSI Layer Functions; Local Area Networks; Metropolitan Area Network; Wide Area Network.

References:

1. Data & Computer Communications: W. Stallings., Pearson Education
2. TCP/IP Principles, Protocols& Architecture: Douglas E. Comer., Pearson Education
3. Mobile Communications: Jochen H. Schiller, Pearson Education.
4. Computer Network by Andrew S. Tanenbaum, PHI, 4th Edition
5. Data Communication and Networking by Forouzoun Behrouz A. Fegansophia.

MTSE-204**KEY TOPICS IN SOFTWARE ENGINEERING**

L	T	P		Marks	Credits
4	-	-	Exam	: 100	4
			Sessional	: 50	2
			Total	: 150	6
			Duration of Exam	: 3 hrs	

Note: Eight questions of equal marks to be set taking two from each UNIT. The student is to attempt any five questions selecting at least one from each UNIT.

UNIT- I

Formal Methods: Basic concepts, mathematical preliminaries, Applying mathematical notations for formal specification, formal specification languages, using Z to represent an example software component, the ten commandments of formal methods, formal methods- the road ahead.

Cleanroom Software Engineering: The cleanroom approach, functional specification, cleanroom design, cleanroom testing.

UNIT -II

Component-Based Software Engineering: Engineering of component-based systems, the CBSE process, domain engineering, component-based development, classifying and retrieving components, economics of CBSE.

Client/Server Software Engineering: The structure of client/server systems, software engineering for c/s systems, analysis modeling issues, design for c/s systems, testing issues.

UNIT - III

Web Engineering: The attributes of web-based applications, the Web-E process, a framework for Web-E, formulating/analyzing web-based systems, design for web-based applications, testing web-based applications, management issues.

Reengineering: Business process reengineering, software reengineering, reverse reengineering, restructuring, forward reengineering, the economics of reengineering.

UNIT - IV

Computer-Aided Software Engineering: Introduction, building blocks for CASE, taxonomy of CASE tools, integrated CASE environments, integration architecture, CASE repository.

References:

1. Roger S. Pressman, Software Engineering a Practitioner's Approach, McGraw-Hill, New York.
2. J.Bowan, Formal Specification and Documentation using Z: A Case Study Approach, International Thomson Computer Press, New York.
3. Antoni Diller, Z: An Introduction to Formal Methods (second edition), Wiley, New York.
4. M. Dyer, The Cleanroom Approach to Quality Software Development, Wiley, New York.
5. Prowell et al., Cleanroom Software Engineering: Technology and Process, Addison-Wesley, , Massachusetts.
6. Allen, Frost, Yourdon, Component-Based Development for Enterprise Systems :

- Applying the Select Perspectives, Cambridge University Press, England.
7. Zantinge and Adriaans, Managing Client/Server, Addison-Wesley, Massachusetts.

MTSE-205**ADVANCED DATA BASE MANAGEMENT SYSTEM**

L	T	P		Marks	Credits
4	-	-	Exam	: 100	4
			Sessional	: 50	2
			Total	: 150	6
			Duration of Exam	: 3 hrs	

Note: Eight questions of equal marks to be set taking two from each UNIT. The student is to attempt any five questions selecting at least one from each UNIT.

UNIT – I

Introduction: - Traditional Approach To Information Processing, Data Base Concepts And Its Approach To Data Processing, Feature Of DBMS, Software, Users, Why Database?, What Is DBMS, Elements Of DBMS: Data Definition Language (DDL), Data Manipulation Language (DML), Data Query Language (DQL), How Does A DBMS Works.

UNIT – II

Introduction To Data Base Model, Relational Data Base Models, Hierarchical Data Base, Network Data Base, Data Base Design, Applications, Problems In DBMS Environment, Selecting Database Software, Basic Of Relational Data Base Management.

Relational Algebra (Union, Intersection, Difference, Cartesian Product, Select, Project, Join, Divide), Entity – Relationship Model- Components (Entities, Attributes, Relationship, Cardinality, Weak Entities, Recursive Entities).

UNIT – III

Normalization, The Need For The Normalization, Conversion To Ist, IInd And IIIrd Normal Form, File Access Method- Sequential File, Direct Access File, Role of DBMS, Why Relational Database, Structure of RDBMS, Next Generation Data Base System, Knowledge Based System, Computer Facilities, Features of Distributed Vs Centralized Data Base, Role of DBA.

UNIT –IV

Data Classification: Importance of Data, Private Organizations Versus Military Classifications; Threats And Risks: Confidentiality, Authentication, Integrity, Non-Repudiation; Cryptography: Type Of Cryptography, Symmetric Key Cryptography, Asymmetric Key Cryptography; Digital Signature;

References:

1. An Introduction to Database Systems by Bipin Desai, Galgotia Pub.
2. An Introduction to Database Management Systems by C.J.Date, Pearson Education, 7th edition
3. Database System Concepts by Silberschatz Abraham Korth, TMH, 4th edition

MTSE-206**KEY TOPICS IN SOFTWARE ENGINEERING LAB**

		Marks	Credits
L	T	Exam	
-	-	: 50	2
	3	Sessional	
		: 50	2
		Total	
		: 100	4
		Duration of Exam	
		: 3 hrs	

The experiments will be based on the topics covered in the corresponding theory subject.

MTSE-207

ADVANCED DBMS LAB

		Marks	Credits
L	T	Exam	
-	-	: 50	2
	3	Sessional	
		: 50	2
		Total	
		: 100	4
		Duration of Exam	
		: 3 hrs	

The experiments will be based on the topics covered in the corresponding theory subject.