

Tibrewala **INSTITUTE OF ENGINEERING**

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DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

TEACHING AND EXAMINATION SCHEME

AND DETAILED SYLLABUS FOR

M. TECH. (SOFTWARE ENGINEERING)

EFFECTIVE FROM ACADEMIC SESSION 2012 – 2013



INSTITUTE OF ENGINEERING DEPARTMENT OF COMPUTER SCIENCE ENGINEERING TEACHING AND EXAMINATION SCHEME AND DETAILED SYLLABUS FOR M. TECH. (SOFTWARE ENGINEERING) EFFECTIVE FROM ACADEMIC SESSION 2012 – 2013

YEAR: I

SEMESTER: I

S.	Subject	Subject Name	Н	rs./We	ek		Maximum & Minimum Marks			
No.	Code	Subject Name	L]	Т	Р	Exam Hrs.	Internal/ Min. Pass	External/ Min. Pass	Total/Min. Pass Marks	
Theo	ry						Marks	Winimum Marks External/ Min. Pass Marks Total/Min. Pass Marks 70/28 100/40 70/28 100/40 70/28 100/40 70/28 100/40 70/28 100/40 60/24 100/40 60/24 100/40		
1	MSE-101	Software Engineering Design Methodology	3	1	-	3	30/12	70/28	100/40	
2	MSE-102	Software Architecture	3	1	-	3	30/12	70/28	100/40	
3	MSE-103	Advanced Database Management Systems	3	1		3	30/12	70/28	100/40	
		Elective – I		-	11	Dr.				
	MSE-104	Distributed Operating System				,	42			
4	MSE-105	Advanced Data Structures	3	1	-	3	30/12	70/28	100/40	
	MSE-106	Client Server Based IT Solutions						1		
Pract	ical's			ſ				51		
5	MSE-151	Software Engineering Design Methodology Lab	-(-	3	3	40/16	60/24	100/40	
6	MSE-152	ADBMS Lab	-	-	3	3	40/16	60/24	<u>100/4</u> 0	
	-1	Total	12	A4	6		1	C I	600	
	P	Total Teaching Load	22		9	-1		5		



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YEAR: I

SEMESTER: I

MSE 101 SOFTWARE ENGINEERING DESIGN METHODOLOGY (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.					
Ι	 Principles and Motivations Definitions and need for engineered approach to software development; Software development process models from the points of view of technical development and project management: waterfall, rapid prototyping, incremental development, spiral mode emphasis on computer-assisted environments. 						
II	Introduction to Modeling Tools Basics of object-oriented approach, object-oriented programming and languages, OMT, visual modeling, UML, Rational Rose Tool						
III	Object Modeling and Design Classes, objects, relationships, key abstractions, common mechanisms, diagrams, class diagrams, advanced classes, advanced relationships, interfaces, types, roles, packages, instances, object diagrams, interactions, use cases, use case diagrams, interaction diagrams, activity diagrams, events and signals, state machines, processes, threads, state chart diagrams, components, deployment, collaborations, patterns and frameworks, component diagrams, systems and models, code generation and reverse engineering.	8					
IV	Software Development Methods Formal, semi-formal and informal methods; Requirements elicitation, requirements specification; Data, function, and event-based modeling; Some of the popular methodologies such as Yourdon's SAD, SSADM etc; CASE tools-classification, features, strengths and weaknesses; ICASE; CASE standards.	8					
v	Software Project Management Principles of software projects management; Organizational and team structure; Project planning; Project initiation and Project termination; Technical, quality, and management plans; Project control; Cost estimation methods - Function points and COCOMO.	7					
	Total	36					

Reference Books:

1. Roger Pressman; Software Engineering - A Practitioner's Approach, McGraw Hill, New York.

- 2. Ian Sommerville; Software Engineering, Addison-Wesley Publishing Company, England
- 3. Pankaj Jalote; An integrated Approach to Software Engineering, Narosa Publishing House, New Delhi.

4. Grady Booch, James Rumbaugh, Ivar Jacobson, The Unified Modeling Language User Guide, Pearson Education, New York.

5. James Rumbaugh, Ivar Jacobson, Grady Booch: The Unified Modeling Language Reference Manual, Addison-Wesley, New YorkGrady Booch, Object-Oriented Analysis and Design, Pearson Education, New York.

6. Terry Quatrani, Visual Modeling with Rational Rose 2000 and UML, Addison- Wesley, New York.

7. G. Schneider, Applying Use Cases: A Practical Guide: Addison-Wesley Object Technology Series, Addison-Wesley, New York.



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YEAR: I

SEMESTER: I

MSE 102 SOFTWARE ARCHITECTURE

(L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
Ι	Software Architecture terms Component, Relationship, View, Architectural Styles, Frameworks, Patterns, Methodologies, Processes, Functional and Non-functional Properties of Software Architectures	7
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	8
ш	Architectural Styles Pipes and Filters, Data Abstraction and Object-Orientation, Event-Based, Implicit Invocation, Layered Systems, Repositories, Interpreters, Process Control, Heterogeneous Architectures	7
IV	Software Implementation - development environment facilities Code generation, reverse engineering, profiling, software libraries, testing and debugging	7
V	Software Quality Changeability, Efficiency, Interoperability, Reliability, Testability, Reusability, Fault tolerant software	7
	Total	36

Reference Books:

DC

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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YEAR: I

SEMESTER: I

MSE 103 ADVANCED DATABASE MANAGEMENT SYSTEMS (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
Ι	Overview of DBMS, concurrency control, failure recovery. Introduction to distributed data base management systems, Semantic Database Models and Systems.	7
II	Object-Oriented Database Systems, Relational Extensions: Design. Techniques, Extension Techniques Object / Relational Systems.	7
III	Open ODB, Transaction Management, Interface, OSQL, Odapter, Case Study of an ORDBMS, Related Development, Current Product Scenario.	7
IV	SQL, User Defined ADT in SQL, Routines, ADT Subtypes and Inheritance, Tables, Procedural Facilities, Other Type Constructions.	8
v	Standard For OODBMS Products and Applications: ODM – Standards, ODMG, Smalltalk Binding, Generic ADT Packages, Language Bindings.	6
	Total	35

- 1 C S R Prabhu,"Object Oriented Data Base Systems" approaches and Architectures, PHI,
- 2. F. H. Lochousky, DC Tsichritzis"DBMS" NewYork Academic Press.
- 3. F. H. Lochousky, DC Tsichritzis"Data Models" PHI.
- 4. C.J.DATE "Introduction to Data Base to Management System" Addison Wesley.
- 5. N. Goodman, V. Hadzilacos "Concurrency Control and Recovery in Data Base System" Addison Wesley.



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YEAR: I

SEMESTER: I

MSE 104 DISTRIBUTED OPERATING SYSTEM

(L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.			
Ι	Introduction: Hardware, Operating systems, distributed operating systems, Network operating systems, Middleware, Client-server model. Communication: Inter-process communication, Protocols, Remote procedure call, Remote object invocation, Message-oriented communication, Stream-oriented communication.	7			
Π	Synchronization: Semaphores, Monitors, Deadlock, Clock synchronization, Logical clocks, Election Algorithms, Mutual Exclusion, Distributed Transactions. File system management	8			
ш	Processes: Scheduling algorithms, Threads, Clients, Servers, Code migration, Software agents. Memory management and virtual memory.				
IV	Naming: DNS, X.500, Locating mobile entities, Garbage collection. Consistency and Replication: Data- and Client centric models, Distribution and Consistency protocols. Fault tolerance: Reliable client-server and group communication, Distributed commit, Recovery.	8			
V	Security: Data integrity, message authentication, message replay, message confidentiality, public-key algorithms, digital signatures, key management.	7			
	Total	<mark>37</mark>			

Reference Books:

1. Andrew S.Tanenbaum: Distributed Operating System, Prentice Hall International Inc.1995.

2. Andrew S. Tanenbaum and Maarten van Steen, Distributed Systems: Principles and Paradigms, 2nd edition, Pearson Prentice Hall, Upper Saddle River, NJ, 2007.

3. G. Coulouris, J. Dollimore, and T. Kindberg, Distributed Systems: Concepts and Design, 2nd edition, Addison-Wesley Publishing Company, Menlo Park, CA, 1994.

4. M. Lister and R. D. Eager, Fundamentals of Operating Systems, Fifth Edition, Springer Verlag, New York, NY, 1993.



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YEAR: I

SEMESTER: I

MSE 105 ADVANCED DATA STRUCTURES

(L, T, P) = 4 (3+1+0)

Unit	Contents of Course					
T	I Advanced data structures:					
-	self-adjustment, persistence and multidimensional trees.	•				
тт	Randomized algorithms:	7				
11	Use of probabilistic inequalities in analysis & applications.	/				
	Geometric algorithms:					
III	Point location, convex hulls and Voronoi diagrams. Arrangements, Graph algorithms:					
	Matching and Flows.					
TX 7	Approximation algorithms:	7				
IV	Use of Linear programming and primal dual, local search heuristics.	/				
	Parallel algorithms:					
\mathbf{V}	Basic techniques for sorting, searching, merging, list ranking in PRAMs and	7				
	Interconnection networks.					
	Total	35				

- 1. Motwani and Raghavan "Randomized Algorithms", Cambridge University Press
- 2. Preparata and Shamos "Computational Geometry", Springer Verlag
- 3. Mehlhorn "Data Structures and Algorithms: 1, Searching and Sorting", Springer Verlag EATCP Monograph on Theoretical Computer Science
- 4. Papadimitrou and Steiglitz "Combinatorial Optimization", Princeton University Press
- 5. Joseph Ja'Ja' "Introduction to Parallel Algorithms" Addison-Wesley.
- 6. Vaizirani "Approximation Algorithms", Springer



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YEAR: I

SEMESTER: I

MSE 106 CLIENT SERVER BASED IT SOLUTIONS

(L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
Ι	Client Server Computing Concept of Client-Server Technology, Client-Server Technology and Heterogeneous Computing, Costs and Benefits of Client Server Computing, Implementation and Scalability.	7
II	Client Server Model and Software Design Client-Server Model, Motivation, Terminology and Concepts, Applications, Concurrency in Network, Concurrency in Clients, Concurrency in Servers, Context Switching and Protocol Software Design, Advantages of concurrency.	7
III	Architecture and Design of Client Server Model Multitasking with Processes and Threads, Scheduling, Synchronization, Memory, Communications.	7
IV	Algorithms in Client/Server Software Design TCP Client algorithms, Socket Interface, Programming a UDP Client; The Conceptual Server algorithm, Basic Types of Servers and their comparisons, Interactive Server algorithms, Concurrent Server algorithms, Problem of Server Deadlock.	7
v	Portable Client/Server Applications Architecting Portable Application Code, Architecting Platform-Independent Source- Code, Operating System/Communications/File System independent modules, Client Server Applications Architecting using Frameworks.	7
	Total	35

Reference Books:

1. Douglas E. Comer, David L; Stevens, Internetworking with TCP/IP: Client-Server Programming and Applications : Vol III, Prentice Hall of India, New Delhi.

2. Jaffrey D. Schqnk; Client Server Applications and architecture, BPB Novell Press, New Delhi

3. Douglas J. Reilly; Client/Server Developers Guide, Addision Wesley Developer'sPress, Masschachusetts



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YEAR: I

SEMESTER: I

MSE 151 SOFTWARE ENGINEERING DESIGN METHODOLOGY LAB (L, T, P) = 4 (3+1+0)

S. No.	Contents of Course	Hrs.
	The experiments will be based on the topics covered in the corresponding theory Course.	8

YEAR: I

MSE 152

ADBMS LAB ADDAT TIL SEMESTER: I (L, T, P) = 4 (3+1+0)

S. No.	Contents of Course	Hrs.
	The experiments will be based on the topics covered in the corresponding theory Course.	8





INSTITUTE OF ENGINEERING DEPARTMENT OF COMPUTER SCIENCE ENGINEERING TEACHING AND EXAMINATION SCHEME AND DETAILED SYLLABUS FOR M. TECH. (SOFTWARE ENGINEERING) EFFECTIVE FROM ACADEMIC SESSION 2012 – 2013

YEAR: I

SEMESTER: II

S.	Subject	Subject Name	Subject Nome		ek		Maximum & Minimum Marks							
No.	Code	Subject Name	т	T	р	Exam Hrs.	Internal/	External/	Total/Min.					
Theo	ry		L	1	L P Min. Pass Min. Pass Marks Marks Marks		Pass Marks							
1	MSE-107	Security Analysis of software	3	1	-	3	30/12	70/28	100/40					
2	MSE-108	Software Reliability	3	1	-	3	30/12	70/28	100/40					
3	MSE-109	Software Quality Assurance & Certification	3	1	731	3	30/12	70/28	100/40					
		Elective – I		4	11									
	MSE-110	Cryptography & Network Security					42							
4	MSE-111	Object Oriented Software Engineering	3	1	1	1	1	1	1	-	3	30/12	70/28	100/40
	MSE-112	Software Testing						1						
Pract	ical's			T				15						
5	MSE-153	Advanced Java Programming Lab	-(-	3	3	40/16	60/24	100/40					
6	MSE-154	Software Testing Lab	-		3	3	40/16	60/24 <	100/4 <mark>0</mark>					
		Total	12	24	6		1	S I	600					
	P	Total Teaching Load	22		Ч	-1		9						



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YEAR: I

SEMESTER: II

MSE 107 SECURITY ANALYSIS OF SOFTWARE

(L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
Ι	Overview of Computer Security: Threats, risks, vulnerabilities, safeguards, attacks, exploits, Information states, Security at the various states of information- processing, storage and transmission; Definition of security based on current state and reachable states, Comprehensive model of security, Confidentiality, integrity and availability, Risk management, corrective action, risk assessment and physical security.	7
П	Access Control: Access control matrix, Access control lists, Capabilities, Role-based access, control and Application dependence. Security Policies :Types of policies, Role of trust, Information states and procedures, Types of access control, Separation of duties, Application dependence, Importance for automated information systems (AIS) and Security planning Confidentiality Policies - Goals and definitions, Bell-LaPadula model and Multi-level security. Integrity Policies - Goals and definitions, Information states and procedures, Operating system integrity, Biba model and Clark-Wilson model Hybrid Policies - Chinese Wall model and Role-Based Access Control.	6
ш	 Authentication :Passwords, Challenge-response, Biometrics, Location, Combinations and Application to access control/authorization Malicious Logic: Trojan horses, Computer viruses, Computer worms, Logic bombs, Defenses and countermeasures Auditing :Auditing mechanisms, Auditing system design, Privacy issues, Trails and logs, Access control issues, Application dependence. 	8
IV	Intrusion Detection :Principles, Models, Architecture, Organization and Intrusion response Network Security : Policy development, Network organization, Firewalls, Availability, Access control issues, Attacks anticipation, Traffic analysis, Public vs private	8
V	Administrative policies: Purposes, Back-up policies, E-mail security and privacy policies, Wireless policies, FAX security policies, Internet security policies, Incident response policies, Testing and validation policies, Application development control, Facilities management, Copyright management, Licensing management, Biometrics access management, Software piracy, Law enforcement issues, assisting investigations, Media destruction/ sanitization/ protection, Security planning, Resources misuse or abuse, Documentation and auditing, Review of controls, Policies installment process, Managers endorsement, user obligations, System test and evaluation, Communication with users, Communication with vendors, Software installation and patches.	7
	Total	36

- 1. Matt Bishop, "Introduction to Computer Security", by Addison Wesley, 2005.
- 2. Viega, John, Gary McGraw, *Building Secure Software: How to Avoid Security Problems the Right Way*, Addison-Wesley, Boston, 2002.
- 3. Oaks, Scott, Java Security, Second edition, O'Reilly & Associates, Inc., Sebastopol, CA, 2001



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YEAR: I

SEMESTER: II

MSE 108 SOFTWARE RELIABILITY

(L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
Ι	Software Reliability Basic Ideas of Software Reliability, Computation of software reliability, Classes of software reliability Models.	7
II	Time Dependent Software Reliability Models Time between failure reliability Models, Fault Counting Reliability Models	6
III	Time Independent Software Reliability Models Fault injection model of Software Reliability, Input Domain Reliability Model.	8
IV	Orthogonal defect classification, Software availability Models.	8
V	Software Reliability Modeling A general procedure for reliability modeling	7
	Total	36

- 1. Hoang Pham, Software Reliability, Springer Verlag, New York.
- 2. Jhon D. Musa, Software Reliability Engineered Testing, Mc. Graw Hill , New York.
- 3. Doron Reled, Software Reliability Methods, Springer Verlag, New York
- 4. R. Ramakumar, Reliability Engineering: Fundamentals and Applications, Prentice Hall, New Delhi.



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YEAR: I

SEMESTER: II

MSE 109 SOFTWARE QUALITY ASSURANCE & CERTIFICATION (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
Ι	Concepts and Overview: Concepts of Software Quality, Quality Attributes, Software Quality Control and Software Quality Assurance, Evolution of SQA, Major SQA activities, Major SQA issues, Zero defect Software. Software Quality Assurance: The Philosophy of Assurance, The Meaning of Quality, The Relationship of Assurance to the Software Life-Cycle, SQA Techniques.	7
II	Tailoring the Software Quality Assurance Program: Reviews, Walkthrough, Inspection, and Configuration Audits. Evaluation: Software Requirements, Preliminary design, Detailed design, Coding and Unit Test, Integration and Testing, System Testing, types of Evaluations.	6
ш	Configuration Management: Maintaining Product Integrity, Change Management, Version Control, Metrics, and Configuration Management Planning. Error Reporting: Identification of Defect, Analysis of Defect, Correction of Defect, Implementation of Correction, Regression Testing, Categorization of Defect, Relationship of Development Phases.	8
IV	Trend Analysis: Error Quality, Error Frequency, Program Unit Complexity, Compilation Frequency. Corrective Action as to Cause: Identifying the Requirement for Corrective Action, Determining the Action to be Taken, Implementing the Correcting the corrective Action, Periodic Review of Actions Taken	8
V	Traceability, Records, Software Quality Program Planning, Social Factors: Accuracy, Authority, Benefit, Communication, Consistency, and Retaliation.	7
	Total	36

- 1. Robert Dunn, "Software Quality Concepts and Plans", Prentice-Hall, 1990.
- 2. Alan Gillies, "Software Quality, Theory and Management", Chapman and Hall, 1992.
- 3. Michael Dyer, "The Cleanroom approach to Quality Software Engineering", Wiley & Sons, 1992.
- 4. Daniel Freedman, Gerald Weinberg, "Handbook of Walkthroughts, Inspections and Technical Reviews", Dorset House Publishing, 1990
- 5. Tom Gilb, "Principles of Software Engineering Management", Addison-Wesley, 1988.
- 6. Tom Gilb, Dorothy Graham, "Software Inspection" Addison-Wesley, 1993.
- 7. Watts Humphrey, "Managing the Software Process", Addison-Wesley, 1990.
- 8. Watts Humphrey, "A Discipline for Software Engineering", Addison-Wesley, 1995.
- 9. Arthur Lowell, "Improving Software Quality An Insiders guide to TQM", 1993, Wiley & Sons.



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YEAR: I

SEMESTER: II

MSE 110 CRYPTOGRAPHY & NETWORK SECURITY

(L, T, P) = 4 (3+1+0)

Unit	Contents of Course					
Ι	Multi-level model of security, Cryptography, Secret Key Cryptography, Modes of Operation, Hashes and Message Digest, Public Key Algorithm, Security Handshake Pitfall, Strong Password Protocol; Case study of real time communication security.	7				
II	Introduction to the Concepts of Security, Security Approaches, Principles of security, Types of attacks; Cryptographic Techniques: Plain text and Cipher text, Substitution Techniques, Transposition Techniques Encryption and Decryption, Symmetric and Asymmetric Key Cryptography.	8				
III	Computer-based symmetric Key Cryptographic; Algorithms: Algorithm Types and Modes, An Overview of Symmetric Key Cryptography, Data Encryption Standard (DES), International Data Encryption Algorithm (IDEA), Advanced Encryption Standard (AES); Computer-based Asymmetric Key Cryptographic Algorithms; Cryptography, An Overview of Asymmetric Key Cryptography, The RSA algorithm, Symmetric and Asymmetric Key Cryptography Together, Digital Signatures, Knapsack Algorithm.	7				
IV	Public Key Infrastructure (PKI) Digital Certificates, Private Key Management, The PKI Model, Public Key Cryptography Standards (PKCS); Internet Security Protocols Secure Socket Layer (SSL), Secure Hyper Text Transfer Protocol (SHTTP), Time Stamping Protocol (TSP), Secure Electronic Transaction (SET), SSL versus SET, 3-D Secure Protocol, Electronic Money, Email Security; User Authentication Mechanisms: Authentication Basics, Passwords, Authentication Tokens, Certificate-based Authentication.	8				
v	Practical Implementations of Cryptography/Security: Cryptographic Solutions Using Java, Cryptographic Solutions Using Microsoft, Cryptographic Toolkits, Security and Operating Systems; Network Security: Brief Introduction to TCP/IP, Firewalls, IP Security, Virtual Private Networks (VPN); Case Studies on Cryptography and Security	7				
	Total	37				

- 1. Atul Kahate "Cryptography and Network Security" Tata McGraw-Hill
- 2. Charlie Kaufman, Radia Perlman, Mike Speciner" Network Securities" Pearson,
- 3. J. A. Coopeer "Computer Communication Securities"TMH,
- 4. D.W. Davies W. L. Price "securities For computer Networks"
- 5. John Wiley Sons, L.Stein "Web Securities A step by step Guide " Addison Wesley.



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YEAR: I

SEMESTER: II

MSE 111 OBJECT ORIENTED SOFTWARE ENGINEERING

(L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.						
Ι	Introduction to Software Engineering: Software Engineering Development, Software Life Cycle Models, Standards for eveloping life cycle models. Object Methodology & Requirement Eligitation: Introduction to Object Oriented Methodology							
II	Requirement Elicitation: Introduction to Object Oriented Methodology. Overview of Requirements Elicitation, Requirements Model-Action & Use cases, Requirements Elicitation Activities, Managing equirements Elicitation.							
III	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.							
IV	System Analysis: Analysis Model, Dynamic Modelling & Testing, System Design: Design concepts & activities, Design models, Block design, Testing.	8						
V	Testing Object Oriented Systems: Introduction, Testing Activities & Techniques, The Testing Process, Managing Testing. Case Studies.	7						
	Total	<mark>3</mark> 6						

Reference Books:

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

McGraw Hill, 1999.



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YEAR: I

SEMESTER: II

MSE 112 SOFTWARE TESTING

(L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
Ι	Introduction Need for software testing, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, No absolute proof of correctness, Overview of Graph Theory.	7
Π	Functional Testing Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.	6
III	Structural Testing Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing. Reducing the number of test cases Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, Slice based testing.	8
IV	Testing Activities Unit Testing, Levels of Testing, Integration Testing, System Testing, Debugging, Domain Testing.	8
V	Object Oriented Testing Issues in Object Oriented Testing, Class Testing, GUI Testing, Object Oriented Integration and System Testing. Testing Tools Static Testing Tools, Dynamic Testing Tools, Characteristics of Modern Tools.	7
	Total	36

- 1. William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York, 1995.
- 2. Cem Kaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Second Edition, Van Nostrand Reinhold, New York, 1993.
- 3. Boris Beizer, "Software Testing Techniques", Second Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.
- 4. Louise Tamres, "Software Testing", Pearson Education Asia, 2002.
- 5. Roger S. Pressman, "Software Engineering A Practitioner's Approach", Fifth Edition, McGraw-Hill International Edition, New Delhi, 2001.
- Boris Beizer, "Black-Box Testing Techniques for Functional Testing of Software and Systems", John Wiley & Sons Inc., New York, 1995.
- 7. Marc Roper, "Software Testing", McGraw-Hill Book Co., London, 1994.
- 8. Gordon Schulmeyer, "Zero Defect Software", McGraw-Hill, New York, 1990.
- 9. Watts Humphrey, "Managing the Software Process", Addison Wesley Pub. Co. Inc., Massachusetts,
- 10. Glenford Myers, "The Art of Software Testing", John Wiley & Sons Inc., New York, 1979.



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YEAR: I

SEMESTER: I

MSE 153 ADVANCED JAVA PROGRAMMING LAB (L, T, P) = 4 (3+1+0)

S. No.	Contents of Course	Hrs.
	The experiments will be based on the topics covered in the corresponding theory Course.	8

YEAR: I

SEMESTER: I

(L, T, P) = 4 (3+1+0)

MSE 154 SOFTWARE TESTING LAB

S. No.	Contents of Course	Hrs.
	The experiments will be based on the topics covered in the corresponding theory Course.	8

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Year: II

Semester: III

S.	Subject	Subject Name	Н	Hrs./Week			Maxim	ım & Minimu	m Marks
No.	Code		L	Т	Р	Exam Hrs.	Internal/ Min. Pass	External/ Min. Pass	Total/Min. Pass Marks
		Theory					Marks	Marks	
1	MSE-201	Unified Software Configuration Management	3	1	-	3	30/12	70/28	100/40
		Elective – III							
	MSE-202	E-Business							
2	MSE-203	Computer Graphics & Image Processing	3	1		3 5 7	30/12	70/28	100/40
	MSE-204	Distributed Network Communication		-	11				
		Practical's				,	47		
3	MSE-251	ASP.NET Lab	<u> </u>	-	3	3	40/16	60/24	100/40
4	MSE-252	Seminar	1	-	1	-	4 <mark>0/16</mark>	60/24	100/40
5	MSE-253	Dissertation Part-I	-	- [2	-	40/16	60/24	100/40
	9	Total	7	2	6			11	50 0
	h	Total Teaching Load	15					~	
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YEAR: II

SEMESTER: III

MSE 201 UNIFIED SOFTWARE CONFIGURATION MANAGEMENT(L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.		
Ι	Software Configuration Management SCM best practices, SCM tools and process, Dyeing with changing project requirements. Overview of the Unified Change Management Model UCM, ClearCase, UCM process overview, defining the Implementation Model, The UCM baseline and Change Model.			
II	Functional Overview of ObjectsThe Repository, Versioned Object Base, Workspaces, Component Management,Process, Building, Clearmake, Derived Objects, Configuration recordsEstablishing the Initial SCM Environment ClearCase Architecture Basics, Defining the Implementation Model, Creating the VOBs, Baseline promotion levels Project Management in ClearCase.	6		
ш	Coordinating Multiple Project Teams and Other Scenarios Organizing large Multi project development efforts, Coordinating cooperating projects, Independent components, Shared components, Multiple Parallel release, Using UCM without Activity-based SCM.	8		
IV	Development Using the UCM Model A Developer's perspective of UCM, joining a project, making changes, delivering changes to the project, Rebasing your development stream, Dealing with conflicting changes.	8		
V	Integration, Build and Release Software Integration, Isolation and integration, Building and Baselining, Staging and Release	7		
	Total	<mark>36</mark>		

- Brian A. White, Software Configuration Management Strategies and Rational Clear Case Addison Wesley, New York.
- Roger S. Pressman, Software Engineering a Practitioner's Approach, McGraw-Hill, New York.
- 3. James Rumbaugh, Ivar Jacobson and Grady Booch, The Unified Modeling
- 4. Language Reference Manual, Addison Wesley, New York.



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YEAR: II

SEMESTER: III

MSE 202 E-BUSINESS

(L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	Overview of e-Business: Linking today's Business with tomorrow's technology, e-Business means structural transformation, business design for e-Business, challenge traditional definitions of value, value in terms of customer experience, e-Business communities, major business trends. Constructing e-Business Design: Self-diagnosis as a first step of e-Business design, Reversing the value chain as a second step of e-Business design, Choosing a narrow focus as a third step of e-Business design – <i>service excellence</i> , <i>operational excellence, continuous innovation excellence</i> ; Case studies.	7
п	Constructing e-Business Architecture : Issues of application integration, Cross-functional integrated applications, Integrating applications clusters into an e-Business architecture, Aligning the e-Business design with application integration. Customer Relation Management (CRM): Why CRM?, Defining CRM, New CRM architecture, Supporting requirements of the next-generation CRM infrastructure, Challenges in CRM implementation, Nextgeneration CRM trends, Manager's roadmap for building a CRM infrastructure.	6
III	Selling-Chain Management: Deriving forces for Selling-Chain management, Managing the order acquisition process, Case study of CISCO's Selling-Chain management, Elements of Selling-Chain infrastructure. Enterprise Resource Planning (ERP): What is ERP?, Why ERP?, Enterprise architecture planning, ERP usage in the real World, ERP implementation, Future of ERP applications. Supply Chain Management (SCM): Defining SCM, Basics of Internet-Enabled SCM, e-upply chain fusion, Manager's roadmap for SCM.	8
IV	e-Procurement: Purchasing versus procurement, Operating resource procurement, Case study of open resource procurement at Microsoft, e-Procurement chain management, Next generation integrated procurement applications, Elements of Buy-Side e-Procurement solutions, Elements of Sell-Side e-Procurement solutions, Manager's roadmap for e-Procurement. Knowledge-Tone Applications: Why knowledge applications and what is it?, Emerging classes of knowledge-tone applications, knowledge-tone usage in the real World, Elements of knowledge-tone architectural framework, Data warehousing, Online analytical processing (OLAP), Roadmap to knowledge-tone framework.	8
V	Developing the e-Business Design: Challenges of e-Business strategy creation, Roadmap to moving your company into e-Business. Translating e-Business Strategy into Action: The overall process – translating strategy into action, e-Business blueprint creation, Basic steps of e-Business blueprint planning, Key elements of a business case, e-Business project planning checklist, Why e-Business initiatives fail?	7
	Total	36

- 1. Ravi Kalakota and Marcia Robinson; e-Business- Roadmap for Success; Pearson Education Asia Pte Ltd, Tecmedia, New Delhi.
- 2. H. Albert Napier, Philip J. Judd, Ollie Rivers, Stuart W. Wagner; Creating a Winning E-Business; Vikas Publishing House Pvt. Ltd., New Delhi



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YEAR: II

SEMESTER: III

MSE 203 COMPUTER GRAPHICS & IMAGE PROCESSING

(L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	Review of Graphics Fundamentals Basic raster graphical algorithm for 2D primitives, Line drawing algorithm, 2D and 3D transformations; Window, Viewport, Clipping algorithm; Circle drawing algorithm, Ellipse drawing algorithm, Bezier curve, b-spline curve, surfaces and Solid modeling.Parallel projection, Perspective projection and Computation of vanishing point; Zbuffer algorithm, Scan line algorithm. Area subdivision and Ray tracing algorithms	7
II	Shading Illumination mode, Specular reflection model, Shading models for curve surfaces, Radiosity method, Rendering, Recursive ray tracing, Texture mapping.	6
ш	Image Manipulation & Storage What is an Image, Elementary Image processing techniques; Multipass transformation, Image Compositing. Advanced Modeling Techniques Procedural Models, Fractal Models, Grammar based models, particle systems, Volume rendering.	8
IV	Segmentation in 2D Greedy and Local Methods – Watersheds and minimum spanning trees Deformable Methods – Intelligent scissors/ livewires, active contours; DP snakes, region and boundary methods.	8
V	Image Reconstruction Anisotropic reconstruction, restoration, noise removal, high dynamic & range imaging and in painting. Animation 3D animation, morphing and simulation of key frames.	7
	Total	36

- 1. Hearn & Baker, "Computer Graphics C version", 2nd ed. Pearson Education.
- 2. Woo-Open, "GL Programming Language" version1.2,3rd edition Pearson Education.
- 3. Hill, "Computer Graphics using open GL", 2nd edition Pearson Education.
- 4. Roger and Adams, "Mathematical Element for Computer Graphics", 2nd ed., Tata McGraw Hill.
- 5. Rogers, "Procedural Element for Computer Graphics", 2nd ed, Tata McGraw Hill.
- Milan Sonka and Vaclav, "Image Processing, Analysis and Machine Vision", 3rd Ed (2007) Thomson Learning.



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YEAR: II

SEMESTER: III

MSE 204 DISTRIBUTED NETWORK COMMUNICATION

(L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
Ι	OSI Application Layer Service Elements-e.g. FTAM, virtual terminal protocol, X.400 message handling. Network Services and Applications-X.500 directory services, information retrieval, online transaction processing, electronic mail, conferencing and EDI. Protocols-Routing and switching protocols functions, design, implementation and testing. RIP version1 & 2, VLAN, STP	7
II	Architectures, Standards and Protocols-TCP OSI/IP, connectionless and connection- oriented protocols, protocol stacks. Network Design, Performance, Operation and Management-architecture, interoperability and open systems issues. Distributed Systems- client/server model, workstations, distributed operating systems, remote procedure call.	6
ш	Routing Advance protocols: OSPF, EIGRP, BGP, IS-IS installation and confirmation in details	8
IV	Local and Metropolitan Area Networks-Ethernet, token ring and FDDI-I and II, DQDB - principles and components. Internetworking-bridges and routers, Internet design and evolution. Integrated Data Networks-narrow band and broadband ISDN, and associated protocols (e.g. SSL7, ATM), CTI	8
V	Wide Area Networks-X.25 packet switching principles, protocols and components, frame relay, cell switching, routing. Security and Reliability of Networks-fault-tolerant and safety/mission critical systems, encryption, access control, network virus Problems	7
	Total	36

- 1. Comer DE, (1995), Internet working with TCP/IP Vol. 1, 3e, Prentice-Hall.
- 2. Kessler G and Train D, (1992), Metropolitan Area Networks, McGraw-Hill.
- 3. Feit S, (1993), TCP/IP, McGraw-Hill.
- 4. Stallings W, (1997), Data and Computer Communications 5e, Macmillan.
- 5. Stallings W, (1995), ISDN and Broadband ISDN 3e, Macmillan



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YEAR: II

SEMESTER: III

MSE-251 ASP.NET LAB (L, T, P) = 3 (0+0+3)

S. No. Contents of Course	Contents of Course	Hrs.	
	The experiments will be based on the topics covered in the corresponding theory Course.	8	

YEAR: II

SEMESTER: III

MSE-252 SEMINAR (L, T, P) = 3 (0+0+3)**Contents of Course** Hrs. S. No. Preparation & Presentations given by the students on their project or current topics. 8

YEAR: II

SEMESTER: III

MSE-253 DISSERTATION PART-I

S. No.	Contents of Course	A1	Hrs.
	Assign a project on an recent topic of the latest technical field.	ep	8

Year: II

S. No.	Subject Code Subject Name	Subject Nome	Hrs./Week			20	Maximum & Minimum Marks		
		Subject Name	т	т	P	Exam Hrs.	Internal/	External/	Total/Min.
Practical's			L		P		Marks	Marks	Pass Marks
1	MSE 254	Dissertation Part-II	-	-	10		250/100	250/100	500/200
		Total Teaching Load	-		10				500

YEAR: II

MSE 254 DISSERTATION PART-II

S. No.	Contents of Course			
	Undertaking a project on an assigned recent topic of the latest technical field.	18		

SEMESTER: IV (L, T, P) = 3 (0+0+3)

(L, T, P) = 3 (0+0+3)

Semester: IV