# M.E. SOFTWARE ENGINEERING

## SEMESTER I (5+1)

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**Total No of Credits**: 65  
**No of Theory courses**: 14  
**No of Lab Courses**: 04
### M.E. SOFTWARE ENGINEERING

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UNIT I QUEUEING MODELS


UNIT II ADVANCED QUEUEING MODELS

Non- Markovian Queues – Pollaczek Khintchine Formula – Queues in Series – Open Queueing Networks – Closed Queueing networks.

UNIT III SIMULATION

Discrete Even Simulation – Monte Carlo Simulation – Stochastic Simulation – Applications to Queueing systems.

UNIT IV LINEAR PROGRAMMING


UNIT V NON-LINEAR PROGRAMMING


L + T: 45 + 15 = 60

TEXT BOOKS


REFERENCES

UNIT I  FOUNDATIONS OF NETWORKING  

UNIT II  QUALITY OF SERVICE  
Traffic Characteristics and Descriptors – Quality of Service and Metrics – Best Effort model and Guaranteed Service Model – Limitations of IP networks – Scheduling and Dropping policies for BE and GS models – Traffic Shaping algorithms – End to End solutions – Laissez Faire Approach – Possible improvements in TCP – Significance of UDP in inelastic traffic

UNIT III  HIGH PERFORMANCE NETWORKS  

UNIT IV  HIGH SPEED NETWORKS  

UNIT V  NETWORK MANAGEMENT  

REFERENCES

UNIT I CLASSICAL PARADIGM
System Concepts – Project Organization – Communication – Project Management

UNIT II PROCESS MODELS

UNIT III ANALYSIS
Requirements Elicitation – Use Cases – Unified Modeling Language, Tools – Analysis Object Model (Domain Model) – Analysis Dynamic Models – Non-functional requirements – Analysis Patterns

UNIT IV DESIGN

UNIT V IMPLEMENTATION, DEPLOYMENT AND MAINTENANCE

REFERENCES
UNIT I  FUNDAMENTALS  9

UNIT II  HEAP STRUCTURES  9

UNIT III  SEARCH STRUCTURES  9

UNIT IV  MULTIMEDIA STRUCTURES  9

UNIT V  ALGORITHMS  9

TOTAL = 45

REFERENCES
UNIT I INTRODUCTION TO ARCHITECTURE


UNIT II DESIGN FUNDAMENTALS


UNIT III DESIGN METHODOLOGIES


UNIT IV ARCHITECTURAL DESIGN


UNIT V CASE STUDIES

Tools for Architectural design – Case Studies.

TOTAL : 45

REFERENCES

1. Practicing the different types of case tools such as (Rational Rose & other Open Source) used for all the phases of Software development life cycle.
2. Data modeling
3. Semantic data modeling
4. Source code generators
5. Re-engineering
6. Experimenting CASE Environments
   a. Toolkits
   b. Language-centered
   c. Integrated
   d. Fourth generation
   e. Process-centered

7. Implementation of the following using CASE Workbenches:
   a. Business planning and modeling
   b. Analysis and design
   c. User-interface development
   d. Programming
   e. Verification and validation
   f. Maintenance and reverse engineering
   g. Configuration management
   h. Project management
UNIT I PROJECT MANAGEMENT CONCEPTS

UNIT II SOFTWARE ESTIMATION & COSTING

UNIT III RISK MANAGEMENT
Risk Definition – Risk Categories – Risk Assessment (Identification / Analysis / Prioritization) – Risk Control (Planning / Resolution / Monitoring) – Failure Mode and Effects Analysis (FMEA)

UNIT IV METRICS

UNIT V PEOPLE MANAGEMENT
Team Management – Client Relationship Management.

TOTAL= 45

REFERENCES
SW9121 SOFTWARE QUALITY ASSURANCE

UNIT I

UNIT II
Basics of software testing – test generation from requirements – finite state models – combinatorial designs - test selection, minimization and prioritization for regression testing – test adequacy, assessment and enhancement

UNIT III
Testing strategies – white box and black box approach – integration testing – system and acceptance testing – performance testing – regression testing - internationalization testing – ad-hoc testing – website testing – usability testing – accessibility testing
Test plan – management – execution and reporting – software test automation – automated testing tools

UNIT IV

UNIT V
Project progress control – costs – quality management standards – project process standards – management and its role in SQA – SQA unit

TOTAL = 45

REFERENCES
UNIT I INTRODUCTION TO SOFTWARE RELIABILITY 7

UNIT II SOFTWARE RELIABILITY MODELING 12
Concepts – General Model Characteristic – Historical Development of models – Model Classification scheme – Markovian models – General concepts – General Poisson Type Models – Binomial Type Models – Poisson Type models – Fault reduction factor for Poisson Type models.

UNIT III COMPARISON OF SOFTWARE RELIABILITY MODELS 10

UNIT IV FUNDAMENTALS OF MEASUREMENT 8

UNIT V PRODUCT METRICS 8

REFERENCES

UNIT I  REQUIREMENTS ENGINEERING OVERVIEW  9

UNIT II  REQUIREMENTS ELICITATION  9

UNIT III  REQUIREMENTS ANALYSIS 9

UNIT IV  REQUIREMENTS DEVELOPMENT  9

UNIT V  REQUIREMENTS VALIDATION  9
Validation objectives – Analysis of requirements validation – Activities – Properties – Requirement reviews – Requirements testing – Case tools for requirements engineering.

REFERENCES

TOTAL = 45
Aim:
The students should go through full SDLC traceability for features, requirements and testing.

Objectives:
The students are expected to refine and validate software requirements through the performance of the following:
- Identify customer’s needs.
- Evaluate system for feasibility.
- Perform economic and technical analysis.
- Allocate functions to system elements.
- Establish schedule and constraints.
- Create system definitions

1. Study various tools such as OSRMT, Borland Caliber Analyst, IBM Telelogic DOORS, Rational Rose Suite etc.

2. Do experiments that cover Requirements Lifecycle Management practices, and techniques of the whole requirements process:
   a. Requirements elicitation (requirements capture)
   b. Requirements definition
   c. Requirements validation
   d. Requirements analysis
   e. Requirements modeling
   f. Requirements management
   g. Requirements traceability
   h. Requirements-based testing

3. Study various testing tools such as WinRunner, LoadRunner, TestDirector, Rational Suite and other Opensource Tools.

4. Perform experiments to do the following:
   a. Requirements Testing
   b. Use-case Scenario Testing
   c. Documentation Testing

5. Mini projects on any relevant current topics. Suggested topics:
a. IT Infrastructure Management Application
b. Reservation Systems for Air lines, Railways etc.
c. Knowledge Management System
d. Remote Procedure Call Implementation

CP9131 SECURITY PRINCIPLES AND PRACTICE

UNIT I INTRODUCTION & MATHEMATICAL FOUNDATION 9
Beginning with a simple communication game – wrestling between safeguard and attack – Probability and Information Theory - Algebraic foundations – Number theory.

UNIT II ENCRYPTION – SYMMETRIC TECHNIQUES 9

UNIT III ENCRYPTION – ASYMMETRIC TECHNIQUES & DATA INTEGRITY
TECHNIQUES 9

UNIT IV AUTHENTICATION 9

UNIT V SECURITY PRACTICES 9

TOTAL: 45

REFERENCES

SW9151 WEB DESIGN AND MANAGEMENT

UNIT I SITE ORGANIZATION AND NAVIGATION

UNIT II ELEMENTS OF PAGE DESIGN

UNIT III SCRIPTING LANGUAGES

UNIT IV PRE-PRODUCTION MANAGEMENT

UNIT V PRODUCTION, MAINTENANCE AND EVALUATION

TOTAL = 45

TEXT BOOKS:

REFERENCES:

The suggestions are as follows
• The third Unit in the syllabus may be revised to provide the students with simple applications.
• The scripting languages title includes languages as well as ‘CGI’ which is not a language
• The scripting languages may be divided into client side and server side
• Using the design rules a simple web site deployed on the server may be experimented with and justify the design and its functionality.
• The Ashley Book is not available in the dept library and may be procured
• Unit 2 and 4, new topics are added
• The teaching hours have been altered from the previous
• Two new books have been added which are really useful

SW9152 FORMAL METHODS IN SOFTWARE ENGINEERING

UNIT I INTRODUCTION

UNIT II FORMAL SPECIFICATION STYLE
Model-Oriented – Specifications – Concurrency-Based Specifications – Example Specification Languages.

UNIT III VDM
Introduction to VDM – Basic Types – Quote Types – Compound Types – Optional Types – Functions – Operations – Additional Constructs – Modules.

UNIT IV THE Z NOTATION
The Interchange Language – User-Defined Identifiers – Data Types – Basic Types – Compound Types – Schemas – Additional Constructs.

UNIT V FORMAL SEMANTICS AND TOOLS

TOTAL = 45

REFERENCES:
UNIT I  INTRODUCTION  9

UNIT II  PROGRAMMING LANGUAGES AND TOOLS  9

UNIT III  REAL TIME DATABASES  9
Real time Databases - Basic Definition, Real time Vs General Purpose Databases, Main Memory Databases, Transaction priorities, Transaction Aborts, Concurrency Control Issues, Disk Scheduling Algorithms, Two-phase Approach to improve Predictability, Maintaining Serialization Consistency, Databases for Hard Real Time systems.

UNIT IV  COMMUNICATION  9

UNIT V  EVALUATION TECHNIQUES  9

TOTAL = 45

TEXT BOOKS:

REFERENCES:
SW9161 SOFTWARE AGENTS

UNIT I AGENTS – OVERVIEW
Agent Definition – Agent Programming Paradigms – Agent Vs Object – Aglet – Mobile Agents – Agent Frameworks – Agent Reasoning.

UNIT II JAVA AGENTS

UNIT III MULTIAGENT SYSTEMS

UNIT IV INTELLIGENT SOFTWARE AGENTS
Interface Agents – Agent Communication Languages – Agent Knowledge Representation – Agent Adaptability – Belief Desire Intension – Mobile Agent Applications.

UNIT V AGENTS AND SECURITY

TOTAL = 45

REFERENCES:
UNIT I
GIS – Definition - History of GIS - Basic Components of GIS – Hardware, Software, Data, Methods, People – List of GIS Software: Popular software, Open Source software

UNIT II

UNIT III

UNIT IV

UNIT V

Total = 45

TEXT BOOKS

REFERENCES
1. Peter A. Burrough, Rachael A. McDonnell, Principles of GIS, Oxford University Press, 2000

UNIT II THE CONCEPT OF BEST FIT EMPLOYEE 9

UNIT III TRAINING AND EXECUTIVE DEVELOPMENT 9
Types of training, methods, purpose, benefits and resistance. Executive development programmes – common practices - benefits – self development – knowledge management.

UNIT IV SUSTAINING EMPLOYEE INTEREST 9

UNIT V PERFORMANCE EVALUATION AND CONTROL PROCESS 9

TOTAL = 45

TEXT BOOKS:

REFERENCES:

SW9155 SUPPLY CHAIN MANAGEMENT

UNIT I FUNDAMENTALS OF SUPPLY CHAIN MANAGEMENT
Supply chain networks, Integrated supply chain planning, Decision phases in s supply chain, process view of a supply chain, supply chain flows, Overview of supply chain models and modeling systems, Supply chain planning: Strategic, operational and tactical, Understanding supply chain through process mapping and process flow chart.
UNIT II SCM STRATEGIES, PERFORMANCE

UNIT III PLANNING AND MANAGING INVENTORIES
Introduction to Supply Chain Inventory Management. Inventory theory models: Economic Order Quantity Models, Reorder Point Models and Multiechelon Inventory Systems, Relevant deterministic and stochastic inventory models and Vendor managed inventory models.

UNIT IV DISTRIBUTION MANAGEMENT
Role of transportation in a supply chain - direct shipment, warehousing, cross-docking; push vs. pull systems; transportation decisions (mode selection, fleet size), market channel structure, vehicle routing problem. Facilities decisions in a supply chain. Mathematical foundations of distribution management, Supply chain facility layout and capacity planning.

UNIT V STRATEGIC COST MANAGEMENT IN SUPPLY CHAIN
The financial impacts, Volume leveraging and cross docking, global logistics and material positioning, global supplier development, target pricing, cost management enablers, Measuring service levels in supply chains, Customer Satisfaction/Value/Profitability/Differential Advantage.

REFERENCES

UNIT III SERVICE AND INFORMATION INTEGRATION ARCHITECTURE 9

UNIT IV PROCESS AND APPLICATION INTEGRATION ARCHITECTURE 9

UNIT V CASE STUDY 9

TEXT BOOKS:
2. Martin Fowler Patterns of Enterprise Application Architecture (Addison-Wesley Signature Series) 2002

SW9157 IT SYSTEMS MANAGEMENT

UNIT I INTRODUCTION 3 0 0 3

UNIT II CHANGE MANAGEMENT 10
Change Management Processes - Identifying the need for change, Making a business case and measuring return on investment, Managing change – people, tools, processes.

UNIT III CONFIGURATION MANAGEMENT 10

UNIT IV OPERATIONS MANAGEMENT I 10

UNIT V OPERATIONS MANAGEMENT II 9

TOTAL = 45

REFERENCES:

**ADDITIONAL READING:**

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**SW9158 SOFTWARE ENGINEERING PROCESS MODELS**

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<td>Six Sigma – CMMI.</td>
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**TOTAL = 45**

**REFERENCES:**

CP9151 COMPONENT BASED DEVELOPMENT

UNIT I INTRODUCTION

UNIT II JAVA COMPONENT TECHNOLOGIES

UNIT III CORBA TECHNOLOGIES

UNIT IV COM AND .NET TECHNOLOGIES

UNIT V COMPONENT FRAMEWORKS AND DEVELOPMENT
Connectors – contexts – EJB containers – CLR contexts and channels – Black Box component framework – directory objects – cross-development environment –
component-oriented programming – Component design and implementation tools – testing tools - assembly tools.

Total = 45

REFERENCES


SW9159 INFOMETRICS

UNIT I  IT ORGANIZATION
Metrics that matter - Interpreting the metrics – Collecting the data – Managing the data – Obstacles to acquiring IT metrics information – Old data versus new graphical analysis – Core of software planning – Measuring the core metrics (Product, Quality, Process, Productivity, Time, Effort) – Estimating and controlling with the core metrics – Work output measurements.

UNIT II  MEASUREMENT PROGRAM APPROACHES
EDS Brazil metrics program – Measurement program implementation approaches – Bench marking – Data definition framework for defining software measurements.

UNIT III  SOFTWARE METRICS
Functional points as part of measurement program – Estimation of software reliability – Establishing central support for software sizing activities – Using metrics to manage projects – Tracking software progress – Effectively utilizing software metrics.

UNIT IV  SOFTWARE ESTIMATION

UNIT V  KNOWLEDGE MANAGEMENT
Quality information and knowledge – Why quality information and knowledge – Define information quality – Create organizational knowledge – Manage knowledge as assets – Create customized solution – Network knowledge infrastructure.

TOTAL = 45

REFERENCES:

CP9156 USER INTERFACE DESIGN

UNIT I INTRODUCTION

UNIT II HUMAN COMPUTER INTERACTION

UNIT III WINDOWS

UNIT IV MULTIMEDIA

UNIT V EVALUATION

Total = 45

TEXT BOOKS:
2. Deborah Mayhew, The Usability Engineering Lifecycle, Morgan Kaufmann, 1999

REFERENCES:


CP9158 BIO INFORMATICS

UNIT I INTRODUCTORY CONCEPTS

UNIT II SEARCH ENGINES AND DATA VISUALIZATION

UNIT III STATISTICS AND DATA MINING

UNIT IV PATTERN MATCHING

UNIT V MODELING AND SIMULATION
REFERENCES


CP9160   LANGUAGE TECHNOLOGIES

UNIT I   INTRODUCTION

UNIT II   INFORMATION RETRIEVAL

UNIT III   TEXT MINING
Categorization – Extraction based Categorization- Clustering- Hierarchical Clustering- Document Classification and routing- finding and organizing answers from Text search – use of categories and clusters for organising retrieval results – Text Categorization and efficient Summarization using Lexical Chains – Pattern Extraction.

UNIT IV   GENERIC ISSUES

UNIT V   APPLICATIONS

TOTAL = 45

TEXT BOOKS:


REFERENCES:

CP9164 DATA WAREHOUSING AND DATA MINING

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V
REFERENCES

1. Jiawei Han and Micheline Kamber “Data Mining Concepts and Techniques” Second Edition,

CP9161 KNOWLEDGE MANAGEMENT

UNIT I INTRODUCTION

UNIT II KNOWLEDGE MODELS

UNIT III TECHNIQUES OF KNOWLEDGE MANAGEMENT
Knowledge Elicitation Techniques – Modeling Communication Aspects – Knowledge Management and Organizational Learning.

UNIT IV KNOWLEDGE SYSTEM IMPLEMENTATION

UNIT V ADVANCED KM

TOTAL = 45

TEXT BOOKS:


REFERENCES:

2. http://www.epistemics.co.uk

SW9160 XML AND WEB SERVICES L T P C 3 0 0 3

UNIT I XML TECHNOLOGY FAMILY 9
XSLT – XLINK – XPATH – XQ

UNIT II ARCHITECTING WEB SERVICES 9
of CORBA and DCOM – Service – oriented Architecture (SOA) – Architecting web
services – Implementation view – web services technology stack – logical view –
composition of web services – deployment view – from application server to peer to peer
– process view – life in the runtime

UNIT III WEB SERVICES BUILDING BLOCK 9
Transport protocols for web services – messaging with web services – protocols – SOAP
– describing web services – WSDL – Anatomy of WSDL – manipulating WSDL – web
service policy – Discovering web services – UDDI – Anatomy of UDDI – Web service
inspection – Ad-Hoc Discovery – Securing web services.

UNIT IV IMPLEMENTING XML IN E-BUSINESS 9
B2B - B2C Applications – Different types of B2B interaction – Components of e-
services for mobile devices.

UNIT V XML AND CONTENT MANAGEMENT 9
Semantic Web – Role of Meta data in web content – Resource Description Framework
– RDF schema – Architecture of semantic web – content management workflow –
XLANG – WSFL.

TOTAL: 45 PERIODS

TEXT BOOKS:
2. Sandeep Chatterjee and James Webber, “Developing Enterprise Web Services: An
REFERENCES:

IT9123 ADVANCES IN DATABASES

UNIT I QUERY AND TRANSACTION PROCESSING

UNIT II PARALLEL AND DISTRIBUTED DATABASES

UNIT III OBJECT AND OBJECT RELATIONAL DATABASES

UNIT IV ENHANCED DATA MODELS

UNIT V EMERGING TECHNOLOGIES

TOTAL : 45 PERIODS
REFERENCES


CP9177 MULTICORE ARCHITECTURE

UNIT I

UNIT II

UNIT III
Multicore programming Model – Shared memory model, message passing model, transaction model – OpenMP and MPI Programming.

UNIT IV

UNIT V
Cell Broad band engine architecture, PPE (Power Processor Element), SPE (Synergistic processing element), Cell Software Development Kit, Programming for Multicore architecture.
TEXT BOOK:
3. IBM Journals for Power 5, Power 6 and Cell Broadband engine architecture.

REFERENCES: