ANNA UNIVERSITY, CHENNAI

AFFILIATED INSTITUTIONS

R - 2009

CURRICULUM I SEMESTER (FULL TIME)

M.E. SOFTWARE ENGINEERING

SEMESTER I

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1	**MA9219**	Operations Research	3	1	0	4
2	CS9213	Computer Networks and Management	3	0	0	3
3	SE9213	Object Oriented Software Engineering	3	0	0	3
4	SE9214	Software Architecture	3	0	0	3
5	SE9215	Formal Methods in Software Engineering	3	0	0	3
PRACTICAL						
6	CS9216	**Networking Lab**	0	0	3	2
7	SE9217	Case Tools Lab	0	0	3	2
		TOTAL	**15**	**1**	**6**	**20**

MA9219 OPERATIONS RESEARCH LT P C
3 1 0 4

UNIT I QUEUEING MODELS 12

Poisson Process – Markovian Queues – Single and Multi-server Models – Little's formula – Machine Interference Model – Steady State analysis – Self Service Queue.

UNIT II ADVANCED QUEUEING MODELS 12

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

UNIT III SIMULATION 12

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

UNIT IV LINEAR PROGRAMMING 12

Formulation – Graphical solution – Simplex method – Two phase method - Transportation and Assignment Problems.

UNIT V NON-LINEAR PROGRAMMING 12

Lagrange multipliers – Equality constraints – Inequality constraints – Kuhn – Tucker conditions – Quadratic Programming.

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Winston.W.L. "Operations Research", Fourth Edition, Thomson – Brooks/Cole, 2003.
2. Taha, H.A. "Operations Research: An Introduction", Ninth Edition, Pearson Education Edition, Asia, New Delhi, 2002.

REFERENCES:

1. Robertazzi. T.G. "Computer Networks and Systems – Queuing Theory and Performance Evaluation", Third Edition, Springer, 2002 Reprint.
2. Ross. S.M., "Probability Models for Computer Science", Academic Press, 2002.

CS9213 COMPUTER NETWORKS AND MANAGEMENT LT P C
3 0 0 3

UNIT I HIGH SPEED NETWORKS 9

Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection, ATM Cell – ATM Service Categories – AAL. High Speed LAN's: Fast Ethernet, Gigabit Ethernet, Fibre Channel – Wireless LAN's.

UNIT II CONGESTION AND TRAFFIC MANAGEMENT 9

Queuing Analysis- Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

UNIT III TCP AND ATM CONGESTION CONTROL 10

TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO backoff – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats, ABR Capacity allocations – GFR traffic management.

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES 9

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ – Random Early Detection, Differentiated Services.

UNIT V PROTOCOLS FOR QoS SUPPORT 8

RSVP – Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms – Multiprotocol Label Switching – Operations, Label Stacking, Protocol details – RTP – Protocol Architecture, Data Transfer Protocol, RTCP.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. William Stallings, "HIGH SPEED NETWORKS AND INTERNET", Pearson Education, Second Edition, 2002.

REFERENCES:

1. Warland & Pravin Varaiya, "HIGH PERFORMANCE COMMUNICATION NETWORKS", Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.
2. Irvan Pepelnjk, Jim Guichard and Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003.

SE9213 OBJECT ORIENTED SOFTWARE ENGINEERING LT P C
3 0 0 3

UNIT I INTRODUCTION 9

System Concepts – Software Engineering Concepts – Development Activities – Managing Software Development – Unified Modeling Language – Project Organization – Communication

UNIT II ANALYSIS 9

Requirements Elicitation – Concepts – Activities – Management – Analysis Object Model – Analysis Dynamic Models

UNIT III SYSTEM DESIGN 9

Decomposing the system – Overview of System Design – System Design Concepts – System Design Activities – Addressing Design Goals – Managing System Design

UNIT IV OBJECT DESIGN AND IMPLEMENTATION ISSUES 9

Reusing Pattern Solutions – Specifying Interfaces – Mapping Models to Code – Testing

UNIT V MANAGING CHANGE 9

Rationale Management – Configuration Management – Project Management – Software Life Cycle

TOTAL:45 PERIODS

REFERENCES:

1. Bernd Bruegge, Alan H Dutoit, Object-Oriented Software Engineering, 2nd ed, Pearson Education, 2004.
2. Craig Larman, Applying UML and Patterns, 3rd ed, Pearson Education, 2005.
3. Stephen Schach, Software Engineering 7th ed, McGraw-Hill, 2007.

SE9214 SOFTWARE ARCHITECTURE LT P C
3 0 0 3

UNIT I 8

Introduction – software design levels – software engineering discipline – architecture business cycle – architectural patterns – reference models – architectural structures, views

UNIT II 9

Architectural styles – pipes and filters – object-orientation – invocation – layered systems – repositories – interpreters – process control – heterogenous architectures – case studies

UNIT III 10

Architecture and functionality – architecture qualities – architecture in the lifecycle - Architectural design - Shared information systems – database integration – integration in software development environments – architectural structures for shared information systems

UNIT IV 9

Architectural design guidance – design space – design rules – applying design space – quantified design space – formal models and specification – formalizing architectural style, design space - z - notation

UNIT V 9

Linguistic issues – requirements for architectural description languages – first class connectors – adding implicit invocation to traditional programming languages – tools for architectural design – universal connector language - Software architecture Documentation – reconstruction

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Mary shaw and David Garlan, Software Architecture – Perspectives on an emerging discipline, Pearson education, 2008. (unit 1 to 5)
2. Len Bass, Paul Clements, Rick Kazman, Software Architecture in Practice, Addison-Wesley, 2003. (unit 1, 3, 5)

REFERENCES:

1. Christine Hofmeister, Robert Nord, Dilip Soni, Applied Software Architecture: A Practical Guide for Software Designers, Addison-Wesley, 1999
2. David M. Dikel, David Kane, James R. Wilson, Software Architecture: Organizational Principles and Patterns, Prentice Hall, 2001
3. Jan Bosch, Morven Gentleman, Christine Hofmeister, Juha Kuusela, Software Architecture: System Design, Development and Maintenance, Springer, 2002

SE9215 FORMAL METHODS IN SOFTWARE ENGINEERING LT P C
3 0 0 3

UNIT I INTRODUCTION 8

Why Formal methods were developed – Problems in Natural Language Specifications, Formal Versus Informal Programming – Advantages of Formal Methods – Requirements of Formal System – Types – Prepositional Logic – Predicate Logic – Relationships and Functions.

UNIT II FORMAL SPECIFICATION STYLE 8

Model-Oriented – Specifications – Concurrency-Based Specifications –Example Specification Languages.

UNIT III VDM 10

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

UNIT IV THE Z NOTATION 10

The Interchange Language – User-Defined Identifiers – Data Types – Basic Types – Compound Types – Schemas – Additional Constructs.

UNIT V FORMAL SEMANTICS AND TOOLS 9

Operational Semantics – Denotational Semantics – Axiomatic Semantics Proof Editors – Proof Analyser – Symbolic Simulators –Translators – Test Generation Tools.

TOTAL: 45 PERIODS

TEXT BOOK:

1. Andrew Harry, " Formal Methods: Fact File VDM and Z", John Wiley and Sons, 1996.

REFERENCE:

1. Jim Woodcock, Jim Davies, “Using Z Specification, Refinement and Proof”, Prentice Hall International, 1996.

CS9216	NETWORKING LAB	LT P C 0 0 3 2

1. Socket Programming
   a. TCP Sockets
   b. UDP Sockets
   c. Applications using Sockets
2. Simulation of Sliding Window Protocol
3. Simulation of Routing Protocols
4. Development of applications such as DNS/ HTTP/ E – mail/ Multi - user Chat
5. Simulation of Network Management Protocols
6. Study of Network Simulator Packages – such as opnet, ns2, etc.

TOTAL: 45 PERIODS

SE9217	CASE TOOLS LAB	LT P C 0 0 3 2

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

TOTAL: 45 PERIODS