DEVI AHILYA VISHWAVIDYALAYA, INDORE
INSTITUTE OF ENGINEERING & TECHNOLOGY

ME (Computer Engineering)(Full Time) With Specialization in Software Engineering
Schemes of Subjects & Examination (Subject to revision)

Th Marks (Max 100, Min 50) shall be based on Theory paper-It shall be an examination in the end of the semester.

CW Marks (Max 50, Min 25) shall be based on Attendance (25), Marks obtained in Test-I & Test –II of 25 marks each. Average of the two tests will be taken for awarding the 25 marks.

SW Marks (Max50, Min 25) shall be based on Attendance (25), Marks obtained in Two Experiments and Viva Voce (25)

Pr Marks (Max 50, Min 25) shall be based on Viva-Voce by External Examiner.

Th- Theory, CW-Class Work, SW- Sessional Work, Pr-Practical

Semester I

S.No	Sub Code	Subject	L	T	P	Th	CW	SW	Pr	TOTAL
									Maximum marks	
1.	5CO201	Advance Computer Systems	3	1	-	100	50	-	-	150
2.	5CO202	Object Oriented Analysis & Modeling	3	1	2	100	50	50	50	250
3.	5CO203	Software Construction	3	1	2	100	50	50	50	250
4.	5CO204	Advance Computer Networks	3	1	2	100	50	50	50	250
5.		Elective- I	3	1	-	100	50	-	-	150
6.	5CO210	Comprehensive Viva-I	-	-	-	-	-	-	-	100
	Total		**15**	**5**	**6**	**500**	**250**	**150**	**150**	**1150**

Semester II

S.No	Sub Code	Subject	L	T	P	Th	CW	SW	Pr	TOTAL
1.	5CO251	Design Patterns	3	1	-	100	50	-	-	150
2.	5CO252	Component Technology	3	1	2	100	50	50	50	250
3.	5CO253	Object Oriented Design	3	1	2	100	50	50	50	250
4.	5CO254	Database Engineering	3	1	2	100	50	50	50	250
5.		Elective- II	3	1	-	100	50	-	-	150
6.	5CO260	Comprehensive Viva-II	-	-	-	-	-	-	-	100
	Total		**15**	**5**	**6**	**500**	**250**	**150**	**150**	**1150**

List of Electives in Semester- I & II

S.No.	Sub Code	Elective -I	S.No.	Sub Code	Elective -II
1	5CO205	Applied Digital Signal Processing	1	5CO255	Project Management
2	5CO206	Speech & Language Processing	2	5CO256	Knowledge Management
3	5CO207	Optimization Algorithms	3	5CO257	Software Testing & Quality Assurance
4	5CO208	Machine Learning	4	5CO258	Bioinformatics Computing
5	5CO209	Embedded System Technology	5	5CO259	Web Application Development

Semester- III

S.No	Sub Code	Subject	L	P	Th	CW	SW	Pr	TOTAL
					Maximum Marks				
1	6CO201	Dissertation Phase-I	-	8	-	-	100	50	150
	TOTAL		**-**	**8**	**-**	**-**	**100**	**50**	**150**

Semester- IV

S.No	Sub Code	Subject	L	P	Th	CW	SW	Pr	TOTAL
					Maximum Marks				
1	6CO251	Dissertation Phase-II	-	12	-	-	250	100	350
	TOTAL		**-**	**12**	**-**	**-**	**250**	**100**	**350**
		GRAND TOTAL OF FOUR SEMESTERS							**2800**

DEVI AHILYA VISHWAVIDYALAYA, INDORE
INSTITUTE OF ENGINEERING & TECHNOLOGY
ME (Computer Engineering)(Part Time)With Specialization in Software Engineering
Schemes of Subjects & Examination (Subject to revision)

Th Marks (Max 100, Min 50) shall be based on Theory paper-It shall be an examination in the end of the semester.

CW Marks (Max 50, Min 25) shall be based on Attendance (25), Marks obtained in Test-I & Test –II of 25 marks each. Average of the two tests will be taken for awarding the 25 marks.

SW Marks (Max 50, Min 25) shall be based on Attendance (25), Marks obtained in Two Experiments and Viva Voce (25)

Pr Marks (Max 50, Min 25) shall be based on Viva-Voce by External Examiner.

Th- Theory, CW-Class Work, SW- Sessional Work, Pr - Practical

Semester-I

S.No	Sub Code	Subject	L	T	P	Th	CW	SW	Pr	TOTAL
1.	5CO231	Advance Computer Systems	3	1	-	100	50	-	-	150
2.	5CO232	Object Oriented Analysis & Modeling	3	1	2	100	50	50	50	250
3.	5CO233	Software Construction	3	1	2	100	50	50	50	250
4.	5CO240	Comprehensive Viva-I	-	-	-	-	-	-	-	50
	Total		**9**	**3**	**4**	**300**	**150**	**100**	**100**	**700**

Semester-II

S.No	Sub Code	Subject	L	T	P	Th	CW	SW	Pr	TOTAL
1.	5CO234	Object Oriented Design	3	1	2	100	50	50	50	250
2.		Elective-I	3	1	-	100	50	-	-	150
3.	5CO241	Comprehensive Viva-II	-	-	-	-	-	-	-	50
	TOTAL		**6**	**2**	**2**	**200**	**100**	**50**	**50**	**450**

Semester-III

S.No	Sub Code	Subject	L	T	P	Th	CW	SW	Pr	TOTAL
1.	5CO281	Design Patterns	3	1	-	100	50	-	-	150
2.	5CO282	Component Technology	3	1	2	100	50	50	50	250
3.	5CO283	Database Engineering	3	1	2	100	50	50	50	250
4.	5CO290	Comprehensive Viva-III	-	-	-	-	-	-	-	50
	TOTAL		**9**	**3**	**4**	**300**	**150**	**100**	**100**	**700**

Semester-IV

S.No	Sub Code	Subject	L	T	P	Th	CW	SW	Pr	TOTAL
1.	5CO284	Advance Computer Networks	3	1	2	100	50	50	50	250
2.		Elective- II	3	1	-	100	50	-	-	150
3.	5CO291	Comprehensive Viva-IV	-	-	-	-	-	-	-	50
	TOTAL		6	2	2	200	100	50	50	450

List of Electives in Semester- II & IV

S.No.	Sub Code	Elective -I	S.No.	Sub Code	Elective -II
1	5CO235	Applied Digital Signal Processing	1	5CO285	Project Management
2	5CO236	Speech & Language Processing	2	5CO286	Knowledge Management
3	5CO237	Optimization Algorithms	3	5CO287	Software Testing & Quality Assurance
4	5CO238	Machine Learning	4	5CO288	Bioinformatics Computing
5	5CO239	Embedded System Technology	5	5CO289	Web Application Development

Semester- V

S.No	Sub Code	Subject	Maximum Marks						
			L	P	Th	CW	SW	Pr	TOTAL
1	6CO231	Dissertation Phase-I	-	8	-	-	100	50	150
	TOTAL		-	8	-	-	100	50	150

Semester- VI

S.No	Sub Code	Subject	Maximum Marks						
			L	P	Th	CW	SW	Pr	TOTAL
1	6CO281	Dissertation Phase-II	-	12	-	-	250	100	350
	TOTAL		-	12	-	-	250	100	350
		GRAND TOTAL OF FOUR SEMESTERS							2800

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN SOFTWARE ENGINEERING
5CO201/ 5CO231 ADVANCED COMPUTER SYSTEMS

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	**Instructions Hours Per Week**			**Marks**					
5CO201/5CO231Advanced Computer Systems	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
Duration of Paper: 3 Hrs.	**3**	**1**	**-**	**Max**	100	50	-	-	150
				Min	50	25	-	-	75

Objective:
To strengthen the knowledge of computer architecture based on the recent developments and to appreciate internal working of modern computer systems.

Prerequisites:
Basic knowledge of computer organization, data structures and programming.

CONTENTS

UNIT-I
Traditional Development from Von-Neumann Model to Parallel Model; Computer Design Principles.

UNIT-II
Instruction Set Principles and Examples; Instruction Level Parallelism: Concepts; Techniques and Software Approaches.

UNIT-III
Memory Hierarchy Design; Multiprocessors and Threaded Architectures; Storage Systems.

UNIT-IV
Interconnection Networks and Clusters.

UNIT-V
Cases of Microprocessors; Micro controllers and Embedded Architectures.

BOOKS RECOMMENDED
[1] J. L. Hennessy and D. A. Patterson, Computer Architecture: A Quantitative Approach, 3/e, Morgan Koffman Press, 2002.
[2] K. Hwang and Briggs, Computer Architecture and Parallel Processing, McGrawHill, 1986.
[3] Latest white paper from the relevant websites.

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN SOFTWARE ENGINEERING
5CO202/ 5CO232 OBJECT ORIENTED ANALYSIS AND MODELING

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Computer Engineering) (Sp. Software Engineering)				
Subject Code & Name	Instructions Hours Per Week			Marks				
5CO202/5CO232 Object Oriented Analysis and Modeling	L	T	P		TH	CW	SW	PR	Total
	3	1	2						
Duration of Paper: 3 Hrs.	3	1	2	Max	100	50	50	50	250
				Min	50	25	25	25	125

Objective:
To be able to analyze the system/ application to be developed; and to be ready to design and implement the software systems from industry perspective.

Prerequisites:
Preliminary Object Oriented Concepts.

CONTENTS

UNIT-I
Software Engineering Best practices; Unified Process: Workflow and Lifecycle; Modeling

UNIT-II
Object Orientation and Mechanisms; Requirements Management; Creating Artifacts; SRS, Use Case Models, Supplementary Specifications

UNIT-III
Use-Case Analysis, Responsibilities, Attributes and Associations

UNIT-IV
Analysis and Design Overview; Architectural Analysis.

UNIT-V
Unified Modeling Language, Structural, Behavioral, Architectural Modeling, UML Diagram and Tools.

BOOKS RECOMMENDED
[1] P.Kruchten, The Rational Unified Process: An Introduction, Pearson Education Asia, 2000.
[2] G. Booch, I. Jacobson, J. Rumbaugh, The Unified Modeling Language- User's Guide, Addison Wesley, 1999.
[3] W. Boggs and M. Boggs, Mastering UML with Rational Rose, BPB Publication, 1999.
[4] G.Booch, Object-oriented Analysis and Design with Applications, Addison Wesley, 1994.
[5] M.Blaha, J.Rambaugh, Object-Oriented Modeling and Design with UML, Pearson Education 2nd edition, 2007.
[6] www.sdmagazine.com, www.rational.com

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN SOFTWARE ENGINEERING
5CO203/ 5CO233 - SOFTWARE CONSTRUCTION

Devi Ahilya University, Indore, India Institute of Engineering & Technology			ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	Instructions Hours Per Week		Marks					
5CO203/5CO233 Software Construction	L	T	P		TH	CW	SW	PR	Total
Duration of Paper: 3 Hrs.	3	1	2	Max	100	50	50	50	250
				Min	50	25	25	25	125

Objective:
To enhance the programming and coding skills at a professional level and be able to develop the useful programs.

Prerequisites:
Basic knowledge of problem solving and programming fundamentals.

CONTENTS
UNIT I
Introduction:- Introduction to software construction and Java programming language. Importance of Java to the Internet, Java buzzwords, overview of Java, data types, variables and arrays, operators and control statements, Data structures

UNIT II
Introducing classes and methods, overloading methods, argument passing, nested and Inner class, Inheritance, multilevel hierarchy, abstract classes, Packages and interfaces.

UNIT III
Exception handling, Multithreaded programming- Java thread model, Thread priorities, synchronization, interthread communication.

UNIT IV
Input/Output, java I/O classes and interfaces, streams classes, Serialization, Networking, Java and Net, Applet basics and architecture, passing parameters to the applet, event handling.

UNIT V
Server side programming, Java servlets, servlet chaining, server side include, session tracking, JSP, scripting, Jar files and web application development, Connectivity and SQL, JDBC, Java Beans; J2EE Overview- EJBs;

BOOKS RECOMMENDED
[1] C.S.Horstmann and G. Cornell, Core Java-I: Fundamentals, Sun Microsystems Press, 1999 (Pearson Asia, 2000).
[2] C.S.Horstmann and G. Cornell, Core Java-II: Advanced, Sun Microsystems Press, 2000 (Pearson Asia, 2000).
[3] Ivor Horton, Beginning Java 2 JDK 1.3 Edition, WROX (Shroff Pub.) 2000.
[4] P. Naughton and H.Schildt, Java 2 Complete Reference, Tata McGrawHill, 1999.
[5] S. McConnell, Code Complete, Microsoft Press, 1993 (or latest available).
[6] Latest white paper from the relevant websites.

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN SOFTWARE ENGINEERING
5CO204/ 5CO284 - ADVANCE COMPUTER NETWORKS

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	Instructions Hours Per Week			Marks					
5CO204/5CO284-Advance Computer Networks	L	T	P		TH	CW	SW	PR	Total
Duration of Paper: 3 Hrs.	3	1	2	Max	100	50	50	50	250
				Min	50	25	25	25	125

Objective: To develop the skills of designing and implementing computer networks.

CONTENTS

UNIT I

Network overview, review of underlying network technologies, structure of network software in an operating system; internetworking concept and architectural model,, classful internet addresses, mapping internet addresses to physical addresses (ARP),

UNIT II

Internet Protocol-datagram delivery, forwarding IP datagrams, error messaging (ICMP), classless and subnet address extensions (CIDR), Routing architecture cores, peers and algorithms,

UNIT III

TCP & UDP protocol implementation, routing architecture, IP switching and MPLS, mobile IP, routing between peers (BGP), routing within autonomous system (OSPF,RIP), Internet Multicasting –

UNIT IV

Private network interconnection (NAT, VPN), Socket interface, Bootstrap and auto configuration (DHCP), Domain Name system, Remote Login (TELNET, SSH),

UNIT V

Electronic Mail –SMTP, POP, IMAP, WWW-HTTP, Network Management (SNMP) Voice and Video over IP (RTP), Traffic Scheduling & Policing, QoS, Internet Security and Firewall Design (IPSec, SSL)

BOOKS RECOMMENDED

1) Douglas E.Comer Internetworking with TCP/IP Vol. I Principles, Protocols and Architecture, 5nd Edition 2006
2) Douglas E. Comer,David L. Stevens; Internetworking with TCP/IP Vol. II design, Implementation of Intranets. PHI, 3nd Edition 2000.
3) B. Forouzan, TCP/IP Protocol Suite, McGraw Hill,3/e,2006
4) James F. Kurose, Keith W. Ross, "Computer Networking: A Top Down Approach Featuring the Internet", Addison Wesley, July 2002

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN SOFTWARE ENGINEERING
5CO251/5CO281 – DESIGN PATTERNS

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	Instructions Hours Per Week			Marks					
5CO251/5CO281 - Design Patterns	L	T	P		TH	CW	SW	PR	Total
Duration of Paper: 3 Hrs.	3	1	-	Max	100	50	-	-	150
				Min	50	25	-	-	75

Objective:
To strengthen the knowledge of Object Oriented Design and Development by understanding various design patterns.

Prerequisites:
Knowledge of object oriented system concepts, object oriented analysis and modeling and object oriented programming.

CONTENTS

UNIT I
Introduction to Software Patterns, Overview of UML, Class Diagrams, Collaboration Diagrams, State chart Diagram, Deployment Diagram, Fundamental Design Patterns: Delegation, Interface, Abstract Super-class, Interface and Abstract class, Immutable, Marker Interface

UNIT II
Simple Factory pattern, Factory Method, Abstract Factory, Builder, Prototype, Singleton

UNIT III
Adaptor, Bridge, Composite, Façade, Flyweight, Decorator, Proxy Pattern

UNIT IV
Chain of Responsibility, Command, Interpreter, Mediator, Memento Pattern

UNIT V
Observer, State, Strategy, Template Method, Visitor, Iterator Pattern

BOOKS RECOMMENDED
1. Gamma, Helm, Johnson, Vlissides, Design Patterns. Elements of Reusable Software., Pearson Education 2006
2. Cooper, J. W., Java Design Patterns, A Tutorial, Pearson Education, 2000.
3. Freeman, Freeman, Head First Design Patterns, O'Reilly Pub. 2007
4. Mark Grand, Patterns in Java Vol. 1, Wiley 2002
5. Mark Grand, Patterns in Java Vol. 2, Wiley 2002
6. Mark Grand, Patterns in Java Vol. 3, Wiley 2002
7. Douglas Schmidt, Pattern Oriented Software Architecture Vol1, John Wiley 2000, also called as POSA

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN SOFTWARE ENGINEERING
5CO252/ 5CO282 - COMPONENT TECHNOLOGY

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	Instructions Hours Per Week			Marks					
5CO252/5CO282 Component Technology	L	T	P		TH	CW	SW	PR	Total
Duration of Paper: , 3 Hrs.	3	1	2	Max	100	50	50	50	250
				Min	50	25	25	25	125

Objective: To develop skill and experience in development of complete software product; using components.

Prerequisite:
Core Programming skills and OO development.

CONTENTS

UNIT-I
Business Components and three-tier architecture.

UNIT-II
Concepts of servers; containers; Beans.

UNIT-III
Concepts of Client – Remote interface; Session and Entity Beans;

UNIT-IV
Distributed transactions handling; Building and Deploying components for Large System

UNIT-V
Case studies with EJBs; COM – DCOM and CORBA Technologies.

BOOKS RECOMMENDED

[1] T. Valesky; Enterprise Java Beans; (LPE) Pearson Education Asia 1999.
[2] Addon Gurt & Eddon Henry**;** Inside Distributed Com; Web Publishing; 2002
[3] ebook, Enterprise Java Beans, WWW.serverside.com

M.E. (COMPUTER ENGINEERING) Specialization in software Engineering
5CO253 / 5CO234 - Object Oriented Design

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	Instructions Hours Per Week			Marks					
5CO253/5CO234 Object Oriented Design	L	T	P		TH	CW	SW	PR	Total
Duration of Paper: 3 Hrs.	3	1	2	Max	100	50	50	50	250
				Min	50	25	25	25	125

Objective:
To develop the skills of designing, implementing testing and deploying the software application on the given environment.

Prerequisites:
Object-Oriented Analysis and modeling; Java/C++, UML.

CONTENTS

UNIT I
Review of OOA&M; Architecture, Design, System Concepts, Domain Concepts, Application Concepts

UNIT II
Architectural Design, Design Classes, Subsystems, Subsystem Design Behavior & Persistency;

UNIT III
Concurrency Requirements, Mapping Processes to Implementation, Distribution, Network Configuration, Deployment Model

UNIT IV
Process-to-Node Allocations, Use-Case Design, Design Objects, Unifying Classes & Subsystems;

UNIT V
Class Design, Operators, States, Attributes, Dependencies & Association, Object Orientated Testing, Software Process.

Books Recommended:
[1] Scott W. Ambler, The Object Primer, Cambridge University Press, 2/e 2000
[2] B. Bruegge , A. Dutoit, Object-Oriented SE
[3] M.Blaha, J. Rambaugh, Object–Oriented Modeling and Design with UML, 2nd Edition 2007, Pearson Education
[4] www.rational.com, www.sdmagazine.com

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN SOFTWARE ENGINEERING
5CO254/ 5CO283 – DATABASE ENGINEERING

Devi Ahilya University, Indore, India Institute of Engineering & Technology			ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	**Instructions Hours Per Week**		**Marks**					
5CO254/5CO283 Database Engineering	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
Duration of Paper: 3 Hrs.	**3**	**1**	**2**	**Max**	100	50	50	50	250
				Min	50	25	25	25	125

Section 1.01
Objective: This course will help the students to acquire the foundation of Database Management systems. It includes concepts relating to various advanced database models, and concepts like database mining and warehousing. This course also describes in major details about the foundation of relational database management systems. Thus, this is an advanced course, which will further develop the knowledge and skill acquired by the students at the basic level.
Prerequisites:
Preliminary Database Concepts.
CONTENTS
UNIT 1:
The Relational model, relations, relational operators, relational algebra and calculus, embedded SQL, storage structures in databases, advanced concepts of Entity relationship model.
UNIT 2:
Relational Database Design, Functional Dependency, Multi-valued dependency, Theory of Normalisation, Query Processing, Concurrency management, Recovery Management, Database Security management.
UNIT 3:
Advanced Data Models, Client-Server database model, Distributed database model, Database servers and Application servers, Object Oriented Data Model.
UNIT 4:
Knowledge Databases, Multimedia Databases, Geographical databases, webs database, Mobility and Personal Databases, Database as Backend to web Tools, ODBC, JDBC.
UNIT 5:
Data Warehousing: Concepts and Applications, Data Mining, Future trends etc. Architecture of advanced DBMS

BOOKS RECOMMENDED
1. Elmasri and Navathe, Fundamentals of Database Systems [4e], Pearson Education
2. Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems [3e], McGraw-Hill
3. Korth, Silberchatz, Sudarshan, Database System Concepts, McGraw-Hill.
4. Peter Rob and Coronel, Database Systems, Design, Implementation and Management, Thomson Learning.
5. C.J.Date, Longman, Introduction To Database Systems, Pearson Education

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN SOFTWARE ENGINEERING
5CO235/5CO205 APPLIED DIGITAL SIGNAL PROCESSING

Devi Ahilya University, Indore, India Institute of Engineering & Technology			ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	**Instructions Hours per Week**		**Marks**					
5CO235/5CO205 Applied Digital Signal Processing	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
	3	**1**	**0**	**Max**	**100**	**50**	**-**	**-**	**150**
Duration of paper: 3 hrs				**Min**	**50**	**25**	**-**	**-**	**75**

Course Objective:
To provide clear conceptual knowledge of different DSP algorithms and to introduce speech, multimedia and other signal processing applications.

Prerequisite(s):
A basic course in Digital signal processing.

CONTENTS

UNIT -I
Signals and Signal Processing: Characterization and Classification of signals; Sampling and Quantization; Typical signal Processing Operations; Examples Typical Signals and Systems; Typical Signal Processing applications; Why Digital Signal Processing; Building blocks of a Digital signal processor; Discrete Time Fourier Transform, Z – transform and properties.

UNIT -II
Discrete Fourier Transform: Introduction; Computation of DFT and IDFT; Periodic and symmetry properties of DFT; DTFT v/s DFT; Circular shift and Circular convolution Linear convolution using DFT; Block convolution, Overlap – add method and Overlap – save method.

UNIT -III
Fast Fourier Transform: Redix Two DIT and DIF FFT algorithm; Butterfly computation; Bit reversed mapping; In place computation; Composite – N algorithm; Prime factor algorithm.

UNIT -IV
Digital Filter Structures: Block Diagram Representation; Signal Flow Graph Representation; Equivalent structures; Basic FIR Digital Filter structures; Basic IIR filter structures; state space structure; All Pass Filter; Tunable HR Digital filters; Cascaded lattice realization of IIR and FIR Filters; Parallel all Pass Realization of IIR Transfer

Function; Computational Complexity of Digital Filter structures; Tellegen theorem and its applications.(Transposition theorem and Network sensitivity formula.)

UNIT -V
Digital Filter Design: Brief Review of Analog Filter Design; Impulse Invariance method of IIR filter design; bilinear Transform Method of IIR Filter Design; Design of Digital HR notch Filters; Low Pass HR digital filter design based on Truncated Fourier Series; FIR Filter Design Based on Frequency Sampling Approach; computer aided design of digital filters. Introduction to speech and language processing.

BOOKS RECOMMENDED
[1] Digital Signal Processing A Computer- Based Approach; Sanjit K. Mitra; Tata McGraw Hill (Third Edition).
[2] Digital Signal Processing; Telecommunications and Multimedia Technology; V.K.Khanna; Wheeler Publishing 1999.
[3] Understanding Digital Signal Processing; Richard G. Lyons; Addison Wesely Longman Inc.; First Indian Reprint 1999.
[4] Digital Signal Processing, Theory, analysis and Digital filter design; B. Somanathan Nair; PHI New Delhi India 2005.
[5] Digital Signal Processing; A. V. Oppenheim and R. W. Schafer

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN SOFTWARE ENGINEERING
5CO206/ 5CO236 - SPEECH AND LANGUAGE PROCESSING

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	**Instructions Hours Per Week**			**Marks**					
5CO206/5CO236 Speech and Language Processing	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
Duration of Paper: 3 Hrs.	**3**	**1**	**-**	**Max**	100	50	-	-	150
				Min	50	25	-	-	75

Objective:
To gain the knowledge for developing advanced technology of computer systems like speech recognition and machine translation.

Prerequisite:
Discrete structures, Finite automata, Context-free Grammar

CONTENTS
UNIT I:
Natural Language Processing, Applications, Ambiguity, Morphology, Parsing with Finite State Transducers, Regular Expressions, Stemmer, Spelling errors.
UNIT II:
Computational Phonology: speech sound, phonetic transcription, text to speech; Pronunciation Variations, Bayesian Method to spelling and pronunciations, Minimum Edit Distance, Weighted Automata, N-Grams for spelling and pronunciation.
UNIT III:
HMM and speech recognition, Viterbi algorithm, Acoustic processing of speech, Feature Extraction, Speech Synthesis; Part-of-Speech Tagging: rule based, stochastic, transformation based.
UNIT IV:
Syntax Processing: Parsing with CFG, Earley Parsing, Probabilistic Parsing, CYK algorithm; Semantic Processing: Meaning representation, First Order Predicate Calculus, Semantic augmentation of CFG rules, Semantic grammar, Idioms and compositionality.
UNIT V:
Lexical Semantics: Internal structure of words, Thematic roles, Primitive decomposition, Word Net; Word sense disambiguation; Information Retrieval: Vector space model, Improving user queries; Pragmatic Processing: Discourse; Natural Language Generation, Machine Translation.

BOOKS RECOMMENDED
 [1] D. Jurafsky and J.H. Martin; Speech and Language Processing; Processing; Prentice Hall; 2000.
 [2] J. Allen, Natural Language Understanding; Banjamin Cummings; 1995

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN SOFTWARE ENGINEERING
5CO207/ 5CO237 - OPTIMIZATION ALGORITHMS

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	Instructions Hours Per Week			Marks					
5CO207/5CO237 Optimization Algorithms	L	T	P		TH	CW	SW	PR	Total
Duration of Paper: 3 Hrs.	3	1	-	Max	100	50	-	-	150
				Min	50	25	-	-	75

Objective:
To understand the optimization and search techniques**.**

Prerequisite: Nil

CONTENTS

UNIT – I
Introduction : Engineering applications of optimization. Design variables. Constraints, objectives function, variable bounds, statement and formulation of an optimization problem, Examples of chemical Engg.

UNIT – II
Optimization problems, classification of optimization problems, different optimization algorithms.

UNIT – III
Optimal Point: Local optimal point, global optimal point and inflection point.
Single Variable Optimization Techniques: Optimality criterion. Bracketing method (Bounding phase method) Region elimination methods (Internal halving method, Golen section search method) Point estimation method (successive quadratic estimation methods) Gradient- based methods (Newton-Raphson method, Bisection method, secant. Cubic search method.) Root finding using optimization techniques.

UNIT – IV
Multivariable Optimization Techniques: Optimality criterion Unidirectional search method Direct Search method (Hooke-Jeeves Pattern Search method, Powell's conjugate direction method) Gradient-based methods (Steepest descent method, Newton's method, Marquardt's methods)

UNIT –V
Construined Optimization Algorithms: Kuhn-Tucker conditions. Transformation method (Penalty function method) Direct search for constrained minimization (variable elimination method, complex search method)

Linear Programming: Linear programming problems, Simplex method of linear programming techniques.

BOOKS RECOMMENDED
1) Kalyanmoy Deb; " Optimization for engg.Design"; Prentice Hall Engg. Optimization by S.S. Rao New Age
2) T.I. Edgar & D.M. Himmelblau; " Optimization of Chemical Processes"; McGraw Hill
3) Beverdge & Schecter, "Optimization: Theory & Practice "; McGraw Hill

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN SOFTWARE ENGINEERING
5CO208/ 5CO238 - MACHINE LEARNING

Devi Ahilya University, Indore, India Institute of Engineering & Technology			ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	Instructions Hours Per Week		Marks					
5CO208/5CO238 Machine Learning	L	T	P		TH	CW	SW	PR	Total
Duration of Paper: 3 Hrs.	3	1	-	Max	100	50	-	-	150
				Min	50	25	-	-	75

Objective: To expose the students about automatic machine learning methodologies.

Prerequisite:
Computer Themes; Formal Language & Automata.

CONTENTS
UNIT-I
Introduction: Theoretical Approaches: Inductive Inference; Grammatical Inference; PAC Learning; Complexity of learning; Polynomial learn ability; VC-dimension

UNIT-II
Methodologies: Parametric Learning; Language learning; Explanation based learning; Learning using exemplars; Genetic algorithms; Learning in neural nets; Multi-strategy learning

UNIT-III
Automatic program construction from example computations; Inference of LISP and logic programs; Inference of decision trees and finite automata

UNIT-IV
Architecture of machine learning programs; ID5; C4.5 etc.

UNIT-V
Application of Machine learning to Data Mining and Knowledge Discovery.

BOOKS RECOMMENDED
[1] Anthony M. and Biggs N.; Computational learning theory; Cambridge Univ. Pr. 1992.
[2] Michalewicz Z.; Genetic Algorithms + Data Structures = Logic Programs; Springer; 1992.
[3] Bergadano F. and Gunetti D.; Inductive Logic Programming; MIT Press; 1996.
[4] Goldberg D.E.; Genetic Algorithms in Search; Optimization and Machine Learning; Addison- Wesley; 1989.
[5] Ross Q.J.; C4.5; Programs for Machine Learning; Morgan Kaufmann; 1997.
[6] U.M. Fayyad et. Al.; Knowledge Discovery and Data Mining; MIT Press; 1996.
[7] Nilsson N J, Introduction to Machine Learning, eBook, 1996.

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN SOFTWARE ENGINEERING
5CO209/ 5CO239 - EMBEDDED SYSTEM TECHNOLOGY

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	Instructions Hours Per Week			Marks					
5CO209/5CO239 Embedded Systems Technology	L	T	P		TH	CW	SW	PR	Total
Duration of Paper: 3 Hrs.	3	1	-	Max	100	50	-	-	150
				Min	50	25	-	-	75

Objective: To learn about the embedded system design issues.

Prerequisite:
Microprocessors; software for H/W Interface.

CONTENTS
UNIT I
Introduction: An Embedded System Definition; Embedded Processor in a VLSI Circuit; Embedded System Hardware; Interfacing using Glue Logic; Software Embedded into the System; Application Examples of Embedded Systems in Automobile; Communication; Networking and Smart Cards.
UNIT II
Processor Structure and Memories: Internal Buses; External Buses; Control Bus; Data Bus; Programming the Parallel and Serial Ports and Timers**:** UART Mode Communication; Serial Communication in 8051; 68HC11 and 80196; 12C Bus and PCI Bus; Timers; Real Time Clock; Event Initiation After a preset Delay; Watch Dog Timer; Baud and Bit rate Control.
UNIT III
Interrupts**:** Software and hardware Interrupt Sources; Assignment of Interrupt Priorities; High Level Language Programming in Embedded System: Advantages of C; Sharing of data by Multiple Tasks and Routines; Optimization of Memory Needs; Real Time Operating Systems: Scheduling of periodic; sporadic and a periodic Tasks; Interprocessor Communication; IEEE Posix Standard
UNIT IV
Multiprocessor Systems: Modeling Tools; SDF graphs; Timed Petrinets; Multithreaded Graphs; Applications of graphs for partitioning and Load Balancing; Scheduling and Synchronization in Multiprocessor Systems

UNIT V

Distributed Embedded Systems; Designing and developing an Embedded System: System Design; Design Cycle; Use of Target Systems; Emulators; Simulators; Testing and Debugging.

BOOKS RECOMMENDED

[1] Microcontrollers ; Keneth Hintz & Daniel Tabak; McGraaw-Hill; Inc.

[2] Embedded System primer,

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN SOFTWARE ENGINEERING
5CO255/5CO285 PROJECT MANAGEMENT

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	Instructions Hours Per Week			Marks					
5CO255/5CO285 Project Management	L	T	P		TH	CW	SW	PR	Total
Duration of Paper: 3 Hrs.	3	1	-	MAX	100	50	-	-	150
				MIN	50	25			75

Objective: To develop a managerial skill for producing good quality software project and to provide a complete view of project development Life cycle.

CONTENTS
UNIT I
Projects and Products: Nature; Initiatives; Process; Product; Resources;
UNIT II
Project Lifecycle: Time & Cost Estimating; Design; Planning Techniques; Risk Analysis;
UNIT III
Project Management Tools: Execution; Measurement; Reporting; Change and Configuration Management; Implementation issues & Integration Quality Management;
UNIT IV
People Management: Task Allocation; Team Management; Leadership; Multiple Project Coordination;
UNIT V
Development Management: Program Management, Project Documentation, Communication Issues

BOOKS RECOMMENDED
 [1] G. Mclod; Managing IT Projects; Couse Tech.; 1996.
 [2] F.P. Broks Jr. The Mythical Man – month; Addison Wesley; 1999.

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN SOFTWARE ENGINEERING
5CO256/5CO286 - KNOWLEDGE MANAGEMENT

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	Instructions Hours Per Week			Marks					
5CO256/5CO286 - KNOWLEDGE MANAGEMENT	L	T	P		TH	CW	SW	PR	Total
Duration of Paper: 3 Hrs.	3	1	-	Max	100	50	-	-	150
				Min	50	25	-	-	75

Objective:
To be familiar with the advanced techniques of improving the productivity in the organizations by means of reuse of knowledge.

CONTENTS

UNIT I:
 Introduction to Knowledge Management: Data - Information - Knowledge – Wisdom (Intelligence) Genesis, Defining Knowledge, Organizational Knowledge, Knowledge Gap, Knowledge Cycle, Knowledge Management, Need, Importance and Benefits of Knowledge Management, Knowledge Management Models.

UNIT II:
Knowledge Capture, Codification and Sharing Techniques: Knowledge Identification, Capture and Codification Techniques, Knowledge Sharing, Knowledge Distribution, Transfer of Best Practices, Knowledge Maps, Semantic Webs, AI Techniques.

UNIT III:
Knowledge Management System: Knowledge Management Development Life Cycle, Infrastructure Evaluation, Knowledge Management System Analysis, Design and Development, Knowledge Filters, Audit and K-spots, KM System Implementation Issues, Deployment and Usage.

UNIT IV:
Knowledge Management Tools: Knowledge Management Tools and Software, Customized Solutions, Portals and Interfaces, Related Cases Studies.

UNIT V:
Organizational Culture and Knowledge Management: Organization, Organizational Culture, Organizational Memory, Organization Policies, Human Psychology, KM Strategy and Metrics, KM Team, Future Challenges for KM.

BOOKS RECOMMENDED

[1] Amrit Tiwania; The Knowledge Management Toolkit; (LPE) pearson Education Asia;2001
[2] T.H. Davenport & L. Prusak; Working Knowledge: How Organizations manage what they know HBS Prass; 1998.

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN SOFTWARE ENGINEERING
5CO257/5CO287 - SOFTWARE TESTING & QUALITY ASSURANCE

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	**Instructions Hours Per Week**			**Marks**					
5C0257/5CO287 SOFTWARE TESTING & QUALITY ASSURANCE	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
Duration of Paper: 3 Hrs.	**3**	**1**	**-**	**Max**	**100**	**50**	**-**	**-**	**150**
				Min	**50**	**25**	**-**	**-**	**75**

Objective: To develop a skill in developing good quality in the software product.

UNIT I:
SOFTWARE TESTING PRINCIPLES: Need for testing - Psychology of testing - Testing economics – Various software development Life cycles (SDLC) –Principles of testing.

UNIT II:
WHITE BOX TESTING: White box testing techniques - Statement coverage - Branch Coverage - Condition coverage - Decision/Condition coverage - Multiple condition coverage - Dataflow coverage - Mutation testing - Automated code coverage analysis

UNIT III:
BLACK BOX TESTING: Black box testing techniques - Boundary value analysis - Robustness testing - Equivalence partitioning -Syntax testing - Finite state testing - Levels of testing – Unit testing- Integration Testing.

UNIT IV:
TESTING STRETAGIES: System testing - Functional testing-non-Functional testing-acceptance testing- performance testing –Factors and Methodology for Performance testing, Regression testing-Methodology for Regression testing.

UNIT V:
ADVANCE SOFTWARE TESTING METHOD (OBJECT ORIENTED TESTING):
Syntax testing - Finite state testing - Levels of testing - Unit, Integration and System Testing.
Challenges - Differences from testing non-OO Software - Class testing strategies - State-based Testing Software quality Assurance: ISO 9000; CMM and Test Management Issues; Quality Assurance personnel Issues.

BOOKS RECOMMENDED
1. Srinivasan Desikan & Gopalswamy Ramesh "Software testing Principles and Practices" Pearson education, 2006
2. R. Patton; Software Testing; Techmedia (SAMS) 2000.
3. Glenford J.Myers, " The Art of Software Testing ", John Wiley & Sons, 1979.
4. Boris Beizer, Black-Box Testing: " Techniques for Functional Testing of Software and Systems ",John Wiley & Sons, 1995.
5. P.C.Jorgensen, " Software Testing - A Craftman's Approach ", CRC Press, 1995.
6. Robert V.Binder, " Testing Object-Oriented Systems: Models Patterns and Tools ", Addison Wesley, 2000.

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN
SOFTWARE ENGINEERING
5CO258/5CO288 – Bioinformatics Computing

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	**Instructions Hours per Week**			**Marks**					
5CO258/5CO288 Bioinformatics Computing	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
	3	**1**	**-**	**Max**	**100**	**50**	**-**	**-**	**150**
Duration of paper: 3 hrs				**Min**	**50**	**25**	**-**	**-**	**75**

Objective:
To study the concepts of various biological based information security systems.

Pre-requisite: NIL

<div align="center">COURSE CONTENTS</div>

UNIT-I

Overview of Biometrics: Definitions, biometric modalities, course outline, Basic applications: access control, e-commerce, forensics.

UNIT-II

Design of a Biometric System: Building blocks, Modes of operation, Fingerprint verification: Minutiae Based Fingerprint Matching, Non-minutiae Based Representations, Fingerprint Enhancement, and Fingerprint Classification.

Face Recognition:- Introduction, Authentication vs. Identification, Challenges in Face recognition, Algorithms for face recognitions.

UNIT-III

Iris Recognition: Introduction, devices for capturing Iris, Iris representation schemes, Iris recognition

algorithms. Biometrics based on hand geometry, signature, ear, palm, voice and DNA.

UNIT-IV

Multimodal Biometrics: Limitations of unimodal systems, multibiometric scenarios, levels of fusion, system design, score fusion techniques, score normalization, user-specific parameters, and soft biometrics.

UNIT-V

Case Study Presentations: Biometrics in Banking Industry, Biometrics in Computerized, Patient Records, Biometrics in Credit Cards, Biometrics in Mass Disaster Victim, Identification Forensic Odontology

Books Recommended:

1) D. Maltoni, D. Maio, A. K. Jain, and S. Prabhakar; "*Handbook of Fingerprint Recognition*"; Springer Verlag, 2003.
2) A.K. Jain, R. Bolle, S. Pankanti (Eds.); "*BIOMETRICS: Personal Identification in Networked Society*", Kluwer Academic Publishers, 1999.
3) J. Wayman, A.K. Jain, D. Maltoni, and D. Maio (Eds.); Biometric Systems: Technology, "*Design and Performance Evaluation*"; Springer, 2004.

M.E. (COMPUTER ENGINEERING) SPECIALIZATION IN SOFTWARE ENGINEERING
5CO259/5CO289 – WEB APPLICATION DEVELOPMENT

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Computer Engineering) (Sp. Software Engineering)					
Subject Code & Name	Instructions Hours Per Week			Marks					
5C0259/5CO289 Web Application Development	L	T	P		TH	CW	SW	PR	Total
Duration of Paper: 3 Hrs.	3	1	-	Max	100	50	-	-	150
				Min	50	25	-	-	75

Objective: To learn web application development using various technologies and to develop skills for building web application with dynamic contents.

Prerequisite: Knowledge of Java Programming language (core), HTML and basics of SQL.

CONTENTS

UNIT I:

Introduction: Introduction to web application and WWW. HTTP protocol- Http request, Http response; web container and web server overview;

UNIT II:

Client Side Technologies: Client side scripting system, HTML, Java Script, VB Script

UNIT III:

Server side technologies: Servlets, Servlet life cycle, Java Server pages- JSP overview; Directives; Scripting elements; Standard actions, Implicit objects; Scope; XML – equivalent tags; JSP basics of design; Dispatcher approach; Introduction to JSP tag extension;

UNIT IV:

Database Connectivity with Middle tier: Connectivity of java with Database system. API for interaction with database; Connection pooling; Transaction.

Introduction to CGI, PHP and ASP. Comparison of these technologies with servlet and JSP. Session Tracking **-** Approaches to session tracking; Session tracking with JAVA servlet; Servlet collaboration.

UNIT V:

Wireless Web: Wireless web Protocols, Collaborative Computing; Web–enabled Mobile Computing; Web–Service Development;

BOOKS RECOMMENDED

[1] J2EE Tutorial from www.java.sun.com.

[2] JAVA servlet programming, Jason Hunter, William Crawford, O'Reilly, SPD.

[3] Professional JAVA server programming, J2EE edition, volume I, Wrox, SPD.

[4]Jessica Bordman; Collaborative Web Development; Pearson Education Asia – 2000.