SCHEME OF EXAMINATION

&

DETAILED SYALLBUS

for

B. Tech./M. Tech. (Dual Degree) programme
[9th – 12th Semester]

In

Computer Science and Engineering

Guru Gobind Singh Indraprastha University
Kashmere Gate, Delhi [INDIA] –110 403
www.ipu.ac.in

Guru Gobind Singh Indraprastha University
Kashmere Gate, Delhi – 110 403 [INDIA]
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SCHEME OF EXAMINATION

Ninth Semester

Course Code	Subject Name	L	T/P	Credits
IT-509	Information Security	4	-	4
IT-416	Mobile Computing	4	-	4
ITR-731	Advanced Software Project Management	4	-	4
	Elective-I	4	-	4
	Elective-II	4	-	4
Practicals				
IT-551	Information Security Lab.		4	2
IT-553	Mobile computing . Lab		4	2
IT-555	Advanced Software Project Management Lab		4	2
Total		**20**	**12**	**26**
List of Electives				
IT-501	Intelligent Systems	4	-	4
IT-503	Optical Communication	4	-	4
IT-505	Programming with AVR Microcontroller	4	-	4
IT-507	Project Work	4	-	4
ITR-705	Software Reusability	4	-	4
IT-511	Network Management	4	-	4
ITR-721	Satellite Communication	4	-	4
ITR-729	Information Storage & Management	4	-	4
MS-235	Enterprise Resource Planning	4	-	4
BAEP-705	Nano Science & Engineering	4	-	4
BAEP-707	Introduction to Quantum Information and Computation	4	-	4
HCS-607	Nonverbal Communication	4	-	4

Note: A candidate can also choose an elective form the B. Tech. seventh semester, provided that he has not opted for it earlier.

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SCHEME OF EXAMINATION

Tenth Semester

Course Code	Subject Name	L	T/P	Credits
IT-502	Distributed DBMS	4	-	4
ITR-630	Enterprise computing in JAVA	4	-	4
	Elective-I	4	-	4
	Elective-II	4	-	4
	Elective-III	4	-	4
Practicals				
IT-552	Advanced DBMS Lab.	-	4	2
IT-554	Enterprise computing in JAVA Lab.	-	4	2
IT-556	Lab. Based on Elective Sujects	-	4	2
Total		**20**	**12**	**26**
List of Electives				
IT-504	Advanced Semantic Web	4	-	4
IT-506	Service Oriented Architecture	4	-	4
ITR-606	Wireless Mobile Networks	4	-	4
ITR-608	VLSI Design	4	-	4
ITR-612	Real Time Systems & Software	4	-	4
IT-510	Advanced Software Engineering	4	-	4
ITR-618	Software Requirement & Estimation	4	-	4
ITR-620	Neural Networks	4	-	4
ITR-622	Network Programming	4	-	4
ITR-624	Fuzzy Logic & Design	4	-	4
ITR-626	Genetic Algorithms	4	-	4
ITR-628	Information Theory & Coding	4	-	4
IT-508	Project Work	4	-	4
IT-512	High Performance Computing	4	-	4
HCS-606	Interpersonal Communication & Personality Development	4	-	4
HCS-702	Research Methodology	4	-	4

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SCHEME OF EXAMINATION

Eleventh Semester

Course Code	Subject Name	L	T/P	Credits
IT-951	Dissertation Work -1 (Survey and formulation of the Problem)	-	-	20
IT-953*	Seminar & Progress Work	-	-	08
Total				**28**

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SCHEME OF EXAMINATION

Twelfth Semester

Course Code	Subject Name	L	T/P	Credits
IT-952	Dissertation	-	-	24
IT-956*	Comprehensive Viva	-	-	04
Total				**28**

Note: 1. '*' marked papers are NUES papers
2. Total number of credits in B. Tech./M. Tech. (Dual Degree)=210/108
3. Minimum Number of credits to be earned for the award of the degree of M. Tech. (Dual Degree) = 300.
4. Minimum number of credits to be earned by the students directly admitted to the M. Tech. programme through lateral entry = 100

IT-509	Information Security	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: **Maximum Marks : 60**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Introduction

Security goals, Classical security Techniques and Information Security Concepts. Confidentiality and Security, Security Policy and Operations Life Cycle, Security System Development and Operations

Security Threats

The Attack Process. Attacker Types. Vulnerability Types. Attack Results. Attack Taxonomy. Threats to Security: Physical security, Biometric systems, monitoring controls, and Data security and intrusion and detection systems.

Unit-2

Cryptography

Conventional techniques, Modern techniques, DES, DES chaining, Triple DES, RSA algorithm, Key management. Message Authentication and Hash Algorithm, Authentication requirements and functions secure Hash Algorithm, Message digest algorithm, digital signatures. AES Algorithms.

Unit-3

Network Security: Security at the application, transport and Network Layers Security issues with E-mail, PGP and S/MIME., SSL and TSL and IPSec

Unit-4

VPN: VPN Basics. Types of IPsec VPNs. IPsec Modes of Operation and Security Options. Topology Considerations. Design Considerations. Site-to-Site Deployment Examples.

Secure Network Design

Analysis of Organizational Security requirements, Design of the security architecture, Protocol Capabilities, Tool Capabilities. Secure Management Design Options., Firewalls, Trusted systems, IT act and cyber laws.

Text Books:

1. William Stalling "Cryptography and Network Security" Fourth Ed., Prentice Hall, 2006
2. B A Forouzan "Cryptography and Network Security" TMH, 2008

Reference Books:

1. Charles P. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing" 3rd Edition, Prentice Hall, 2003
2. Jeff Crume "Inside Internet Security" Addison Wesley, 2003
3. Sean Convery, " Network Security Architectures, Published by Cisco Press, First Ed. 2004

Paper Code: IT-416 **L:3 T/P:1 C:4**
Paper ID: 15416 **Paper: Mobile Computing**

INSTRUCTIONS TO PAPER SETTERS:	**Maximum Marks : 60**
1.	Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2.	Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

UNIT – I

Introduction to Personal Communications Services (PCS): PCS Architecture, Mobility management, Networks signalling.

Global System for Mobile Communication (GSM) system overview: GSM Architecture, Mobility management, Network signalling, Performance Analysis: Admission control and handoffs

UNIT – II

2.5/3G Mobile Wireless systems: packet switched Data
Introduction, 3G CDMA cellular standards, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G. 2.5/3G TDMA: General Packet Radio Services (GRPS) and EDGE.

UNIT – III

Access Scheduling techniques in cellular systems
Slotted Aloha access, integrated access: voice and data, scheduling in packet based cellular systems.
Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.

UNIT – IV

Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML).

Wireless Local Loop(WLL): Introduction to WLL Architecture, wireless Local Loop Technologies.

Global Mobile Satellite Systems; case studies of the IRIDIUM and GLOBALSTAR systems.

TEXT BOOKS:

1. Yi-Bing and Imrich Chlamtac, "Wireless and Mobile Networks Architectures", John Wiley & Sons, 2001.
2. Raj Pandya, "Mobile and Personal Communication Systems and Services", PHI, 2001
3. Mischa Schwartz, "Mobile Wireless Communications", Cambridge University Press, UK, 2005.

REFERENCES:

1. Mark Ciampa, "Guide to Designing and Implementing wireless LANs", Thomson learning, Vikas Publishing House, 2001.
2. Ray Rischpater, "Wireless Web Development", Springer Publishing, 2000.
3. Sandeep Singhal, "The Wireless Application Protocol", Pearson Education Asia, 2000.
4. P. Stavronlakis, "Third Generation Mobile Telecommunication systems", Springer Publishers, 2001

ITR – 731	Advanced Software Project Management	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Introduction to Software Project Management:

Software development as a project; Stakeholders in software project; Software product, process, resources, quality, and cost; Objectives, issues, and problems relating to software projects.

Overview of Project Planning:

Steps in project planning; Defining scope and objectives; work breakdown structure; Deliverables and other products; time, cost, and resource estimation; Alternatives in planning

Project Evaluation:

Strategic assessment; Technical assessment; Cost-benefit analysis; Cash flow forecasting; Cost-benefit evaluation techniques; Break-even analysis; Risk evaluation

Selection of Appropriate Project Approach:

Choosing development technology and methodology; choice of process model; Rapid application development; Waterfall model; V-process model; Spiral model; Prototyping,; Incremental delivery.

Unit-2

Software Effort Estimation

Problem in software estimation; Effort estimation techniques; Expert judgement; Estimation by analogy; Delphi technique; Algorithmic methods; Top-down and bottom-up estimation; Function point analysis; Object points; COCOMO model.

Activity Planning

Network planning model; Activity-on-arrow network; Precedence network; Forward pass; Backward pass; Critical path; Slack and float.

Risk Analysis and Management

Nature and categories of risk in software development; risk Identification; Risk assessment; Risk mitigation, monitoring, and management; Evaluating schedule risk using PERT.

Unit-3

Recourse Allocation

Nature of project resources; Identifying resource requirement of activities; Allocating and scheduling resources; cost of resources; Standard, planned, and actual cost; Cost variance; time-cost trade-off.

Project Tracking and Control

Measurement of physical and financial progress; Earned value analysis; Status reports; Milestone reports; Change control.

Contact Management
Outsourcing of products and services; Types of contracts; Stages in contract placement; Terms of contract; Contract monitoring; Acceptance testing

Unit-4
Managing People and Organizing Teams
Organizational behaviour; Recruitment and placement; Motivation; Group behaviour; Individual and group decision making; Leadership and leadership styles; forms of organizational structures.

Software Quality Assurance
Planning for quality; Product versus process quality management; Procedural and quantitative approaches; Defect analysis and prevention; Statistical process control; Pareto analysis; Causal analysis; Quality standards; ISO 9000; Capability Maturity Model; Quality audit.

Configuration Management
Configuration management process; Software configuration items; Version control; change control; Configuration audit; Status reporting.

Text:
1. Bob Hughes and Mike Cotterell, "Software Project Management", Third Edition 2002, McGraw-Hill
2. Pankaj Jalote, "Software Project Management in Practice", 2002, Pearson Education Asia.

Reference:
1. Roger S. Pressman, "Software Engineering: A practitioner's Approach", Fifth Edition 2001 McGraw-Hill
2. Robert T. Futrell, Donald F. Shafer, and Linda I.. Shafer, "Quality Software Project Management" 2002, Pearson Education Asia.
3. Ramesh Gopalaswamy, "Managing Global Software Projects", 2003, Tata McGraw-Hill

IT-501	Intelligent Systems	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: **Maximum Marks : 60**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Data, information and knowledge. Model of an intelligent system. Models of knowledge representations: Representation and reasoning in logic. Semantic representations: semantic networks, frames; Frame/ script systems; Conceptual dependency and conceptual graphs.

Unit-2

Ontologies. Knowledge based systems: Software architecture of a knowledge-based system, Rule-based programming and production systems, Rule chaining and inference control, Inference: reasoning about knowledge, Temporal reasoning, Inference under uncertainty: Bayesian techniques, Fuzzy reasoning, Case-based reasoning.

Unit-3

Intelligent agents, the agent metaphor and attributes of agent hood, Agent theory and languages, Inter-agent communication, Ontological issues. Alternatives to the symbolic approach:

Unit-4

Planning, intelligent interfaces, user-modeling, Practical implications of choosing and applying AI solutions. Knowledge representation and the Web, Semantic Web

Text Books

1. Russel, S., Norvig, P.: Artificial Intelligence, a Modern Approach, Pearson Education
2. Mitchel, T.: Machine Learning. McGraw Hill
3. G. Weiss, *Multiagent Systems*, MIT Press, 1999.
4. M. Wooldridge, *An Introduction to MultiAgent Systems*, J. Wiley & Sons

IT-503	Optical Communication	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Introduction: concepts of information, general communication systems, evolution of optical fiber communication systems, advantages, disadvantages of optical fiber, communication systems.

Wave propagation in dielectric waveguide: snell's law, internal reflection, dielectric slab wave guide, numerical aperture, propagation of model & rays. step-index fibers, graded index fibers.

Unit-2

Attenuation in optics fibers: Fiber attenuation, connectors &splices, bending loses, Absorption, scattering, very low loss materials, plastic & polymer-clad-silica fibers.

Wave propagation in fibers: wave propagation in step index & graded index fiber, fiber dispersion, single mode fibers, multimode fibers, dispersion shifted fiber, dispersion flattened fiber, polarization.

Unit-3

Optical sources & detectors: principles of light emitting diodes (LED's) , design of LED's for optical fiber communications, semiconductor LASER for optical fiber communication system ,principles of semiconductor photodiode detectors, PIN photodiode, Avalance photodiode detectors.

Optical fiber communication system: telecommunication, local distribution series, computer networks local data transmission & telemetry, digital optical fiber communication system, first & second generation system, future system.

Unit-4

Advanced multiplexing strategies: Optical TDM, subscriber multiplexing (SCM), WDM

Optical networking: data communication networks, network topologies, MAC protocols, Network Architecture- SONET/TDH, optical transport network, optical access network, optical premise network.

Refence Books :

1. Senior J., optical fiber communications, principles & practice, PHI.
2. Keiser G., optical fiber communications, Mcgraw-hill.
3. Gowar J., optical communication systems, PHI.
4. William B. Jones jr., Introduction to optical fiber communication systems,Holt, Rinehrt and Winston,Inc.

IT-505	Programming with AVR microcontroller	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Microcontroller architecture, The AVR RISC Microcontroller Architecture: AVR family architecture, Register File, Memory access and instruction Execution, I/O Memory, I/O Ports.

Unit-2

AVR Instruction Set: Program and data addressing modes, Arithmetic & Logic Instruction, Program Control Instruction, Data Transfer Instruction

AVR Hardware Design Issues: Power source, Operating clock sources, Reset circuit

Unit-3

Hardware & Software Interfacing with AVR: Lights & switches, Stack operation in AVR Processors, Implementing Combinational Logic, Connecting the AVR to the PC serial port, Expanding I/O, Interfacing analog to Digital converters and DAC, Interfacing with LED/LCD displays, Stepper motor interface with AVR.

Unit-4

Communication links for the AVR Processor: RS-232 Link, RS-422/423 link, SPI and microwave bus, IrDA Data link, CAN

AVR System Development tool: Code assembler, Code simulator, Evaluation boards, AVR emulator, Device Programmer

TEXT BOOKS:

1. Dhananjay V. Gadre, “Programming and Customizing the AVR Microcontroller”, TMH 2003.

Code No: IT-507	**P**	**C**
Lab: Project Work	**4**	**4**

The student will submit a synopsis at the beginning of the semester for approval to the school project committee in a specified format. The student will have to present the progress of the work through seminars and progress report. A report must be submitted to the school for evaluation purpose at the end of the semester in a specified format.

ITR- 705	Software Reusability	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Introduction: Software Reuse success factors

Architecture Style: Object-oriented software engineering, application & component systems, use case components, object components, layered architecture.

Unit-2

Reuse processes: Object oriented business engineering, applying business engineering to define processes & organization, application family engineering, component system engineering, application system engineering

Unit-3

Organizing a reuse business: Its transaction, Management, working

Component based software development: component definition, component metamodel, component engineering vs application engineering

Unit-4

Component based and Model driven development using UML: Component specification, context

realization, component realization

Text Books:

1. Ivan Jacobson, Griss Jacobson, Patrick Johnsson, "Software Reuse: Architecture, Process and Organization for business Success, ACM press books, 1997

Reference Books:

2. Joffrey S. Poutin, "Measuring Software Reuse: Principles Practices, Economic Models", Addison Wesley, 2001

3. Hans-Gerhard Gross, "Component based Software testing with UML", Springer-Verlag, Berlin, 2005

IT-511	Network Management	L	T/P	C
		4	0	4

UNIT-I

Data communications and Network Management Overview : Analogy of Telephone Network Management, Communications protocols and Standards, Case Histories of Networking and Management, Challenges of Information Technology Managers, Network Management: Goals, Organization, and Functions, Network and System Management, Network Management System Platform, Current Status and future of Network Management.

UNIT-II

SNMPV1 Network Management : Organization and Information and Information Models. Managed network: Case Histories and Examples, The History of SNMP Management, The SNMP Model, The Organization Model, System Overview, The Information Model.

SNMPv1 Network Management : Communication and Functional Models.
The SNMP Communication Model, Functional model

SNMP Management: SNMPv2 : Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information, The SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility With SNMPv1

SNMP Management: RMON : What is Remote Monitoring? , RMON SMI and MIB, RMON1, RMON2, ATM Remote Monitoring, A Case Study of Internet Traffic Using RMON

UNIT-III

Telecommunications Management Network : Why TMN?, Operations Systems, TMN Conceptual Model, TMN Standards, TMN Architecture, TMN Management Service Architecture, An Integrated View of TMN, Implementation Issues.

UNIT-VII

Network Management Tools and Systems : Network Management Tools, Network Statistics Measurement Systems, History of Enterprise Management, Network Management systems, Commercial
Network management Systems, System Management, Enterprise Management Solutions.

Web-Based Management : NMS with Web Interface and Web-Based Management, Web Interface to SNMP Management, Embedded Web-Based Management, Desktop management Interface, Web-Based Enterprise Management, WBEM: Windows Management Instrumentation, Java management Extensions, Management of a Storage Area Network: , Future Directions

TEXT BOOK :

1. Network Management, Principles and Practice, Mani Subrahmanian, Pearson Education.

REFERENCES :

1. Network management, Morris, Pearson Education.
2. Principles of Network System Administration, Mark Burges, Wiley Dreamtech.
3. Distributed Network Management, Paul, John Wiley.

ITR – 721 Satellite Communication	L	T/P	C
	4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Introduction:

Origin and brief history of satellite communications, An overview of satellite system engineering, satellite frequency bands for communication.

Orbital theory:

Orbital mechanics, locating the satellite in the orbit w.r.t. earth look angle determination. Azimuth & elevation calculations.

Unit-2

Spacecraft systems:

Attitude and orbit control system, telemetry , tracking and command (TT&C), communications subsystems, transponders, spacecraft antennas.

Satellite link design:

Basic transmission theory, noise figure and noise temperature, C/N ratio, satellite down link design, satellite uplink design.

Unit-3

Modulation, Multiplexing, Multiple access Techniques:

Analog telephone transmission, Fm theory, FM Detector theory, analog TV transmission, S/N ratio Calculation for satellite TV linking, Digital transmission, baseband and bandpass transmission of digital data, BPSK, QPSK , FDM, TDM,

Access techniques : FDMA, TDMA, CDMA.

Unit-4

Encoding & FEC for Digital satellite links:

Channel capacity, error detection coding, linear block, binary cyclic codes, convolution codes.

Satellite Systems:

Satellite Earth station Technology,satellite mobile communication, VSAT technology, Direct Broadcast by satellite (DBS).

Reference Books:

1. Timothy Pratt , Charles W. Bostian, "Satellite communication", John Wiley &sons publication, 2003
2. J.J. Spilker, "Digital Communication by satellite , PHI Publication, 1997
3. J. Martin, "Communication satellite systems", PHI publication, 2001

ITR – 729	Information Storage & Management	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Complexity of Information Management: Proliferation of Data, Data Center Evolution, Managing Complexity, I/O and the five pillars of technology, Storage Infrastructure, Evolution of Storage

Unit-2

Storage Systems Architecture: Modern Storage Systems, Storage Systems, Intelligent Disk Subsystems , Physical Disks , Back End ,Cache ,Front End , Host Environment

Introduction to Networked Storage: Storage Networking Overview, Direct Attached Storage, Storage Area Networks, Case study – Applying SAN concepts, Network Attached Storage, Case study – Applying NAS concepts, IP SAN, CAS, Hybrid Network Storage Based Solutions/ Emerging Technologies, Case study – Applying SAN, NAS, IP SAN concepts

Unit-3

Introduction to Information Availability: Business Continuity Overview, Data Availability, Business Continuity – Local, Case study – Applying local information availability strategies, Business Continuity – Remote, Case study – Applying remote information availability strategies, Disaster Recovery

Unit-4

Managing and Monitoring: Monitoring in the Data Center, Case study – Monitoring exercise, Management in the Data Center, Case study – Managing exercise

Case Studies must be supported by laboratory

Text Book:

1. Marc Farley Osborne, "Building Storage Networks", Tata McGrawHill, 2001
2. Robert Spalding, "Storage Networks: The Complete Reference", Tata Mcgraw Hill, 2003
3. NIIT, "Introduction to Information Security Risk Management" , Prentice-Hall of India, 2000

MS-235	Enterprise Resource Planning	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: **Maximum Marks : 60**

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Objectives: This course aims at providing overall knowledge regarding the concepts and structure of ERP systems and imparts necessary managerial skills for ERP implementation in a business enterprise.

Course Contents:

Unit-1

ERP: Enterprise Perspective: An Overview, Features of ERP, MIS Integration, ERP drivers, Trends in ERP, ERP in India. (8 Hours)

Unit-2

ERP: System Perspective: Management Information System, Operations Support System, DSS, Transaction Processing System, Network Structure of ERP System, ERP Work flow, Process modeling for ERP Systems, Communication in ERP Systems, OLTP, (On Line Transaction Processing), OLAP (On Line Analytical Processing), Enterprise Integration Application Tools for
ERP. (12 Hours)

Unit-3

ERP: Resource Management Perspective: Business Modules in ERP Packages, Finance, Production, Human Resource, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution, Resource Management, Business Process Reengineering, Relationship between ERP & BPR, ERP Implementation Life Cycle, Implementation methodology, ERP Project Management & Monitoring.
(12 Hours)

Unit-4

ERP: Key Issues: ERP and E-Commerce, ERP Culture, ERP and CRM, ERP and SCM, ERP Selection Issues, ERP in Public Sector Enterprises, Pre and Post Implementation Issues, ERP Vendors, Key ERP Consultants in India, Future Directions in ERP. (10 Hours)

Text Books:

1. Alexis, Leon (Ist Edition, 2000). ERP Demystified. Tata McGraw Hill.
2. Garg, V.K. and Venket, Krishna, N.K., (Ist edition, 1997). ERP Concepts and Practices, PHI Publications.
3. Sadagopan, S. (Ist Edition, 1999). ERP: A Managerial perspective. Tata McGraw Hill.

Reference Books:

1. Langenalter, A. Gary (1st Edition, 2000). Enterprise Resources Planning and Beyond. St. Lucie Press, USA.
2. Imhoff, C. Loftis Lisa & Geiger, G. Jonathan (Ist Edition, 2001). Building the Customer Centric Enterprise. John Wiley & Sons.
3. Shankar, Ravi & Jaiswal, S. (Ist Edition, 1999). Enterprise Resource Planning. Galgotia Publications.
4. Diwan, Parag & Sharma, Sunil (Ist Edition, 1999). Enterprise Resource Planning: A Manager's Guide. Excel Books.

BAEP- 705 NANO SCIENCE AND ENGINEERING

L	T/P	C
4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit -1

Section-A

Introduction of nano science and technology, Scope of nano Science and Technology

Section –B

Properties Of nano particles: - Optical properties, Magnetic Properties, Heat Capacity etc.

Unit-II

Synthesis and fabrication of nano particles :Ball milling ,Thermal evaporation, chemical vapor deposition, Biological method

Unit-III

Characterization Of Nano Particles: X-ray diffraction, Scanning Electron Microscopy, tunneling Electron Microscopy, EDX Analysis

Unit -IV

Nano Device And modelling

BAEP- 707 Introductions to Quantum Information and Computation

L	T/P	C
4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Introduction

Computers as physical systems, technological issues, Introduction to Turing machines-classical probabilistic and deterministic Turing machines, Quantum Turing machines; introduction to computability, complexity, classical complexity and quantum complexity classes

Unit-2

Quantum Physics and Computers

Review of Quantum Mechanics- state vectors, superpositions, unitary operators, hermitian operators, Schrödinger equation, Hamiltonian evolution, the concept of quantum measurement, the concept of qubits, quantum registers and quantum gates

Unit-3

Quantum Algorithms

Introduction to quantum algorithms, Deutsch's algorithm, Shor's algorithm and Grover's search Algorithm, Physical implementation of simple quantum gates.

Unit-4

Quantum Cryptography and Quantum Teleportation, real physical systems and technological feasibility

Heisenberg uncertainty principle, polarization states of photons, quantum cryptography using polarized photons, entanglements, introduction to the EPR paradox, BELL's theorem, Bell basis, teleportation of a single qubit, review of some current experiments and candidate physical systems, technological feasibility of a quantum computer and the limitations imposed by noise.

HCS – 607	Nonverbal Communication	L	T/P	C
		4	0	4

OBJECTIVE:

This course will teach the students how to read *non verbal* language at all levels. The students will be exposed to importance of body language as a means of effective communication and trained to use body language to (a) increase personal impact over the listeners and build rapport with others (b) read and interpret other people's signals, and (c) help control tension and conflict in interactive/communicative *situations.*

COURSE CONTENTS:

Unit I: **Introduction:** Concept and Scope of Non-Verbal Communication: Definitions and Principals; Domains of Non-Verbal Communication: Body Language, Sign Language (i.e. Traffic signals etc), Cultural Conventions, Customs, Space and Time Conventions etc; Clothing and Personal Appearance; Scope and Significance of Non-Verbal Communication

Unit II: **Body Language:** Concept, Scope and Significance as Communicative Tool; Facial Expressions and Eyes, Gestures, Postures, Gait and Space, Physical Environment.

Unit III: **Body Language in Inter-Personal Relationships:** Personal Body Language Awareness: Initial Diagnostic of Personal Body Language; Trainer and Group Feedback; Reading and Responding to Signals from Other People's Body Language; Improving Body Language for Effective Communication

Unit IV: **Non Verbal Communication & Culture:** Socio-Cultural Influence on Body Language: Ritual, Symbols and Taboos; Historical Perspective on Non-Verbal Communication and Socio-Geographical Space

Recommended Reading:

1. Pease, Allan. *Body Language: How to Read other's Thoughts by Their Gestures*. New Delhi: Sudha Publication, 2003
2. Ribbens, Geoff and Richard Thompson. *Body Language*. New York: Hodder & Stoughton, 2007
3. Morris, Desmond. *The Pocket Guide to Man Watching.* London: Grafton Books

IT-502 Distributed Database Management System **L T/P C**
4 0 4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Object Relational and Extended Relational Databases : Database design for an ORDBMS , Nested relations and collections , Storage and access methods , Query processing and optimization , An overview of SQL3 , Implementation issues for extended type , Systems comparison of RDBMS , Comparison of OODBMS and ORDBMS

Unit-2

Paralled and Distributed Databases and Client–Server Architecture : Architectures for parallel databases , Parallel query evaluation , Parallelizing individual operations , Sorting Joins , Distributed database concepts , Data fragmentation , Replication and allocation techniques for distributed database design , Query processing in distributed databases , Concurrency control and recovery in distributed databases , An overview of client–server architecture

Unit-3

Databases on the Web and Semi–Structured Data: Web interfaces to the web
Overview of XML , Structure of XML data , Document Schema , Querying XML data , Storage of XML data , XML applications , The semi–structured data model , Implementation issues

Unit-4

Enhanced Data Models for Advanced Applications : Active database concepts , Temporal database concepts , Spatial databases: concept and architecture , Deductive databases and query processing , Mobile databases , Geographic information systems

Textbooks

1. Elmsari and Navathe, Fundamentals of Database Systems
2. Ramakrishnan and Gehrke, Database Management Systems

References

1. Korth, Silberschatz, Sudarshan, Database System Concepts
2. Rob and Coronel, Database Systems: Design, Implementation and Management
3. Date C.J Introduction to Database Systems

ITR - 630	Enterprise Computing in JAVA	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

J2EE: Introduction to J2EE, Building J2EE Applications, JDBC, Servlets and Web Applications, Java Server Pages and Model/View/Controller, J2EE Web Services Overview, Introduction to EJB, Session EJBs, Entity EJBs, JMS and message driven Beans, Transactions and Security, Application Servers (Case Study of any one of IBM Websphere, BEA Weblogic, JBoss)

Unit-2

Hibernate: Principles of Object Relational Mapping, Hibernate configuration, HQL making objects persistent, Hibernate semantics, Session management, flushing, concurrency and Hibernate, Optimistic and Pessimistic Locking, Object mapping Mapping simple properties, Single and multi valued associations, Bi-directional associations, Indexed collections, Using Hibernate Template, Querying, Session management, Transaction integration and demarcation.

Unit-3

Spring: Introduction of Spring Framework: Spring Architecture, Spring Framework definition, Spring & MVC, Factory Pattern, BeanFactory, Spring Context definition, Inversion of Control (IoC), Spring AOP, Application Context and BeanFactory, Spring ORM, Mapping API for JDO, Hibernate, Hibernate Mapping, JDO Mapping, iBATIS, Spring Abstract Transaction layer, Employing Spring transaction, Using EJB declarative transactions, Integration process, integrating Spring MVC in web application, MVC in web application, MVC Framework.

Unit-4

Web Services: Introduction to XML, Service-Oriented Architectures SOAP, SOAP message structure, handling errors WSDL, UDDI, Java Web Service implementations JAX-RPC, Web service clients in Java, Introduction to Ajax.

Text Books:

1. Jim Farley, William Crawford, O'Reilly and Associates, "Java Enterprise in a Nutshell", 2005
2. Brett McLaughlin, O'Reilly, "Java and XML, 2nd Edition, 2001

Reference Books:

3. Elliott Rusty Harold and W. Scott Means, O'Reilly, "XML in a Nutshell", 2001
4. James Cooper, "Java Design Patternsn: A Tutorial", Addison Wesley
5. Govind Sesadri, "Enterprise java Computing: Application and Architectures", Cambridge University Publications, 1999

IT- 504 Advanced Semantic Web Technology

L	T/P	C
4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Semantic Web : Introduction , growth and evolution , goals and vision , need , problems , applications , it's relation with Artificial Intelligence.

Architecture : Ontology, RDF, XML, URI and other components.

Unit-2

Ontologies: Role of Ontology in intelligent information retrieval on web, OWL, Ontologies for different applications.

Unit-3

Semantics : Kinds of semantics , use of semantics

Search Engines : Role of search Engines in intelligent retrieval of information on web.

Unit-4

Semantic web browsers : Role of semantic web browsers
Issues in semantic web research and proposed solutions.

Text:

1. Tim Berner's Lee, "Weaving the web: The original design and ultimate destiny of www", Harper Business (imprint of Harper Collins) .
2. Michael C Daconta, Leo, Kelvin Smith , "The Semantic Web:A guide to the future of XML,Web services, and knowledge management", Wiley.
3. Vladimir Geroimenko, Chaommei Chin, "Visualizing the Semantic Web", Springer.
4. Jorge Cardoso, "Semantic Web Services, theory tools and application", Information Science Reference.
5. Amit Sheth , Miltiadis D. Lytras, "Semantic Web-Based Information Systems: state-of-art Applications", CyberTech Publishing.
6. David Taniar , Johanna Wenny Rahayu, " Web Semantics & Ontology", IGI Publishing

References:

1. Dieter Fensel, James Hendler, Henry Lieberman, Tim Berner's Lee "Spinning the Semantic Web", MIT press
2. Grigoris Antonion, Frank Van Harmalen,"Semantic Web primer", MIT press
   Thomas B Passin, "Explorer's guide to Semantic Web", Hanning
3. A.F. Salam , Jason Stevens, " Semantic Web Technologies and E-Business: Towards the Integrated Virtual Organization and Business Process Automation", IGI Publishing.
4. Dan Zambonini ," The 7 (f)laws of the Semantic Web", O'Reilly XML Blog

IT-506	Service Oriented Computing	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Introduction : Computing with Services , Basic Standards for Web Services: XML and XML Schema, SOAP, WSDL, UDDI , Enterprise Architectures , Principles of Service-Oriented Computing

Unit-2

Modeling and Representation: Ontologies, KR, UML, Resource Description Framework, RDF, RDFS, N-Triples, Web Ontology Language, OWL , Ontology Management, UBL, IEEE SUO, Consensus

Unit-3

Execution Models, CORBA, P2P, Jini, Transaction Concepts, ACID, Schedules, Serializability, Extensions , Coordination Frameworks for Web Services, WSCL, WSCI, WS-Coordination, BTP , Process Specifications, Workflows, BPEL4WS, BPML, ebXML, PSL , Formal Specification and Enactment

Unit-4

Semantic Service Selection , Social Service Selection: Reputation and Trust
Economic Service Selection: Markets and Auctions , Building SOC Applications
Service Management: WSMF, WSDM, Robustness , Security: SAML, WS-Security, WS-Trust, XACML

Text Book

1. Munindar P. Singh and Michael N. Huhns, **Service-Oriented Computing**, Wiley & Sons.
2. Thomas Erl , **Service-Oriented Architecture (SOA): Concepts, Technology, and Design** , Prentice Hall

ITR-606	Wireless Mobile Networks	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: **Maximum Marks : 60**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit - I

Introduction to Personal Communication Services (PCS): PCS architecture, Mobility management, Networks signaling.

Global system for Mobile Communication (GSM) system overview: GSM Architecture, Mobility Management, Network signaling.

Unit - II

General Packet Radio Services (GPRS): GPRS architecture, GPRS Network nodes.

Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.

Unit - III

Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, Wireless Markup Languages (WML)

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G.

Unit – IV

Wireless local Loop (WLL): Introduction to WLL architecture, WLL technologies.

Global Mobile Satellite Systems: Case studies of IRIDIUM and GLOBALSTAR systems.

Bluetooth technology and Wi-Max

Text Books:

1. "Wireless and mobile Networks Architecture," by Yi –Bing Lin & Imrich Chlamatac, John Wiley & Sons, 2001.
2. "Mobile & Personnel communication Systems and Services", By Raj Pandya, Prentice Hall India, 2001.
3. "Wireless Communication- Principles and practices," 2nd Ed., Theodore S. Rappaport, Pearson Education Pvt. Ltd, 2003.
4. "Mobile communications," Jochen Schiller, Pearson Education Pvt. Ltd., 2002.
5. " The Wireless Application Protocol," Singhal & Bridgman et. al., Pearson Education, 2004.

References:

1. "Principles of Mobile Computing," 2nd Ed., Hensmann, Merk, & Stober, Springer International Edition, 2003.
2. "Mobile Computing," Talukdar & Yaragal, TMH, 2005.
3. "3G Wireless Networks," Smith & Collins, TMH, 2007.

ITR-608 VLSI Design **L T/P C**

4 0 4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Introduction to Transistor Theory: BJT, FET, CMOS

Logic Design with MOSFETs: MOSFET as switches, Complex Logic gates in CMOS, Transmission Gate Circuits, Clocking and Dataflow control. Physical Structure of CMOS Integrated circuits, Fabrication Structure of CMOS Integrated Circuits, Elements of Physical Design: Layout of basic structures, Cell concepts, FET sizing and the unit transistor, Physical design of Logic gates.

Unit-2

Electrical Characteristics of MOSFETs: FET RC Model, Modeling of Small MOSFETs, Electronic analysis of CMOS Logic gates: DC characteristics of the CMOS inverter, inverter switching characteristics, power dissipation, dc characteristics: AND and NOR gates, NAND and NOR transient response, Analysis of Complex Logic gates, gate design for transient performance, transmission gates and pass transistors, gate delays, driving large capacitive loads

Unit-3

System-level physical design: Large scale physical design, Interconnect delay modeling, crosstalk, interconnect scaling, Floorplanning and Routing, Input and Output Circuits, Power distribution and consumption.

Unit-4

VLSI Clocking and System Design: Clocked Flip-flops, CMOS clocking styles, pipelined systems, clock generation and distribution and distribution.

TEXT BOOKS:

1. Neil H E Weste and Kamran Esraghian, "Principles of digital VLSI design – A system perspective", Addison Wesley, 2004

REFERENCES:

1. Demassa & Ciccone, "Digital Integrated Circuits", Willey Pub.
2. Neil H.E. Weste and Kamran Eshraghian, "Principles of CMOS VLSI Design – A System Perspective", Addison Wesley Pub
3. Wayne Wolf, "Modern VLSI Design: system on silicon", Addison Wesley Longman Publisher
4. Douglas A. Pucknell & Kamran Eshranghian, "Basic VLSI Design", PHI
5. Jan M. Rabaey, "Digital Integrated Circuits: A Design Perspective", PHI
6. Sze, S.M., Wiley, "Semiconductor Devices: Physics And Technology", 1985
7. P Antognetti, G Massobrio, "Semiconductor device modeling with SPICE", McGraw-Hill

ITR-612	Real time Systems & Software	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Real time system: Hard vs Soft, Reference model of RTS, Periodic task model, Resource parameters of Jobs

Unit-2

Scheduling: clock driven, weighted RR approach, Priority approach, Dynamic vs static, EDF and LST algorithm, Clock Driven scheduling in detail

Unit-3

Priority driven scheduling of periodic task in detail: RM and DM algorithm, Scheduling aperiodic and sporadic jobs in priority driven systems in detail

Unit-4

Resource and resource Access Control, Multiprocessor scheduling, Resource access control and synchronization, Real Time Communication, OS

Text Book:

1. Alan C. Shaw, "Real – Time Systems and software", John Wiley & Sons Inc,2001

References:

1. Jane W. S. Liu, "Real Time Systems", Pearson Education, 2006
2. Phillip a. Laplante, "Real-Time systems: Design and analysis" Wiley, 2006

IT- 510 Advanced Software Engineering L T/P C

4 0 4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit I

The Basics of Measurement: Representational theory, Measurement & Models, Measurement Scales and Scale Types, Meaningfulness in Measurement Measurement in software engineering, scope of software metrics, A Goal Framework for Software Measurement:Classifying software measures, Determining what to measure, Applying the framework.Object Oriented Metrics , Web Metrics

Unit II

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.

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.Error Reporting: Identification of Defect, Analysis of Defect, Correction of Defect, Implementation of Correction, Regression Testing, Categorization of Defect, Relationship of Development Phases.Trend Analysis: Error Quality, Error Frequency, Program Unit Complexity, Compilation Frequency.

Unit III

Introduction to Formal Methods, Cleanroom Software Engineering ,Component-Based Software Engineering, Agile Development.

Unit IV

Web Engineering , Formulation and Planning for Web Engineering ,Analysis Modeling for Web Applications , Design Modeling for Web Applications ,Testing Web Applications

Text Book:

1. Norman E. Fenton & Shari Lawrence Pfeiffer, "Software Metrics", Thomson Computer Press, 1996.

2. Norman E. Fenton, "Software Metrics: A Rigorous and Practical Approach", International Thomson Computer Press, 1996.

ITR - 618	Software Requirement & Estimation	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Introduction to software life cycle, management activities in a software project

Requirements engineering: Requirements Elicitation, Requirement Elicitation techniques, Requirement Analysis, Requirement Analysis Models, Requirement Documentation, Requirement Management

Unit-2

Size Estimation: Function Point Analysis, Mask II FPA, LOC estimation, Conversion between size measures

Unit-3

Effort, schedule & cost estimation: Estimation factors, COCOMO-II, Putnam Estimation Model, Estimation by Analogy, Validating Software Estimates

Unit-4

Tools: Software Estimation Tools

Industry Resources; IFPUG, UQAM-SEMRL, COSMIC, IEEE, COCOMO

Reference Book:

1. Kishore, Swapna, "Software Requirements and Estimation", Tata McGraw Hill, 2001
2. Norman E. Fenton, "Software Metrics: A Rigorous and Practical Approach", International Thomson Computer Press, 1996.
3. B. Henderson-Sellers, "Object-Oriented Metrics, Measures of Complexity", Prentice Hall, 1996.

ITR-620 Neural Network

L	T/P	C
4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Biological analogy, Architecture classification, Neural Models, Learning Paradigm and Rule, single unit mapping and the perception.

Unit-2

Feed forward networks – Review of optimization methods, back propagation, variation on Backpropagation, FFANN mapping capability, properties of FFANN's Generalization.

Unit-3

PCA, SOM, LVQ, Adaptive Resonance Networks.

Unit-4

Hopfield Networks, Associative Memories, RBF Networks.

Applications of Artificial Neural Networks: Regression, applications to function approximation, Classification, Blind Source Separation.

Text Book:

1. Haykin S., "Neural Networks-A Comprehensive Foundations", Prentice-Hall International, New Jersey, 1999.

References:

1. Anderson J.A., "An Introduction to Neural Networks", PHI, 1999.
2. Hertz J, Krogh A, R.G. Palmer, "Introduction to the Theory of Neural Computation",
3. Addison-Wesley, California, 1991.
4. Hertz J, Krogh A, R.G. Palmer, "Introduction to the Theory of Neural Computation", Addison-Wesley, California, 1991.
5. Freeman J.A., D.M. Skapura, "Neural Networks: Algorithms, Applications and Programming Techniques", Addison-Wesley, Reading, Mass, (1992).
6. Golden R.M., "Mathematical Methods for Neural Network Analysis and Design", MIT Press, Cambridge, MA, 1996.
7. Cherkassky V., F. Kulier, "Learning from Data-Concepts, Theory and Methods", John Wiley, New York, 1998.
8. Anderson J.A., E. Rosenfield, "Neurocomputing: Foundatiions of Research, MIT Press, Cambridge, MA, 1988.
9. Kohonen T., "Self-Organizing Maps", 2nd Ed., Springer Verlag, Berlin, 1997.
10 Patterson D.W., "Artificial Neural Networks: Theory and Applications", Prentice Hall, Singapore, 1995.
11. Vapnik V.N., "Estimation of Dependencies Based on Empirical Data", Springer Verlag, Berlin, 1982.
12. Vapnik V.N., "The Nature of Statistical Learning Theory", Springer Verlag, New York, 1995.
13. Vapnik V.N., "Statistical Learning Theory: Inference from Small Samples", John Wley, 1998.

ITR–622	Network Programming	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Introduction to Systems Programming: Files, System Files, File Formats, Buffered I/O, Directories, File System, Inodes, links, fcntl, links, locks, Device I/O, Terminal I/O, ioctl(), Files and Devices ,Signals, video I/O ,Multi-Tasking

Unit-2

Processes and Inter-Process Communication: timers, polling vs interrupts, environment, fork, exec, wait, environment, exit and wait, pipe, fifos, message queues, semaphore

Unit-3

Network Programming: Sockets, Operation, Socket types, Domains Name Binding, Closing Sockets, I/O Multiplexing, Client/Server Models, Connection Based Services, Handling Out of Band Data, Connectionless Services, Design issues of Concurrent and iterative servers, Socket options

Unit-4

XDR and Remote Procedure Calls, Network Programming at the level of Programming Language (can use Java or Python as case study)

Text Book:

1. Unix Network Programming, W. Richard Stevens, Prentice Hall, 1998

References:

1. Internetworking with TCP/IP, Volume3, Douglas Comer, Prentice Hall, 2000
2. Internetworking with TCP/IP, Volume1, Douglas Comer, Prentice Hall, 2000

ITR-624	Fuzzy Logic & Design	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, α-cuts, Properties of α-cuts, Decomposition Theorems, Extension Principle.

Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.

Unit-2

Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

Fuzzy Relations: Crisp & Fuzzy Relations, Projections & Cylindric Extensions, Binary Fuzzy Relations, Binary Relations on single set, Equivalence, Compatibility & Ordering Relations, Morphisms, Fuzzy Relation Equations.

Unit-3

Possibility Theory: Fuzzy Measures, Evidence & Possibility Theory, Possibility versus Probability Theory.

Fuzzy Logic: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges.

Unit-4

Uncertainty based Information: Information & Uncertainty, Nonspecificity of Fuzzy & Crisp sets, Fuzziness of Fuzzy Sets.

Applications of Fuzzy Logic:

Text Book:

1. G.J.Klir , Yuan,"Fuzzy Sets and fuzzy logic, Theory and applications", Prentice Hall India, 1995.

Reference Books:

1. John Yen, Reza Langari, "Fuzzy Logic Intelligence, Control and Information", Pearson Education, 2006.
2. Ross, "Fuzzy Logic with Engineering Applications", 2nd Edition, John Wiley, 2004.
3. H. Zimmermann, "Fuzzy Set Theory and its applications", 2nd Edition, Allied Publishers, 1996.

ITR-626	Genetic Algorithms	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Introduction

A brief history of evolutionary computation, Elements of Genetic Algorithms, A simple genetic algorithm, Applications of genetic algorithms

Genetic Algorithms in Scientific models

Evolving computer programs, data analysis & prediction, evolving neural networks, Modeling interaction between learning & evolution, modeling sexual selection, measuring evolutionary activity.

Unit-2

Theoretical Foundation of genetic algorithm

Schemas & Two-Armed and k-armed problem, royal roads, exact mathematical models of simple genetic algorithms, Statistical- Mechanics Approaches.

Unit-3

Computer Implementation of Genetic Algorithm

Data structures, Reproduction, crossover & mutation, mapping objective functions to fitness form, fitness scaling, coding, a multiparameter, mapped, fixed point coding, discretization and constraints.

Some applications of genetic algorithms

The risk of genetic algorithms, De Jong & function optimization, Improvement in basic techniques, current application of genetic algorithms

Unit-4

Advanced operators & techniques in genetic search

Dominance, duplicity, & abeyance, inversion & other reordering operators. Other micro operators, Niche & speciation, multiobjective optimization, knowledge based techniques, genetic algorithms & parallel processors.

Text Book:

1. David E. Goldberg, "Genetic algorithms in search, optimization & Machine Learning" Pearson Education, 2006

Reference Books:

1. Melanle Mitchell, "An introduction to genetic algorithms", Prentice Hall India, 2002.
2. Michael D. Vose, "The simple genetic algorithm foundations and theory, Prentice Hall, 1999
3. Masatoshi Sakawa, "Genetic Algorithms & Fuzzy Multiobjective Optimization", Kluwer Academic Publisher, 2001
4. D. Quagliarella, J Periaux, C Poloni & G Winter, "Genetic Algorithms in Engineering & Computer science", John Wiley & Sons, First edition, 1997
5. Pinaki Mzumder, Elizabeth M. Raudnick, "Genetic Algorithms for VLSI design, layout and test automation", Pearson Education, 2006

ITR - 628	Information Theory & Coding	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Information, channel capacity, The concept of amount of information, entropy, Information rate, Conditional and joint entropies.

Unit-2

Source coding: Noise less coding, Shannon's first fundamental theorem, Discrete memory less channel, Mutual information, Sources with finite memory, Markov sources, Shannon's second fundamental theorem on coding, Huffman coding, Lempel – Ziv algorithm, Shannon-Fano algorithm.

Unit-3

Channel coding: Error detecting codes, Hamming distance, Error correcting codes, Repitition codes, Linear block codes, binary cyclic codes, BCH codes, Reed-Soleman codes, Golay codes.

Unit-4

Convolution Coding: Code tree, state diagram, Trellis diagram, Maximum-Likelihood decoding – Viterbi's algorithm, sequential decoding.

Network information theory, introduction to Cryptography

Text Books:

1. T M Gover, J M Thomos, "Elements of Information Theory", Wiley , 1991
2. S. Haykin, "Digital Communication", Wiley. 2002
3. J.G.Proakis,"Digital Communications", Mc Graw Hill, 2002

Code No: IT-508	**P**	**C**
Lab: Project Work	**4**	**4**

The student will submit a synopsis at the beginning of the semester for approval to the school project committee in a specified format. The student will have to present the progress of the work through seminars and progress report. A report must be submitted to the school for evaluation purpose at the end of the semester in a specified format.

IT-512	High Performance Computing	L	T/P	C
		4	0	4

INSTRUCTIONS TO PAPER SETTERS: **Maximum Marks : 60**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Unit-1

Introduction

Introduction to Computer Components: Processors, Memory, Secondary Storage Devices, Interconnection Networks. Cost, timing, and scale (size) models for the above. An overview of Model of Program Execution: Notions of a Process; Virtual Memory; System Calls; Data Segments; Dynamic Memory Allocation.

Unit-2

RISC Architecture

CPU and memory architecture for RISC microprocessors and their successors. Machine-Level View of a Program: typical RISC processor's instruction set; machine code form of a program .

Performance Issues and Techniques: Cost and Frequency Models for I/O, paging, and caching. Notion of Cacheing; temporal and spatial locality models for instruction and data accesses; Intra-process parallelism and pipelining;

Unit-3

Optimizing Compilers

Typical Compiler Optimizations of Programs; Improving Performance: Identifying program bottlenecks - profiling, tracing; simple high-level-language optimizations - locality enhancement, memory disambiguation, moving loop-invariants, etc. Choosing Appropriate Computing Platforms: benchmarking, cost-performance issues, etc.

Unit-4

Parallel Computing and Multiprocessing

Introduction to Parallel Programs and Architectures: Classification of Parallel computers, Parallel programming paradigms, task partitioning and mapping, message passing, and synchronization. programmer's view of shared and distributed memory architecture.

TEXT BOOKS:

1. Dowd K, *High Performance Computing*, O'Reilly Series, 1993.
2. R.E. Bryant and D. O'Hallaron, *Computer Systems: A Programer's Perspective*, Pearson Education, 2003.

HCS - 606	Interpersonal Communication & Personality Development	L	T/P	C
		4	0	4

Objective: To offer the learner a relevant, systematic for developing self understanding, promoting socially sensitive personal growth, understand and integrate responsibly with the environment and develop commensurate communication skills.

UNIT I

Interpersonal Effectiveness: Means of Contact, Dealing with Others (Techniques on how to talk, listen, criticize, compliment, thank and converse effectively), Perception of Self and Others, Barriers in communication, Relationship Management , Conflict Resolution, Ethical and Moral Responsibilities.

UNIT II

Personality Enhancement: Self Esteem, Self-Improvement, Positive Attitudes, Communication Channels, Self and Time Management, Standards of Conduct, Negotiating Diversity, Social and Personal Ethics.

UNIT III

Communication in Groups: Understanding Groups, Group Dynamics and Types, Group Formation, Key Factors in Groups, Communicating in Groups, Intra Group Relationships, Problem Solving and Conflict Management, Leadership, Small Group Communication: Presentations on topics/small activities like role play, case study etc.

UNIT IV

Literature and Media as Case Studies in Interpersonal Communication & Personality Development: A detailed study and analysis of the following texts:

1. *My Experiments with Truth* by M.K. Gandhi
2. Selected tales from *Panchtantra* by Vishnu Sharma
3. The movie - *Chak-De India*

Recommended Texts

1. Dimbleby, Richard and Graeme Burton. *More than Words: An Introduction to Communication*. London and New York: Routledge, 2001 (rpt, third edition).
2. Wallace, Harold R. and L. Ann Masters. *Personal Development for Life and Work.* Singapore: Thompson, 2006.

HCS - 702	Research Methodology	L	T/P	C
		4	0	4

Detailed syllabus being prepared

Code No: IT-951 **C**

Subject: Dissertation work – I (Survey and formulation of the Problem) **20**

The student will submit a synopsis at the beginning of the semester for the approval from the school project committee in a specified format. Synopsis must be submitted within a two weeks. The first defense, for the dissertation work, should be held with in a one month. Dissertation Report must be submitted in a specified format to the school for evaluation purpose.

Code No: IT-953 **C**

Subject: Seminar & Progress Report **8**

The student will have to present the progress of the project work through seminars and progress reports at the interval of four weeks.

Code No: IT-952 **C**

Subject: Dissertation work **24**

The student will submit a synopsis at the beginning of the semester for the approval from the school project committee in a specified format. Synopsis must be submitted within a two weeks. The first defense, for the dissertation work, should be held with in a one month. Dissertation Report must be submitted in a specified format to the school for evaluation purpose.

Code No: IT-956 **C**

Subject: Comprehensive Viva **4**