SCHEME OF INSTRUCTIONS
BE IV YEAR I SEMESTER
(COMPUTER SCIENCE AND ENGINEERING)

THEORY

Sl. No.	Syllabus Ref. No.	Subject
1.	CS401	Distributed Systems
2.	CS402	Artificial Intelligence
3.	CS403	Information Security
4.	CS404	Principles & Applications of Embedded Systems
	ELECTIVE-I	
5.	CS411	Software Project Management
6.	CS412	Computer Graphics
7.	CS413	Image Processing
8.	CS414	Adhoc And Sensor Networks
9.	CS415	Soft computing
10.	CS416	Mobile Computing
11.	CS 417	Real Time Systems
	PRACTICALS	
12	CS431	Distributed Systems Lab
13	CS432	Embedded Systems Lab
14	CS433	Project Seminar

WITH EFFECT FROM THE ACADEMIC YEAR 2013–2014

CS401

DISTRIBUTED SYSTEMS

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT I

Characterization of Distributed Systems: Introduction, Examples of distributed systems, Resource sharing and the web,Challenges

System Models: Introduction, Architectural models, Fundamental models.

Operating System Support Introduction: The operating system layer, Protection, Processes and threads, Communication and invocation, Operating system architecture.

UNIT II

Interprocess communication: Introduction, The API for the internet protocols, External data representation and marshalling. Client Server communication, Group Communication, Case study.

Interprocess communication: Introduction UNIX. Distributed objects and Remote Invocation Introduction, Communication between distributed objects, Remote procedure call, Events and notifications, Case study: Java RMI. Name Services Introduction, Name services and the Domain Name System, Directory services, Case study of the X.5000 Directory Service.

UNIT III

Time and Global States: Introduction, Clocks events and process states, Synchronizing physical clocks, Logical clocks, Global states, Distributed debugging.

Coordination and Agreement: Introduction, distributed mutual exclusion, Election, Multicast communication,Consensus and related problems.

UNIT IV

Transactions and Concurrency Control: Introduction, Transactions, Nested transactions, Locks Optimistic concurrency control. Timestamp ordering, Comparison of methods for concurrency control.

Distributed Transactions: Introduction, Flat and nested distributed transactions,Atomic commit process, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

Replication: Introduction, System model and group communication, Fault-tolerant services. Case study: The gossip architecture,CODA.

UNIT V

Distributed Shared Memory: Introduction, Design and implementation issues, Sequential consistency and Ivy case study. Release consistency and Munin case study, Other consistency model.

Distributed File Systems: Introduction, File service architecture, Case study: Sun Network File System. Enhancements and further developments.

Suggesting Readings:

1.Colouris, Dollimore, Kindberg, " Distributed Systems concepts and Design" - 5th Ed. Pearson Education, 2011
2. Andrew S. Tanenbaum, Van Steen, " Distributed Systems ", Pearson Education , 2010.
3. Singhal M, Shivratari N.G, "Advanced Concepts Introduction, Operating Systems" McGraw Hill, 2001.
4. Pradeep K Sinha, " Distributed Opearating Systems: Concepts and Design", Pearson Education Asia India, 2007.

WITH EFFECT FROM THE ACADEMIC YEAR 2013–2014

CS402

ARTIFICIAL INTELLIGENCE

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT-I

Introduction: Definition, history and applications of AI. Search in State Spaces: Agents that plan, Uninformed search, Algorithm A*, Heuristic Functions and Search Efficiency, Alternative Search Formulations and Applications, Adversarial Search.

UNIT – II

Knowledge Representation and Reasoning: The Propositional Calculus, Resolution in Propositional Calculus, The Predicate Calculus, Resolution in Predicate Calculus, Rule-Based Expert Systems, Representing Common Sense Knowledge.

UNIT-III

Reasoning with Uncertain Information: Review of probability theory, Probabilistic Inference, Bayes Networks.

Planning Methods Based on Logic: The Situation Calculus, Planning.

UNIT-IV

Learning from Observations: Learning decision-trees using Information theory, Learning General Logical Descriptions, Neural Networks: Perceptron, Multilayer feed-forward neural network. Rule Learning.

UNIT-V

Natural Language Processing: Communication among agents

Fuzzy Logic Systems: Crisp Sets, Fuzzy Sets, Some fuzzy terminology, Fuzzy Logic Control, Sugeno Style of Fuzzy inference processing, Fuzzy hedges, Cut Threshold, Neuro Fuzzy systems.

Suggested Reading:

1. Nils J. Nilsson (1998) Artificial Intelligence: A New Synthesis, Elsevier
2. Stuart Russell, Peter Norvig (1995), Artificial Intelligence – A Modern Approach, Pearson Edition/PHI.
3. Elaine Rich, Kevin Knight, Shivashankar B Nair (2009), Artificial Intelligence, Third edition, Tata McGraw Hill.

References :

1. George F Luger (2009), Artificial Intelligence, Structures and strategies for Complex Problem solving, Pearson Edition.

WITH EFFECT FROM THE ACADEMIC YEAR 2013–2014

CS 403

INFORMATION SECURITY

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT- I

Introduction: History, critical characteristics of information, NSTISSC security model, Components of an information system, Securing the components, balancing security and access, The SDLC, The security SDLC

Need for Security: Business needs, Threats, Attacks-secure software development

UNIT-II

Legal, Ethical and Professional Issues: Law and ethics in information security, relevant U.S laws-international laws and legal bodies, Ethics and information security

Risk Management: Overview, Risk Identification, risk assessment, Risk Control strategies, selecting a risk control strategy, Quantitative versus qualitative risk control practices, Risk management discussion points, recommended risk control practices

UNIT-III

Planning for Security: Security policy, Standards and practices, Security blue print, Security education, Continuity strategies.

Security Technology: Firewalls and VPNs: Physical design, firewalls, protecting remote connections.

UNIT-IV

Security Technology: Intrusion detection, Access control and other security tools: Intrusion detection and prevention systems, Scanning and analysis tools, Access control devices.

Cryptography: Foundations of cryptology, cipher methods, cryptographic Algorithms, Cryptographic tools, Protocols for secure communications, Attacks on cryptosystems

UNIT-V

Implementing Information Security: information security project management, technical topics of implementation , Non- technical aspects of implementation, Security certification and accreditation

Security and Personnel: Positioning and staffing security function, Employment policies and practices, internal control strategies.

Information security Maintenance: Security management models. The maintenance model, Digital forensics

Suggesting Reading:

1. Michael E. Whitman and Hebert J Mattord, Principles of Information Security, 4th edition Ed. Cengage Learning 2011

2. Thomas R Peltier, Justing Peltier, John Blackley, Information Security. Fundamentals, Auerbacj Publications 2010

3. Detmar W Straub, Seymor Goodman, Richard L Baskerville, Information Security. Policy proceses and practices PHI 2008

4. Marks Merkow and Jim Breithaupt, Information Security. Principle and Practices, Pearson Education, 2007

WITH EFFECT FROM THE ACADEMIC YEAR 2013–2014

CS 404

PRINCIPLES AND APPLICATIONS OF EMBEDDED SYSTEMS

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT I

Embedded Computing: Introduction, Complex Systems and Microprocessor; Embedded System Design Process, Formalisms for System Design, Design Examples, The 8051 Architecture:Introduction, 8051 Micro Controller Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, interrupts.

UNIT II

Basic Assembly Language Programming Concepts: Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051, Data Transfer and Logical Instructions.

Arithmetic Operations, Decimal Arithmetic, Jump and Call Instructions, Further Details on Interrupts.

UNIT III

Applications: Interfacing with Keyboards, Displays, D/A and NO Conversions, Multiple Interrupts, Serial Data Communication, Introduction to Real-Time Operating Systems:Tasks and Task States, Tasks and Data, Semaphores, Shared Data, Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment.

UNIT IV

Basic Design Using a Real-Time Operating System: Principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations, Saving Memory and Power, An example RTOS like UC-OS(Open Source).

Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System, Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System.

UNIT V

Introduction to advanced architectures: ARM and SHARC, Processor and memory organization and Instruction level parallelism, Net advanced embedded Systems, Design Examples-Elevator Controller.

Suggested Reading:

1.Computers and Components, Wayne Wolt Elsevier.
2.The 8051 Microcontroller; Third Edition,Kenneth J.Ayala, Thomson.
3.An Embedded Software Primer, David E.Simor,Pearson Education
4.Embedding System building blocks, Labrosse, via CMP Publishers.
5.Embedded Systems, Raj Kamal, Tata Mc Graw Hill.

WITH EFFECT FROM THE ACADEMIC YEAR 2013–2014

CS 411

SOFTWARE PROJECT MANAGEMENT
(Elective I)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

UNIT – I
Introduction to Software Project Management, Stepwise: An Overview of Project Planning, Programmer Management and Project Evaluation

UNIT – II
Selection of an Appropriate Project Approach, Software Effort Estimation, Activity planning

UNIT – III
Risk Management, Resource Allocation, Monitoring and Control

UNIT –IV
Managing Contracts, Managing People and Organizing Teams, Software Quality

UNIT – V
Small Projects, Prince2, BS 6079:1996

Suggested Reading:

I. Bob Hughes and Mike Cotterell – Software Project Management, 4th Edition – Tata McGraw Hill – 2006.

References:

I. Walker Royce, Software Project Management: A Unified Framework, Pearson Education – 1998.
II. Pankaj Jalote, Software Project Management, Pearson Education – 2002.

WITH EFFECT FROM THE ACADEMIC YEAR 2013–2014

CS 412

COMPUTER GRAPHICS
(Elective I)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

UNIT-I

Graphics Systems and Models: Graphics system; Images; Physical and synthetic; Imaging system; synthetic camera model; programming interface ; graphics architectures programmable pipelines; performance characteristics. Graphics Programming: Programming two-dimensional applications; OpenGL API; Primitives and attributes; color; viewing, control functions

UNIT-II

Input and Interaction: Input device; clients and servers; displays lists; display lists and modeling; programming event driven input; picking ; building interactive models; animating Interactive programs; logic operations. Geometrics Objects: Three - dimensional primitives; coordinates systems and frames; frames in OpenGL; Modeling colored cube.

UNIT-III

Transformations: Affine Transformations; Transformations in homogenous coordinates; concatenation of Transformations; OpenGL transformation matrices; Viewing: Classical and Computer views; Viewing with a computer; Positioning of camera; Simple projections; Projections in OpenGL; Hidden surface removal; Parallel-projection matrices; Perspective projection matrices.

UNIT-IV

Lighting and Shading: Light sources; The Phong lighting model; Computational vectors; Polygonal shading; Light sources in OpenGL; Specification of matrices in OpenGL; Global illumination; From Vertices To Frames: Basic implementation strategies; line-segment clipping; polygon clipping; clipping of other primitives; clipping in three dimensions; Rasterization ; Bresenham's algorithm; Polygon Rasterization ; Hidden surface removal; anti-aliasing; display considerations.

UNIT-V

Modelling & Hierarchy: Hierarchal models; trees and traversal; use of tree data structure; animation; Graphical objects; Scene graphs; Simple scene graph API; Open Scene graph; other tree structures; Curves and Surfaces: Representation of curves and surfaces; design criteria; Bezier curves and surfaces; Cubic B-splines; General B-splines; rendering curves and surfaces; curves and surfaces in OpenGL.

Suggested Readings:

1.Edward Angel ,Computer Graphics A Top-Down Approach Using OpenGL, Peasrson Education, 5th edition -2009.

2.Fransis S Hill Jr., Stephen M Kelley, Computer Graphics Using OpenGL, Prentice-Hall Inc., 3rd edition , 2007.

3.Jim X. Chen, Foundation of 3D Graphics Programming Using JOGL and Java3D, Springe Verlag, 2006.

4.Hearn Donald, Pauline Baker M: Computer Graphics, 2nd edition , 1995

WITH EFFECT FROM THE ACADEMIC YEAR 2013–2014

CS 413

IMAGE PROCESSING
(Elective - I)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Unit – I

Introduction to Digital Image Processing, Origins and Applications of Digital Image Processing, Fundamental steps in Digital Image Processing, Components of Digital Image Processing System, Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization.

Unit – II

Filtering in the Frequency Domain: Preliminary Concepts, Sampling and the Fourier Transform of Sampled Functions, The Discrete Fourier Transform (DFT) of one Variable, Extension to Function Two Variables, Some Properties of the 2-D Discrete Fourier Transform, Image Smoothing and Sharpening using Frequency Domain Filters.

Unit – III

Intensity Transformations and Spatial Filtering: Histogram Processing, Fundamental of Spatial Filtering, Smoothing and Sharpening Spatial Filters

Image Segmentation: Point, Line and Edge Detection, Thresholding, Region-Based Segmentation.

Unit – IV

Image Compression: Fidelity Criteria, Image Compression Models, Image Formats, Containers and Compression Standards, Compression Methods: Huffman Coding, Golomb Coding, Arithmetic Coding, LZW Coding, Run-Length Coding.

Unit – V

Restoration: Noise Models, Inverse filtering, Least squares Filtering. Introduction to Color Image Processing and Video Processing.

Suggested Reading:

1. Gonzalez R.C., Woods R.E: Digital Image Processing, Pearson Education, Third Edition 2008.
2. William K. Pratt, “Digital Image Processing”, John Wiley & sons Inc. 3rd Edition, 2001.
3. McAndrew, Introduction to Digital Image Processing, Cengage Learning 2004.
4. Sonka, H;avac, Boyle, Digital Image Processing and Computer Vision, Cengage learning, 2008.
5. Rosenfeld A. Kak AC., Digital Picture Processing Vol. I & II Acad, Press, 2nd Edition, 1982.

WITH EFFECT FROM THE ACADEMIC YEAR 2013–2014

CS 414

ADHOC AND SENSOR NETWORKS
(Elective I)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

UNIT I

Introduction, Routing in Ad Hoc Networks, Broadcasting, Multicasting and Geocasting

UNIT II

Wireless LANs, Wireless PANs, Wireless Mesh Networks

UNIT III

Cognitive Radio and Networks, TCP over Ad Hoc Networks, Applications of Sensor Networks

UNIT IV

Sensor Networks Design Considerations, Sensor Networks in Controlled Environmnent and Actuators

UNIT V

Security in Ad Hoc and Sensor Networks, Integrating MANETs, WLANs and Cellular Networks

Suggested Readings

1. Carlos de Morais Cordeiro and Dharma Prakash Agrawal, “Ad Hoc and Sensor Networks : Theory and Applications”, Second Edition, World Scientific Publishers, 2011
2. Prasant Mohapatra and Sriramamurtyhy, “Ad Hoc Networks: Technologies and Protocols”, Springer International Edition, 2009
3. Kazem Sohraby, Daniel Minoli, Taieb Znati, “Wireless Sensor Networks’, A John Wiley & Sons Inc. Publication, 2007

WITH EFFECT FROM THE ACADEMIC YEAR 2013–2014

CS 415

SOFT COMPUTING
(Elective I)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

UNIT I

Introduction: Neural networks, application scope of neural networks, fuzzy logic, genetic algorithm, hybrid systems, Soft computing. Artificial neural networks: Fundamental concepts, Evolution of neural networks, basic model of Artificial neural networks, Important terminology of ANNs, McCulloch-pitts neuron model, Linear separability, Hebb Network Supervised Learning Network: Perceptron networks, adaptive linear neuron (Adaline), Multiple adaptive linear neuron, Back propagation network, Radial basis Function network (Architecture& Training algorithms)

UNIT II

Associative Memory Networks: Training algorithm for pattern Association, Associative memory network, Hetroassociative memory network (Architecture& Training algorithm), Bidirectional associative memory network Architecture, Discrete Bidirectional associative memory network, Continuous BAM ,Analysis of hamming distance, Energy function and storage capacity, Hopfield networks discrete &continuous. Unsupervised Learning Networks: Fixed weight competitive Nets, Kohonen self organizing network, Learning vector quantization (Architecture& Training algorithm) Adaptive Resonance theory network. Special networks: Simulated Annealing Networks,Boltzmann machine, Gaussian machine

UNIT III

Fuzzy Logic: Introduction to Classical sets and fuzzy sets, Classical sets,Fuzzy sets: Operations and Properties. Fuzzy Relations: Cardinality, Operations and Properties, Equivalence & tolerance. Membership function: Fuzzification, membership value assignment: Inference, rank ordering, angular fuzzy sets

UNIT IV

Defuzzification: Lamda Cuts for fuzzy sets and relations, defuzzification methods Fuzzy arithmetic and fuzzy measures: Fuzzy arithmetic, extension principle, fuzzy measures, measures of fuzziness, fuzzy integral Fuzzy rule base and approximate reasoning: truth values and tables in fuzzy logic, fuzzy propositions formation of rules ,decomposition of compound rules, aggregation of fuzzy rules, fuzzy reasoning, fuzzy inference system, fuzzy expert systems

UNIT V

Fuzzy decision making: Individual, multiperson, multi objective, multi attribute, Fuzzy Bayesian decision making, Fuzzy logic control system: control system design, architecture &operation of FLCsystem,FLC system models,Aplication of FLC system.Genetic Algorithim: Introduction,basic operators& terminology, Traditional algorithm vs genetic

algorithm, simple GA, general genetic algorithm, schema theorem, Classification of genetic algorithm, Holland classifier systems, genetic programming , applications of genetic algorithm

Suggested Reading:

1. S. N. Sivanandam & S.N.Deepa, “Principles of Soft Computing”, Wiley India, 2008.
2. Limin Fu, “Neural Networks in Computer Intelligence”, McGraw Hill, 1995.
3. Timoty J. Ross, “Fuzzy Logic with Engineering Applications”, McGraw Hill, 1997.

WITH EFFECT FROM THE ACADEMIC YEAR 2013 - 2014

CS 416

MOBILE COMPUTING

(Elective-I)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT-I

Introduction and applications of mobile computing, Wireless transmission: Frequencies, Signals, Antennas, Signal Propagation, Multiplexing, Modulation , Spread Spectrum, Cellular systems.

Medium access control, SDMA, FDMA, TDMA, CDMA, Comparisons.

UNIT-II

Telecommunication system, GSM, DECT, TETRA, Satellite systems: Applications, Basics, routing, localization, Handover. Broadcast systems: cyclic representation of data, Digital Audio Broadcasting, Digital video broadcasting, convergence of Broadcasting and Mobile Communications.

UNIT-III

Wireless LAN: Infrared Vs Radio transmission, Infrastructure and Adhoc Networks, HYPERLAN, Bluetooth.

UNIT-IV

Mobile IP, Dynamic Host Configuration Protocol, Mobile Adhoc Networks, Mobile Transport Layer, Traditional TCP Classical TCP improvements, TCP over 2.5/3G Wireless Networks, Performance Enhancing Proxies.

UNIT-V

Operating Systems for Mobile Devices: Features of Windows CE, PalmOS, Symbian OS, and Java Card Support for Mobility: Pile systems, WWW, Wireless Application Protocol.

Suggested Reading:

1. Schiller, *Mobile Communications, 2nd* Edition Pearson Education, India, 2003.
2. Hansmann, Merk, Nicklous, Stober, *Principles of Mobile Computing.* 2nd Edition, Springer International Edition, 2003.
3. Frank Adelstein, Sandeep K.S. Gupta *"Fundamentals of Mobile and Pervasive Computing* ",Tata McGraw-Hill 2005.

WITH EFFECT FROM THE ACADEMIC YEAR 2013 - 2014

CS 417

REAL TIME SYSTEMS

(Elective-I)

Instruction	4 Periods per week
Duration of University Examination	3Hours
University Examination	75Marks
Sessional	25Marks

UNIT-I

Introduction : Definition, Applications and Types of Real Time Systems, Typical Case Studies of Real Time Systems, Timing Constraints.

A Reference Model for Real Time Systems: Processors and Resources, Periodic Task Model, Precedence and Data Dependency, Temporal, Functional and Resource parameters, Scheduling Hierarchy.

UNIT-II

Real Time Scheduling: Different Approaches- Clock Driven, Priority Driven, Scheduling of Periodic, Aperiodic and Sporadic Jobs in Priority Driven Systems.

UNIT-III

Resource Management: Resources and Resource Access Control, Critical Section, Priority: Ceiling Protocols, Concurrent Access to Data Objects.

UNIT-IV

Implementation Aspects: Timing Services and Scheduling Mechanisms, Other Basic Operating System Functions, Processor Reserves and Resource Kernel, Open System Architecture, Capabilities of Commercial Real Time Operating Systems, Predictability of General Purpose Operating Systems.

UNIT-V

Case Studies: Vx – Works, RT Linux.

Suggested Reading:

1.Jane W.S. Liu *"Real Time System",* Pearson Education Asia,2001.
2.C.M. Krishna and Kang 0. Shin, *"Real Time Systems",* McGraw Hill Companies Inc., 1997.
3.Raymond J.A. Buhr, Donald L. Bailey, *"An Introduction to Real Time Systems",* Prentice Hall International, 1999.
4.K.V.K.K Prasad, *"Embedded Real Time Systems, Concepts, Design and Programming"* Dream Tech, 2003.

WITH EFFECT FROM THE ACADEMIC YEAR 2013–2014

CS 431

DISTRIBUTED SYSTEMS LAB

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks

1. Develop an FTP Client. Provide a GUI interface for the access of all the services.
2. Implement a mini DNS protocol using RPC.
3. Implement a chat server using JAVA.
4. Implement a 2PC for distributed transaction management.
5. Study of NFS.
6.Case Study on Database Replication

WITH EFFECT FROM THE ACADEMIC YEAR 2013–2014

CS 432

EMBEDDED SYSTEMS LAB

Instruction	3 Periods per week
Duration of university examination	3Hours
University examination	50Marks
Sessional	25Marks

1.Use of 8-bit and 32-bit Microcontrollers (such as 8051 Microcontroller, ARM2148 / ARM2378, LPC 2141/42/44/46/48), Microcontroller and C –compiler (Keil, Ride etc.) to:
I) Interface Input – Output and other units such as: Relays, LEDs, LCDs, Switches, keypads, Stepper Motors, Sensors, ADCs, Timers.
II) Demonstrate Communications: RS232, IIC and CAN protocols,
III) Develop Control Applications such as: Temperature controller, Elevator controller, Traffic Controller.
2.Development and Porting of Real time applications on to Target machines such as Intel or other Computers using any RTOS.
I) Understanding Real Time Concepts using any RTOS through demonstration of:
a)Timing
b)Multi-tasking
c)Semaphores
d)Message Queues
e)Round-Robin Task Scheduling
f)Preemptive Priority based Task Scheduling
g)Priority Inversion
h)Signals
II) Applications development using any RTOS:
a)Any RTOS Booting.
b)Application Development under any RTOS.

WITH EFFECT FROM THE ACADEMIC YEAR 2013–2014

CS 433

PROJECT SEMINAR

Instruction	3 Periods per week
Sessional	25 Marks

Oral presentation is an important aspect of engineering education.

The objective of the seminar is to prepare the student for a systematic and independent study of the state of the art topics in a broad area of his/her specialization.

Seminar topics may be chosen by the students with advice from the faculty members. Students are to be exposed to the following aspects of a seminar presentation.

- Literature survey
- Organisation of the material
- Presentation of OHP slides/PC presentation
- Technical writing.

Each student is required to :

1. Submit a one page synopsis before the seminar talk for display on the notice board.
2. Give a 20 minute presentation through OHP, PC, Slide projector followed by a 10 minute discussion.
3. Submit a report on the seminar topic with a list of references and slides used

Seminars are to be scheduled from the 3rd week to the last week of the semester and any change in schedule should be discouraged.

For award of the Sessional marks, students are to be judged by at least two faculty members on the basis of an oral and written presentation as well as their involvement in the discussions.

SCHEME OF INSTRUCTIONS

CSE IV YEAR II SEMESTER
(COMPUTER SCIENCE AND ENGINEERING)

Sl. No.	Syllabus Ref. No.	SUBJECT
1	CS451	Data Mining
	ELECTIVE-II	
2	CS461	Simulation & Modeling
3	ME 404	Operation Research
4	CS463	Software Quality And Testing
5	CS464	Information Storage And Management
6	CS465	Human Computer Interaction
7	CS466	Software Reuse Techniques
8	ME411	Entrepreneurship
	ELECTIVE-III	
9	CS471	Information Retrieval Systems
10	CS472	Semantic Web
11	LA 454	Intellectual Property Rights
12	CS474	Advanced Databases
13	CS475	Multimedia Systems
14	CS476	Cloud Computing Computing
15	CE 452	Disaster Management
	PRACTICALS	
1	CS481	Data Mining Lab
2	CS482	Seminar
3	CS483	Project

CS-451

DATA MINING

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

UNIT-I

Introduction: Fundamentals of Data Mining, Kinds of Patterns can be mined, Technologies Used, Applications and Issues in Data Mining

Types of Data: Attribute types, Basic Statistical descriptions of Data, Measuring data Similarity and Dissimilarity

Data Preprocessing: Need of Preprocessing, Data Cleaning, Data Integration, Data Reduction, Data Transformation

UNIT-II

Data Warehouse and OLAP: Data Warehouse, Data Warehouse Modeling, Data Warehouse Design and Usage, Data Warehouse Implementation, Data Generalization by Attribute-oriented induction

UNIT-III

Mining Frequent Patterns, Associations and Correlations: Market Basket Analysis, Association rule mining, Frequent Item set mining methods, Pattern Evaluation methods, Constraint based frequent pattern mining, Mining Multilevel and Multidimensional patterns

UNIT-IV

Classification : General approach to classification, Classification by Decision Tree Induction , Bayes Classification methods, Bayesian Belief Networks, Classification by Backpropogation, Lazy Learners, Other Classification methods , Classification using Frequent patterns, Model Evaluation and selection

UNIT-V

Cluster Analysis: Basic Clustering methods, Partitioning methods, Density –Based Methods, Grid-based methods, and Evaluation of Clustering, Outlier Analysis and Detection methods

Data Mining Trends and Research Frontiers: Mining Complex Data Types, Data Mining Applications, Data Mining Trends

Suggested Reading:

1. Data Mining – Concepts and Techniques - Jiawei Han & Micheline Kamber and Jain Pei, Third Edition, India (2011).

References:

1. Data Mining Introductory and advanced topics – Margaret H Dunham, Pearson education
2. Data Mining Techniques – Arun K Pujari, University Press.
3. Data Warehousing in the Real World – Sam Anahory & Dennis Murray Pearson Edn
4. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley Student ed.
5. The Data Warehouse Life cycle Tool kit – Ralph Kimball Wiley student edition.

CS 461

SIMULATION AND MODELLING
(Elective II)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

UNIT-I

Introduction to Simulation. Advantages and Disadvantages of Simulation, Areas of application, System and System Environment, Components of a system, Discrete and Continuous Systems, Model of a System, Types of Models, Discrete-Event System Simulation, Steps in a Simulation Study, Simulation Examples.

UNIT-II

Overview of statistical models and queuing systems, Programming languages for simulation, Continuous and discrete simulation languages - FORTRAN, GPSS, SIMAN, S1MSCRIPT, SLAM and MODSIM III

UNIT- III

Random Numbers: generation, properties of random numbers, generation of pseudo-random numbers, tests for random numbers, Random variate: generation, inverse transformation technique, uniform distribution, exponential distribution. Weibul‘s distribution, triangular distributions, Direct transformation for the normal distribution, convolution method of Erlang distribution, Acceptance rejection techniques: Poisson distribution, Gamma distribution.

UNIT-IV

Input data analysis: Data Collection, Identify the distribution, parameter and estimation. Goodness of fit tests: Chi square test-KS test, Multivariate and time series input models, Verification and validations of simulation models, Model building, verification and validation: Verification of simulation models, Calibration and validation of models face validity, Validation of model assumptions, validation input/output Transformations, Input/output validation using historical input data, Input/output validation using Turing test.

UNIT-V

Output data analysis, stochastic nature of output data, Types of simulation with respect to output analysis. Measures of performance and their estimation, Output analysis for terminating simulations, Output analysis for steady-state simulations, Comparison and evaluation of alternative system designs. Comparison of several system designs. Statistical models for estimating the effect of design alternatives.

Suggesting Reading:

1. Jerry Banks, John S. Carson II, Barry L. Nelson, and David M. Nicol. Discrete-Event System Simulation, Pearson Education Asia, 2001.
2. Narsingh Deo. System Simulation with Digital computers. Prentice Hall of India, 1979.
3. Anerill M Law and W. David Kelton, Simulation modeling and analysis. McGrw Hill, 2009.

WITH EFFECT FROM THE ACADEMIC YEAR 2013 - 2014

ME 404

OPERATIONS RESEARCH

(Elective-II)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

Unit-I

Introduction : Definition and Scope of Operations Research.

Linear Programming: Introduction, Formulation of linear programming problems, graphical method of solving LP problem, simplex method, maximization and minimization, Degeneracy in LPP, Unbounded and, Infeaseable solutions.

Unit-II

Duality : Definition, Relationship between primal and dual solutions, Economic Interpretation, Post optimal of sensitivity analysis, Dual Simplex Method.

Unit-Ill

Transportation Models : Finding an initial feasible solution - North West corner method, Least cost method, Vogel's Approximation method, Finding the optimal solution, optimal solution by stepping stone and MODI methods, Special cases in Transportation problems - Unbalanced Transportation problem.

Assignment Problems : Hungarian method of Assignment problem, Maximization in Assignment problem, unbalanced problem, problems with restrictions, travelling salesman problems.

Unit-IV

Replacement Models : Introduction, replacement of items that deteriorate igoring change in money value, replacement of items that deteriorate considering change in money value with time, replacement of items that fail suddenly - Individual replacement policy, Group replacement policy.

Game Theory: Introduction, 2 person zero sum games, Maximi - Minimax principle, Principle of Dominance, Solution for mixed strategy problems, Graphical method for 2 x n and m x 2 games.

Unit-V

Sequencing Models : Introduction, General assumptions, processing n jobs through 2 machines, processing 'n' jobs through m machines, Processing 2 jobs through m machines.

Queuing Theory : Introduction, single channel - poission arrivals - exponential service times with infinite population & finite population, Multi channel - poisson arrivals - Exponential service times with infinite population.

Introduction to optimization Techniques: Single objective & Multi objective optimization Techniques like G.A, NSGA, P.Q.O. & MPSO Techniques.

Suggested Reading :

1. Hamdy, A. Taha, *"Operations Research-An Introduction",* Sixth Edition, Prentice Hall of India Pvt. Ltd., 1997.
2. S.D. Sharma, *"Operations Research ",* Kedarnath, Ramnath & Co., Meerut, 2009.
3. Hrvey M. Wagner, *"Principles of Operations Research ",* Second Edition, Prentice Hall of India Ltd., 1980.
4. V.K. Kapoor, *"Operations Research ",* S. Chand Publishers,New Delhi, 2004.

5. R. Paneer Selvam, *"Operations Research",* Second Edition, PHI Learning Pvt. Ltd., New Delhi, 2008.
6. Prof. Shanker Narasimha, *"Data Reconciliation".*

WITH EFFECT FROM THE ACADEMIC YEAR 2013 - 2014

CS 463

SOFT WARE QUALITY AND TESTING
(Elective II)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

UNIT-I

Software Quality Assurance Framework and Standards.

SQA Framework: Definition of Quality, Software Quality Assurance, Components of Software Quality Assurance, Software Quality Assurance Plan: Steps to develop and implement a Software Quality Assurance Plan, Quality Standards: ISO 9000 and Companion ISO Standards, CMM, CMMI. PCMM, Malcom Balridge, 3 Sigma, 6 Sigma

UNIT-II

Software Quality Assurance Metrics and Measurement Software Quality Metrics, product Quality metrics, In-Process Quality Metrics, Metrics for Software Maintenance, Examples of Metric Programs, Software Quality metrics methodology: Establish quality requirements, Identify Software quality metrics, implement the software quality metrics, analyze software metrics results, validate the software quality metrics, Software quality indicators - Fundamentals in Measurement theory

UNIT-III

Software Testing Strategy and Environment Establishing testing policy, structured approach to testing, test factors, Economics of System Development Life Cycle (SDLC) Testing Software Testing Methodology .Defects hard to find, verification and validation, functional and structural testing, workbench concept, eight considerations in developing testing methodologies, testing tactics checklist

UNIT-IV

Software Testing Techniques: Black-Box, Boundary value, Bottom-up, Branch coverage, Cause-Effect graphing, CRUD, Database, Exception, Gray-Box, Histograms, Inspections, JADs, Pareto Analysis, Prototyping, Random Testing, Risk-based Testing, Regression Testing, Structured Walkthroughs, Thread Testing, Performance Testing, White-Box Testing ,Software Testing Tools, Taxonomy of Testing tools. Methodology to evaluate automated testing tools, Load Runner, Win runner and Rational Testing Tools, Java Testing Tools, JMetra, JUN IT and Cactus.

UNIT-V

Testing Process, Eleven Step Testing Process: Assess Project Management Development Estimate and Status, Develop Test Plan, Requirements Phase Testing, Design Phase Testing. Program Phase Testing, Execute Test and Record Results, Acceptance Test, Report test results, testing software installation, Test software changes, Evaluate Test Effectiveness, Testing Specialized Systems and Applications Testing Client/Server, Web applications, Testing off the Shelf Components, Testing Security, Testing a Data Warehouse .

Suggested Reading:

1. Effective Methods for Software Testing, 2nd Edition by William E. Perry, Second Edition. Published by Wiley & Sons
2. Software Quality, by Mordechai Ben-Menachem/Garry S. Marliss, by Cengage Learning publication 2008.
3. Foundations of Software Testing, by Graham, Veenendaal, Evans, Black, Cengage Learning 2007.

4. Testing and Quality Assurance for Component-based Software, by Gao, Tsao and Wu, Artech House Publishers
5. Software Testing Techniques, by Bories Beizer, Second Edition, Dreamtech Press

WITH EFFECT FROM THE ACADEMIC YEAR 2013 – 2014

CS 464

INFORMATION STORAGE AND MANAGEMENT
(Elective II)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

UNIT I

Storage System: Introduction to information storage, virtualization and cloud computing, Key data center elements, Compute, application, and storage virtualization, Disk drive & flash drive components and performance, RAID, Intelligent storage system and storage provisioning (including virtual provisioning)

UNIT II

Storage Networking: Fibre Channel SAN components, FC protocol and operations, Block level storage virtualization, iSCSI and FCIP as an IP-SAN solutions, Converged networking option – FcoE, Network Attached Storage (NAS) –components, protocol and operations, File level storage virtualization, Object based storage and unified storage platform

UNIT III

Backup, Replication, Archive: Business continuity terminologies, planning and solutions, Clustering and multi-pathing architecture to avoid single points of failure, Backup and recovery - methods, targets and topologies, Data de-duplication and backup in virtualized environment, Fixed content and data archive, Local replication in classic and virtual environments, Remote replication in classic and virtual environments, Three-site remote replication and continuous data protection

UNIT IV

Cloud Infrastructure: Cloud Enabling Technologies, Characteristics of Cloud Computing, Benefits, Cloud Service Models, Deployment Models, Cloud Computing Infrastructure, Cloud Challenges, Cloud Adoption Considerations, Concepts in practice

UNIT V

Storage Security & Management: Security threats, and countermeasures in various domains, Security solutions for FC-SAN, IP-SAN and NAS environments, Security in virtualized and cloud environments, Monitoring and managing various information infrastructure components in classic and virtual environments, Information lifecycle management (ILM) and storage tiering

Case Study:
1. Technologies described in the course are reinforced with EMC examples of actual solutions.
2. Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

WITH EFFECT FROM THE ACADEMIC YEAR 2013 - 2014

CS 466

HUMAN COMPUTER INTERACTION

(Elective-II)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75Marks
Sessionals	25Marks

UNIT 1

Computing Environments, Analyzing Interaction Paradigms, Interaction Paradigms, Frameworks for Understanding Interaction, Coping with complexity,Interaction Styles.

UNIT 2

Iterative Design, User Centered Design, Interaction Design Models, Overview of Interaction Design Models, Discovery Phase Framework, Collection, Interpretation, Documentation, Conceptual Design, Physical Design, Evaluation, Interface Design Standards,Designing the Facets of the Interface.

UNIT 3

Principles of Interaction Design, Comprehensibility, Learnability, Effectiveness/Usefulness, Efficiency/Usability, Grouping, Stimulus Intensity,Proportion, Screen Complexity, Resolution/Closure, Usability Goals, Model Human Processor,Keyboard level Model,GOMS, Modeling Structure,Modeling Dynamics,Physical Models, Usability, Usability Test, Design the Test, Prepare for the Test, Perform the Test,Process the Data.

UNIT 4

The WIMP Interface,other components, Human Issues Concerning Icons, Using Icons in Interaction Design, Technical Issues Concerning Icons, The Human Perceptual System,Using Color in Interaction Design, Color Concerns for Interaction Design, Technical Issues Concerning Color.

UNIT 5

Human Issues Concerning Text,Using Text in Interaction Design, Technical Issues Concerning Text,The Human Perceptual System, Using sound in Interaction Design, Technical Issues Concerning Sound, The Human Perceptual System,Using Haptics in Interaction Design, Technical Issues Concerning Haptics.

CS 466

SOFTWARE REUSE TECHNIQUES

(Elective-II)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75Marks
Sessionals	25Marks

UNIT-I

Software reuse success factors, Reuse driven software engineering as business, Object oriented software engineering, Applications and Component subsystems, Use case components, Object components.

UNIT-II

Design Patters – Introduction. Creational Patterns – Factory, factory method, abstract factory, singleton, builder, prototype.

UNIT-III

Structural Patterns – Adapter, bridge, composite, decorator, façade, flyweight, proxy. Behavioral Patterns – Chain of responsibility, command, interpreter.

UNIT-IV

Behavioral Patterns – Interartor, mediator, memento, observer, state, strategy, template, visitor. Other design patterns – Whole – part, master – slave, view handler, forwarder – receiver, client dispatcher – server, publisher – subscriber.

UNIT-V

Architectural Patterns – Layers, pipes and filters, black board, broker, model-view controller, presentation – abstraction – control, micro kernel, reflection.

Suggested Reading:

1.Ivar Jacabson, Martin Griss, Patrick Johnson, *"Software Reuse: Architecture, Process and Organization for Business Success",* ACM Press 1997.

2.Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides – *" Design Patterns",* Pearson Education, 1995.

3.Frank Buschmann etc., - *"Pattern Oriented Software Architecture– Volume I",* Wiley 1996.

4.James W Cooper, *"Java Design Patterns, a tutorial",* Pearson Education, 2000.

ME 411
ENTREPRENEURSHIP
(Elective-II)

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks

UNIT-I
Indian Industrial Environment – competence; Opportunities and Challenges, entrepreneurship and Economic growth, Small Scale Industry in India, Objectives, linkages among small, medium and heavy industries,types and forms enterprises.

UNIT-II
Identification and characteristics of Entrepreneurs, Emergence of First generation entrepreneurs, environmental influence and women entrepreneurs. Conception and evaluation of ideas, their sources and decision making, Choice of Technology – Collaborative interaction for Technology development.

UNIT-III
Project formulation, Analysis of market demand, Demand supply gap, Financial and Profitability analysis and Technical analysis. Project financing in India.

UNIT-IV
Project Management during construction phase, project organization, project planning and control using CPM-PERT techniques. Human aspects of project management. Assessment of tax burden.

UNIT-V
Behavioral aspects of entrepreneurs: Personality – determinants, attributes and models, leadership concepts and models. Values and attitudes. Motivation aspects, change behavior.
Time Management: Various approaches of time management, their strengths and weaknesses. The urgency addiction and the time management matrix.

Suggested Reading:

1.Vasant Desai, *Dynamics of Entrepreneurial Development and Management*, Himalaya Publishing House, 1997.
2.Prasanna Chandra, Project-*Planning, Analysis, Selection, Implementation and Review,* Tata Mc Graw Hill Publishing Company Ltd., 1995.
3.B.Badhai, *Entrepreneurship for Engineers*, Dhanpath rai & Co., Delhi, 2001.
4.Stephen R. Covey and A.Roger Merril, *First Things First*, Simon and Schuster, 2002.
5.Robert D. Hisrich and Michael P.Peters, *Entreneurship,* Tata Mc Graw Hill ed., 2002. 6. Sudha G.S., *Organizational Behavior*, National Publishing House, 1996.

WITH EFFECT FROM THE ACADEMIC YEAR 2013 – 2014

CS 471

INFORMATION RETRIEVAL SYSTEMS
(Elective III)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT I

Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses, **Information Retrieval System Capabilities -** Search, Browse, Miscellaneous.

UNIT II

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction, **Data Structures:** Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure –

UNIT III

Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages**Document and Term Clustering:** Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters

UNIT IV

User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the Internet and hypertext ,**Information Visualization**: Introduction, Cognition and perception, Information visualization technologies.

UNIT V

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems. **Information System Evaluation:** Introduction, Measures used in system evaluation, Measurement example – TREC results.

TEXT BOOKS:

1. Information Storage and Retrieval Systems: Theory and Implementation By Kowalski, Gerald, Mark T Maybury Kluwer Academic Press, 2000.
2. Modern Information Retrival By Ricardo Baeza-Yates, Pearson Education, 2007.
3. Information Retrieval: Algorithms and Heuristics By David A Grossman and Ophir Frieder, 2nd Edition, Springer International Edition, 2004.

REFERENCES :

1. Information Retrieval Data Structures and Algorithms By William B Frakes, Ricardo Baeza-Yates, Pearson Education, 1992.
2. Information Storage & Retieval By Robert Korfhage – John Wiley & Sons.
3. Introduction to Information Retrieval By Christopher D. Manning and Prabhakar Raghavan, Cambridge University Press, 2008.

WITH EFFECT FROM THE ACADEMIC YEAR 2013–2014

CS 472

SEMANTIC WEB
(Elective III)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

UNIT I

The Future of the Internet: Introduction, The Syntactic Web, The Semantic Web, The working Semantic Web. **Ontology in Computer Science:** Defining the Term Ontology, Differences among Taxonomies, Thesauri, and Ontologies, Classifying Ontologies, Web Ontologies, Web Ontology Description Languages, Ontology, Categories, and Intelligence.

UNIT II

Knowledge Representation in Description Logic: Introduction, an Informal Example, the Family of Attributive Languages, Inference Problems. **RDF and RDF Schema:** Introduction, XML Essentials, RDF, RDF Schema, A Summary of the RDF/RDF Schema Vocabulary.

UNIT III

OWL: Introduction, Requirements for Web Ontology Description Languages, Header Information, Versioning, and Annotation Properties, Properties, Classes, Individuals, Data types, A Summary of the OWL Vocabulary. **Rule Languages:** Introduction, Usage Scenarios for Rule Languages, Datalog, RuleML, SWRL, TRIPLE. **Semantic Web Services:** Introduction, Web Service Essentials, OWL-S Service Ontology, An OWL-S Example.

UNIT IV

Methods for Ontology Development: Introduction, Uschold and King Ontology Development Method, Toronto Virtual Enterprise Method, Methontology, KACTUS Project Ontology Development Method, Lexicon-Based Ontology Development Method, Simplified Methods. **Ontology Sources:** Introduction, Metadata, Upper Ontologies, Other Ontologies of Interest, Ontology Libraries. **Semantic Web Software Tools:** Introduction, Metadata and Ontology Editors, Reasoners, Other tools.

UNIT V

Software Agents: Introduction, Agent Forms, Agent Architecture, Agents in the Semantic web Context. **Semantic Desktop:** Introduction, Semantic Desktop Metadata, Semantic Desktop Ontologies, Semantic Desktop Architecture, Semantic Desktop Related Applications. **Ontology Application in Art:** Introduction, Ontologies for the Description of Works of Art, Metadata Schemas for The Description of Works of Art, Semantic Annotation of Art Images.

SUGGESTED READING:

1. Semantic Web Concepts: Technologies and Applications, Karin K. Breitman, Marco Antonio Casanova and Walter Truszowski, Springer.

REFERENCES:

1. Information Sharing on the Semanting Web, Heiner Stuckenschmidt, Frank van Harmelen, Springer.
2. Semantic Web Primer, Grigoris Antoniou, Frank Van,third Edition, MIT Press.
3. Semantic Web Services: Concepts, Technologies and Applications, Rudi Studer, Stephan Grimm, Andrees Abeker, Springer.
4. Towards the Semantic Web: Ontology Driven Knowledge Management, John Davis, Dieter Fensal, Frank Van Harmelen, J. Wiley.

WITH EFFECT FROM THE ACADEMIC YEAR 2013 - 2014

LA 454

INTELLECTUAL PROPERTY RIGHTS

(Elective-III)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75Marks
Sessional	25 Marks

UNIT–I

Introduction: Meaning of Intellectual Property- Nature of I.P- Protection of I.P. Rights-kinds of Intellectual Property Rights –International Conventions of Intellectual Property Rights- patent Treaty 1970, GATT 1994, TRIPS & TRIMS – International Organization for Protection of IPR – WTO, WIPRO, UNESCO.

UNIT-II

Patents: Meaning of Patent- Commercial Significance – Obtaining of Patent– patentable Subject – matter – rights and obligations of Patentee – specification – Registration of patents – Compulsory licensing and licenses of rights – Revocation.

UNIT-III

Industrial Designs : Definitions of Designs – Registration of Designs – Rights and Duties of Proprietor of Design – Piracy of Registered Designs.

UNIT-IV

Trade Marks : Meaning of trademark – purpose of protecting trademarks Registered trade mark – procedure – passing off – Assignment and licensing of trademarks – Infringement of trademarks.

UNIT-V

Nature, scope of copyright – Subject matter of copy right – Right conferred by copyrightPublication – Broad – casting, telecasting – computer programme – Database right – Assignment – Transmission of copyright – Infringement of copy right.

Suggested Reading:

1)Cornish W.R, *"Intellectual Property Patents",* Copyright, Trademarks and Allied Rights, Sweet & Maxwell 1993.
2)P . Narayanan, *"Intellectual Property Law",* Eastern law House 2nd Edn. 1997.

CS 474 **ADVANCED DATABASES**

(Elective-III)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT-I

Object Based Databases: Overview, Complex data types, Structured types and inheritance in SQL, Table inheritance, Array and multiset Types in SQL, Object –identity and reference Types in SQL, Implementing O-R features, Persistent programming languages, Object-relational mapping, Object-oriented versus object-relational.

UNIT-II

XML: Motivation, Structure of XML data, XML document scheme, Querying and transformation, Application program interface to XML, Storage of XML data, XML applications.

UNIT-III

Query Processing: Overview, Measures of query cost, Selection Operation, Sorting, Join Operation, Other Operations, Evaluation of Expressions.

Query Optimization: Overview, Transformation of relational expressions, Estimating statistics of expression results, Choice of evaluation plans, Materialized Views.

UNIT-IV

Parallel Databases: Introduction, I/O parallelism, Interquery Parallelism, Intraquery Parallelism, Intraoperation Parallelism, Interoperation Parallelism, Query Optimization, Design of Parallel Systems.

Distributed Databases : Homogeneous and heterogeneous database, Distributed data Storage, Distributed transactions, Commit protocols, Concurrency control in distributed databases, Availability, Distributed query processing, Heterogeneous distributed databases.

UNIT-V

Advanced Application Development: Performance tuning, Performance benchmarks, Other issues in application development, Standardization.

Spatial and Temporal Data and Mobility: Motivation, Time in databases, Spatial and geographic data, Multimedia databases, Mobility and Personal databases.

Suggested Reading:

1. Abraham Silberschatz, Henry F Korth, S Sudarshan, *Database System Concepts,* McGraw Hill International Edition, 6th Edition, 2009.
2. Elmasri Navathe, Somayajulu, Gupta, *Fundamentals of Databases Systems, Pearson Education,* 4th Edition, 2006.
3. CJ Date, A Kannan, S Swamynathan, *An Introduction to Database Systems,* Pearson Education, 8th Edition, 2006.
4. Ramakrishna, Gehrke, *Databases Management Systems,* McGraw-Hill International Edition, 3rd Edition, 2003.

WITH EFFECT FROM THE ACADEMIC YEAR 2013 - 2014

CS 475

MULTIMEDIA SYSTEMS

(Elective-III)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

Unit-I

Multimedia: An overview: Introduction, Multimedia Presentation and Production, characteristics of a multimedia presentation, Multiple Media, Utilities of Multisensory Perception, Hardware and Software Requirements, Uses of Multimedia, Promotions of Multimedia Based content, Steps for creating a multimedia presentation.

Digital Representation: Introduction, Analog Representation, Waves, Digital Representation, Need for Digital Representation, Analog to Digital Conversion, Digital to Analog Conversion,, Relation between Sampling Rate and Bit Depth, Quantization Error, Fourier Representation, Pulse Modulation, Importance and Drawbacks of Digital Representation.

Visual Display Systems: Introduction, Cathode Ray Tube(CRT), Video Adapter card, Video Adapter Cable, Liquid Crystal Display (LCD), Plasma Display Panel (PDP).

Unit-II

Text: Introduction, Types of Text, Unicode Standard, Font, Insertion of Text, Text Compression, File Formats.

Image: Introduction, Image types, Seeing Color, color Models, Basic Steps for Image Processing, Scanner, Digital Camera, Interface Standards, specifications of Digital Images, Color Management Systems(CMS), Device Independent Color Models, gamma and Gamma Correction, Image Processing Software, File Formats, Image Output on Monitor , Image Output on Printer.

Graphics: Introduction, advantage of Graphics, Uses of Graphics, Components of a Graphics System, Coordinate Systems, Line Drawing Algorithms, Filling Algorithms, Clipping Algorithms, Plotter, Transformations, 3D Graphics, 3D Modeling, Surface Characteristics and Texture, Lights.

Unit-III

Audio: Introduction, Acoustics, Nature of Sound Waves, Fundamental Characteristics of Sound, Musical Note and Pitch, Psycho-Acoustics, Elements of Audio Systems, Microphone, Amplifier, Loudspeaker, Audio Mixer, Digital Audio Synthesizers, Musical Instrument Digital Interface(MIDI),MIDI Messages, MIDI Connections, General MIDI (GM) Specifications, Basics of Staff Notation, Sound Card, Audio Transmission, Audio Recording Devices, Audio File Formats and CODECs, Software Audio Players, Audio Recording Systems, Digital Audio Broadcasting, Audio and Multimedia, Voice Recognition and Response, Audio Processing Software.

Video: Introduction, Analog Video Camera, Transmission of Video Signals, Video Signals formats, Television Broadcasting /standards, Digital Video, Digital Video Standards ,PC Video, Video Recording Formats and Systems, Video File Formats and CODECs, Video Editing, Video Editing Software. Animation: Introduction, Historical Background. Uses of Animation, Key frames and Tweening, Types of Animation, Computer Assisted Animation, Creating Movement, Principles of Animation, Some Techniques of Animation, Animation on the Web, 3D Animation, Camera, Special Effects, Creating Animation, Rendering Algorithms, Animation Software, File Formats.

Unit-IV

Compression: Introduction, CODEC, Types of Compression, Types of Redundancies, Lossless/Statistical Compression Techniques, GIF Image Coding Standard, Lossy/Perceptual Compression Techniques, JPEG Image Coding Standard, MPEG Standards Overview, MPEG-1 Audio,MPEG-1 Video, MPEG-2 Audio, MPEG-2 Video, MPEG-4, MPEG-7, Fractals.

CD-Technology: Introduction, Compact Disc (CD), CD Formats, Magneto- Optical Disc, CD Interface, Laserdisc(LD), Error Handling, DVD, DVD- Formats.
Multimedia Architecture: Introduction, User Interfaces, Windows Multimedia Support, Hard ware Support, Distributed Multimedia
Applications, Real- time Protocols, Playback Architectures, Streaming Technologies, Temporal Relationships, Synchronization, Multimedia Data base Systems (MMDBS), Feature Extraction of Image, Feature Extraction of Audio, Feature Extraction of Video, Similarity Metrics, Indexing Mechanisms, Characteristics of Multimedia Databases, Benchmarking of MMDBS, Object Oriented Approach.

Unit-V
Multimedia Documents: Introduction, Document and Document Architecture, Designing a Multimedia Interchanges Format, Markup, Standard Generalized Markup Language (SGML), Open Document Architecture (ODA), Multimedia and Hypermedia Information Coding Expert Group(MHEG), Hypermedia Time based Structuring Language (Hytime), Open Media Framework (OMF), Digital Copyrights.
Multimedia Application Development: Introduction, Software Life Cycle Overview, ADDIE Model, Conceptualization, Content Collection and Processing , Story , Flowline, Script, Storyboard, Implementation, Authoring Metaphors, Testing and Feedback, Final Delivery, Report Writing/Documentation, case Study, Computer Games.
Virtual Reality: Introduction, Forms of Virtual Reality, VR Applications, Software Requirements, Peripheral Devices, Virtual Reality modeling Language (VRML)

Suggested Reading:
1.Ranjan Parekh, *"Principles of Multimedia"*, Tata McGraw Hill, 2008
2.Tay Vaughan, *"Multimedia: Making It Work",* Seventh Edition Tata McGraw Hill, 2008
3.Ralf Stein Metz Clara Nahrstedit, *"Multimedia: Computing, Communication and Applications",* Pearson Education, 2001.
4.John F. Koegel Buford, *"Multimedia Systems",* Addison Wesely, 1994.

WITH EFFECT FROM THE ACADEMIC YEAR 2013 - 2014

CS 476

CLOUD COMPUTING
(ELECTIVE-III)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT-1

Introduction to Cloud Computing: Cloud Computing in a Nutshell,System Models for Distributed Computing,System Models for Cloud Computing, Roots of Cloud Computing, Grid and Cloud, Layers and types of Clouds, Desired Features of Cloud, Basic Principles of Cloud Computing, Challenges and Risks, Service Models.

UNIT-2

Virtual Machines and Virtualization of Clusters and Data Centers: Levels of Virtualization, Virtualization Structures, Virtualization Tools and Mechanism, Virtualization of CPU, Memory, I/O Devices, Virtual Clusters and Resource Management, Virtualization Data-Center Automation.

Case Studies: Xen Virtual Machine Monitors- Xen API, VMWare- VMware Products, VMWare Features. Features of Microsoft Virtual Server

UNIT-3

Cloud Computing Architectures over Virtualized Data Centers: Data Center design and Interconnected networks, Architectural Design of Compute and Storage Clouds, Public Cloud Platform, GAE, AWS, Azure, Inter-Cloud Resource Management.

UNIT-4

Cloud Security and Trust Management: An introduction to the idea of Data Security, Current state of data Security in the Cloud CryptDB,

Onion Encryption Layers, DET, RND, OPE, JOIN, SEARCH, HOM, Homomorphic Encryption, FPE, Trust, Reputation and Security Management.

UNIT-5

Cloud Programming and Software Environments: Features of Cloud and Grid Platforms, Parallel and Distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS, Programming on Microsoft Azure, Emerging Cloud Software Environments.

Common Standards in Cloud Computing: Open Cloud Consortium, Distributed Management Task Force, Standards for Application Developers, Standards for Messaging, Internet Message Access Protocol(IMAP), Standards for Security, Examples for End-User to Cloud Computing.

References:

1) John W. Rittinghouse, "Cloud Computing: Implementation,Management, and Security". James F. Ransome, CRC Press 2009.

2) **Kai Hwang. Geofferey C. Fox, Jack J. Dongarra, "Distributed and Cloud ComoutingFrom Parallel Processing to the Internet of Things".**

3) **Rajkumar Buyya, james Broberg and Andrzej M. Goscinski, "Cloud Computing: Principles and Paradigms, Wiley Publishing 2011"**

WITH EFFECT FROM THE ACADEMIC YEAR 2013 - 2014

CE 452

DISASTER MITIGATION AND MANAGEMENT

(Elective-III)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT-I

Introduction - Natural, human induced and human made disasters international decade of disaster reduction.

UNIT-II

Natural Disasters - Hydrometereological based disasters - Trophfcal cyclones, floods, drought and desertification - Zones Geographical based disasters - Earth quake, Tsunammis, Landslides and avalanches.

UNIT-III

Human induced hazards -chemical industrial hazards, major power breakdowns, traffic accidents, etc.

UNIT-IV

Use of remote sensing and GISI disaster mitigation and management

UNIT-V

Rich and vulnerability to disaster - mitigation and management options warning and forecasting

Suggested Reading:

1.Rajib, S and Krishna Murthy, R. R (2012) *"Disaster Management global Challenges and Local Solutions"* Universities Press, Hyderabad.
2.Navele, P & Raja, C. K (2009), *Earth and atmospheric Disasters Management, Natural and Manmade.*- B. S. Publications, Hyderabad.
3.Fearn-Banks, K (2011), *Crises computations approach: A case book approach.*
4.*Special Indian Education*, Route ledge Publishers, New York & London.
5.Battacharya, T. (2012), *Disaster Science and Management, T*ata McGraw Hill Company, New Delhi.

WITH EFFECT FROM THE ACADEMIC YEAR 2013-2014

CS 481

DATA MINING LAB

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks

1.Implement the following Multidimensional Data Models
  i.Star Schema
  ii.Snowflake Schema
  iii.Fact Constellation
2.Implement Apriori algorithm to generate frequent Item Sets
3.Implement the following clustering algorithms
  i.K-means
  ii.K-mediods
4.Implement the following classification algorithms
  i.Decision Tree Induction
  ii.KNN
5.Perform data Preprocessing using WEKA
6.Perform Discritization of data using WEKA
7.Classification algorithms using WEKA
8.Apriori algorithm using WEKA
9.Perform data transformations using an ETL Tool
10.A small case study involving all stages of KDD. (Datasets are available online like UCI Repository etc.)

WITH EFFECT FROM THE ACADEMIC YEAR 2013–2014

CS 482

SEMINAR

Instruction	3 Periods per week
Sessionals	25 Marks

Oral presentation is an important aspect of engineering education. The objective of the seminar is to prepare the student for a systematic and independent study of the state of the art topics in a broad area of his/her specialization.

Seminar topics may be chosen by the students with advice from the faculty members. Students are to be exposed to the following aspects of a seminar presentation.

Literature survey
Organization of the material
Presentation of OHP slides/PC presentation Technical writing

Each student is required to :

1.Submit a one page synopsis before the seminar talk for display on the notice board.
2.Give a 20 minute presentation through OHP, PC, Slide projector followed by a 10 minute discussion.
3.Submit a report on the seminar topic with a list of references and slides used

Seminars are to be scheduled from the 3rd week to the last week of the semester and any change in schedule should be discouraged.

For award of the Sessional marks, students are to be judged by at least two faculty members on the basis of an oral and written presentation as well as their involvement in the discussions.

WITH EFFECT FROM THE ACADEMIC YEAR 2013–2014

CS 483

PROJECT

Instruction	6 Periods per week
Duration of University Examination	Viva Voce
University Examination	Grade*
Sessionals	25 Marks

Solving a real life problem should be the focus of U.G. projects. Faculty members should propose the projects (brief scope and references) well in advance which should be made available to the students at the department library. The project could be classified as hardware, software, modeling, simulation etc. The project should involve one or many elements of techniques such as analysis, design, synthesis.

The department will appoint a project coordinator who will coordinate the following:

Grouping of students (maximum of 3 in a group) Allotment of projects and project guides

Project monitoring at regular intervals.

All projects allotment is to be completed by the 4th week of 4th year 1st semester so that the students get sufficient time for completion of the project.

All projects will be monitored at least twice in a semester through student presentations. Sessional marks are to be based on the Grades/ Marks, awarded by a monitoring committee comprising of faculty members as well as by the supervisor.

Efforts should be made that some of the projects are carried out in industries with the help of industry coordinators, Problems can also be invited from the industries to be worked out through U.G. projects.

Common norms will be established for the final documentation of the project report by the respective departments.

****Excellent / Very Good / Good / Satisfactory / Unsatisfactory***

Note: Three periods of contact load will be assigned to each project guide.