

## CS/EB/EC/EE/EI/IT 701 INDUSTRIAL ORGANIZATION AND MANAGEMENT

### **Module 1**

Organisation: Introduction, definition of organization, system approach applied to organization, necessity of organization, elements of organization, process of organization, principles of organization, formal and informal organization, organization structure, types of organization structure .

Forms of business organization: Concept of ownership organization, types of ownership. Individual ownership, partnership, joint stock Company, private and public limited company, co-operative organizations, state ownership, public corporation

### **Module 2**

Basic concept of management: Introduction, definitions of management, characteristics of management, levels of management, management skills

Management theory: Scientific management, contribution of Gilbreth. Gantt, Neo-classical theory, modern management theories

Functions of management: Planning, forecasting, organizing, staffing, directing, motivating, controlling, co-coordinating, communicating, decision making.

### **Module 3**

Personnel management: Introduction, definition, objectives, characteristics, functions, principles and organization of personnel management

Markets and marketing: Introduction, the market, marketing information, market segmentation, consumer and industrial markets, pricing, sales, physical distribution, consumer behaviour and advertisement.

Financial management: the basics , financial accounts, inflation, profitability, budgets and controls, cost accounting, valuation of stock, allocation of overheads, standard costing ,marginal costing

### **Module 4**

Productivity and production: Measurement of productivity, productivity index productivity improvement procedure

Materials management and purchasing: Objectives, functions, importance of materials management. Stores and storekeeping

Inventory control: Classification, functions, inventory models, inventory costs, EOQ, Materials requirement planning

### **References:**

1. Fraidoon Mazda, Engineering Management-, Addison -Wesley
2. Koontz and O'Donnell, Essentials of Management, Mc Graw Hill
3. Kotlar P, Marketing Management, Prentice Hall India
4. Prsanna Chandra , Finance Management, TMH.5<sup>th</sup> ed.,
5. Monks J.G Operations Management ,MGH

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 - There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 702 MULTIMEDIA COMPUTING

### ***Module I***

Introduction to Multimedia-media and Data streams-properties of a multimedia system- Data streams characteristics-information units- Multimedia Hardware platforms-Memory and storage devices-Input and output devices-Multimedia software tools.

### ***Module II***

Multimedia Building blocks- Audio: Basic sound concepts- Music-speech-audio file formats- Images and graphics: Basic concepts- computer image processing- Video and Animation: Basic concepts- Animation techniques.

### ***Module III***

Data compression: Storage space and coding requirements- source, entropy and Hybrid coding- Basic compression techniques- JPEG- H.261- MPEG- DVI- Multimedia Database systems- Characteristics of Multimedia Database Management system- data analysis- Data structure- operations on data- Integration in a database Model.

### ***Module IV***

Multimedia Documents- Hypertext and Hypermedia- document architecture SGML- Document architecture ODA- MHEG. Multimedia applications- Introduction- Media preparation- Media composition- Media Integration- Media communication – Media consumption – Media entertainment- trends.

### **Reference:**

1. Ralfsteinmetz and KlaraNahrstedt Multimedia Computing , communications &Applications- Pearson Edn.
2. Rajan Parekh, Principles of Multimedia, Tata Mc Graw Hill
3. J F Koegel Buford- -Multimedia syatems Addison Wesley -
4. T Vaughan-,Multimedia: Making it work Tata Mc Graw Hill

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## CS/IT 703 ADVANCED COMPUTER NETWORKS

### Module 1

Network Technologies : -WAN and LAN - Ethernet Technology: Fast And Gigabit Ethernet -10/100/1000 Ethernet - Properties of an Ethernet - interoperability & collision domains – Ethernet Hardware Addresses - Ethernet Frame Format - Extending An Ethernet With Bridges - Switched Ethernet -VLAN. Class full Internet Addresses: The Original Class full Addressing Scheme Dotted Decimal Notation - Subnet And Classless Extensions - IP Multicast Addresses .ARP: Resolution Through Direct Mapping - Resolution Through Dynamic Binding - ARP Protocol Format- ARP Implementation . RARP.

### Module 2

Internet Routing: Routing Between Peers (BGP)-Routing Within An Autonomous System (RIP, OSPF).Internet Multicasting : Ethernet Multicast- IP Multicast- IGMP- DVMRP-PIM. Understanding Router Components: Ports-Queuing- Scheduling-shaping- policing-marking. QoS in IP network IPv6: Frame formats-Comparison with IPv4. Introduction to ICMP,DHCP and NAT. Network Management: SNMP and RMON models

### Module 3

Wireless transmission: Frequencies for radio transmission-Signals-Antennas-Signal propagation-Multiplexing-Modulation-Spread spectrum-Cellular systems. Medium access control: SDMA-FDMA-TDMA-CDMA-Comparison of S/T/F/CDMA.

### Module 4

Telecommunications systems. Architecture and working principle of GSM,GPRS and UMTS network . Wireless LAN: Infrared vs radio transmission-Infrastructure and ad-hoc network-IEEE 802.11a,b,g, 802.15 and 802.16 protocol standards –Bluetooth - Principle of WiMax . Mobile IP.

### Text Books:

1. Douglas E.Comer, Internetworking With TCP/IP Volume 1: Principles Protocols, and Architecture, 5/e ,Prentice Hall,2006. (Module I and II)
2. Schiller, *Mobile Communication*, 2/e , Addison Wesley, 2005 (Module III and IV)

### References:

1. Youlu Zheng and Shakil Akhtar, *Networks for Computer Scientist and Engineers*, Oxford University Press,2006
2. James.F.Kurose & Keith W.Ross , *Computer Networking –A Top Down approach featuring Internet*, 3/e, Pearson Education,2005.
3. Douglas E.Comer, *Computer Network and Internets*, 2/e, Pearson education ,2003.
4. Andrew S.Tanenbaum, *Computer Networks* ,5/e Edition, Pearson education,2003
5. William Stallings, *Wireless Communication Networks*, 2/e, Pearson Education,2003.
6. Nathan J. Muller, *Bluetooth Demystified*, McGraw-Hill Professional Publishing,2000

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## CS/IT 704 DISTRIBUTED COMPUTING

### Module 1

Characterization of Distributed systems – Introduction- Examples of Distributed Systems- Challenges-System Models –Architectural models-Fundamental Models – Interprocess communication-The API for the Internet protocols-External Data representation and Marshalling-Client Server Communication- group communication. Interprocess communication in UNIX. Distributed Objects and Remote Invocation – Communication between distributed objects-Remote Procedure Call- Events and Notifications- Java RMI, Case study

### Module 2

Operating System Support-The Operating system layer – Protection- Processes and Threads-Operating System architecture  
Distributed file Systems-Introduction-File Service architecture– Case study sun NFS. Name service SNS and DNS.

### Module 3

Time and co-ordination. Synchronizing physical clocks -logical time and logical clocks. Distributed co-ordination –distributed mutual exclusion – elections. Replication – basic architectural model –consistency and request ordering.

### Module 4

Distributed DBMS Architecture- Distributed Database Design –Query Decomposition and Data Localization -Distributed transactions – concurrency control in distributed transactions– distributed deadlocks – transaction recovery.

### Text Book

1. George Coulouris, et. al., “Distributed Systems – Concepts and Design”, Fourth Edition., Pearson Education

### References

1. M.Tamer Ozu,Patrick Valduriez, “Principles of Distributed Database Systems”, Second Edition ,Pearson Education.
2. C.A.R.Hoare, “Communicating Sequential Processes”, Prentice Hall, 1980
3. Dimitri P.Bertsekas, John N.Tsitiklis, “Parallel and Distributed Computation : Numerical Methods”, Prentice Hall International, Inc., 1989
4. Douglas Comer and David L.Stevens, “Internetworking with TCP/IP Vol III: Client server Programming and Applications”, Prentice Hall, New York, 1990
5. Gerard Tel, “Introduction to Distributed Algorithms”, Cambridge University Press, 1994
6. H.S.M.Sedan, “Distributed Computer systems”, Butterworths, London, 1988
7. M.Sasikumar, et.al., "Introduction to Parallel Processing", PHI, New Delhi, 2000

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## **IT 705 (A) PARALLEL COMPUTER ARCHITECTURE & PROGRAMMING**

### **Module I.**

Introduction to Parallel Processing-Shared Memory Multiprocessing-Distributed Memory-Parallel Processing Architectures- Introduction-Parallelism in sequential Machines—Abstract Model of Parallel Computer – Multiprocessor Architecture- Array Processors.

### **Module II.**

Pipelining and Super Scalar Techniques-Linear Pipeline Processors-Non-Linear Pipeline processors-Instruction pipeline design-Arithmetic pipeline Design- Super Scalar and Super pipeline Design.

### **Module III.**

Programmability Issues-An Overview-Operating system support-Types of Operating Systems-Parallel Programming models-Software Tools-Data Dependency Analysis-Types of Dependencies-Program Transformations.

### **Module IV.**

Shared Memory Programming-Thread –based Implementation-thread Management-Attributes of Threads- Mutual Exclusion with Threads- Mutex Usage of Threads- Thread implementation-Events and Conditions variables-Deviation Computation with Threads-Java Threads Distributed Computing –Message Passing Model-General Model-Programming Model- PVM.

### **Text Books**

1. Kai Hwang, “Advanced Computer Architecture: Parallelism, Scalability, Programmability”, McGrawHill International Edition, 1993.
2. M.Sasikumar, et.al., "Introduction to Parallel Processing", PHI, New Delhi, 2000

### **References**

1. P. Pal Chaudhuri , “Computer Organisation and Design”, PHI, New Delhi, 1994.
2. Parthasarathy, Advanced Computer Architecture, Thomson Learning
3. William Stallings, “Computer Organisation and Architecture”, PHI, New Delhi, 1996.
4. “Proceedings of Third International Conference on High Performance Computing”, IEEE, Computer Society Press , California, USA, 1996.
5. “Parallel Processing”, Learning Material Series, Indian Society for Technical Education, New Delhi, 1996.
6. V.Rajaraman, C. Siva Ram Murthy, "Parallel Computers Architecture and Programming", PHI, New Delhi, 2000

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*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

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# CS/IT 705 (B) INFORMATION RETRIEVAL

## Module 1

Introduction – Information versus Data Retrieval. Modeling of Information retrieval. Formal characterization of Information retrieval – Alternate set theoretic models. Alternate algebraic models. Alternate probabilistic models. Structured text retrieval models. Models for Browsing. Retrieval Evaluation

## Module 2

Query languages. Text Operations- Document pre processing. Text compression. Indexing and searching. Inverted files. Suffix trees and suffix arrays. Boolean queries. Sequential searching. Pattern matching. Structural queries. User interface and visualization.

## Module 3

Parallel and Distributed Information Retrieval. Implementation of inverted files, suffix arrays and signature files in MIMD architecture. Implementation of Inverted files, suffix arrays and signature files in SIMD architecture.

## Module 4

Searching the web – modeling the web . Search engines –architecture, user interfaces, ranking, crawling, indices. Web Directories-Metadata- Metasearchers-Web as graph-Hubs and Authorities- Case study - google search engine

### Text Books:

1. Ricardo Baexa-Yates & Berthier Ribeiro-Neto  
Modern Information Retrieval, Addison Wesley Longman, 1999

### References

1. Sergey Brin and Lawrence page, The anatomy of large scale hyper textual(Web) search engine, Computer Networks and ISDN systems, Vol 30, No 1-7
2. J Kleinberg, et. Al, The Web as a graph: Measurements, models and methods, Lecture notes in computer science , Springer Verlag, 1999

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

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## CS/EB/IT 705 (C) ARTIFICIAL NEURAL NETWORKS

### Module 1

Introduction to neural networks. Artificial neural networks. Biological neural networks- Comparison , Basic building blocks of ANN. Activation functions. McCulloch-Pitts Neuron Model, Hebb net. Learning Rules-Hebbian Learning Rules, Perceptron, Delta, Competitive, Boltzmann. Perceptron networks- single layer, multilayer –algorithm.

### Module 2

Feedback Networks, Discrete Hopfield nets, Continuous Hopfield nets. Feed Forward Networks: Back Propagation Networks, Learning Rule, Architecture, training algorithm. Counter Propagation Network: Full CPN, Forward only CPN, architecture, training phases.

### Module 3

Adaptive Resonance Theory, architecture, learning in ART, Self Organizing feature maps: Kohonen SOM, Learning Vector Quantization, Max net, Mexican Hat, Hamming net. Associative memory networks Algorithms for pattern association Hetero associative networks, Auto associative memory networks Bidirectional associative memory networks Energy Function.

### Module 4

Special networks: Probabilistic neural networks, Cognitron, Simulated Annealing, Boltzmann machine, Cauchy machine, Support Vector Machine Classifiers. Application of Neural networks In Image Processing and classification. Introduction to Fuzzy systems, Neuro fuzzy systems.

### Text books:

1. Laurene Fausett: “*Fundamentals of neural networks*”, Prentice Hall, New Jersey,1994.
2. James A. Freeman, David M. Skapura: *Neural Networks Algorithms, Applications and Programming Techniques*, Addison-Wesley, 1990.

### References:

1. S N Sivanandan: “*Introduction to neural networks using “MATLAB”*”, TataMcGrawHill New Delhi.,2004
2. Kevin Gruney: “*An Introduction to neural networks*”, CRC Press,1997.
3. D. L.Hudson & M. E. Cohen: “*Neural Networks and Artificial Intelligence in Biomedical Engg.*”, Prentice Hall Of India, New Delhi.,1999
4. James A. Anderson, “*An Introduction to Neural Networks*”, Prentice Hall of India,1995.
5. Simon Haykin: “*Neural Networks*”, Pearson Education1998
6. Yegnanarayana: “*Artificial Neural Networks*”, Prentice Hall of India2004.
7. Jack M. Zureda, *Introduction to Artificial Neural Systems*,1992

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## IT 705(D) CRYPTOGRAPHY AND DATA SECURITY

### Module I

Cryptography and Cryptanalysis – aspects of security – cryptanalytic attacks – Transposition ciphers – substitution ciphers – the Hagelin Machine – Statistics and Cryptanalysis – The information theoretical approach – general scheme – information measure and absolute security – The unicity distance – Error probability and security – Practical security.

### Module II

The DES algorithm-Characteristics of DES-Alternative Descriptions-Analysis of DES-The modes of the DES-Future of DES-International Data Encryption Algorithm-Stream and Block Enciphering –The theory of finite state machines-shift registers-Random properties of shift register sequences-the generating function-Cryptanalysis of LFSRs-Non-linear Shift registers.

### Module III

Public Key Systems-The RSA system-The knapsack system-cracking the knapsack system-Public key systems based on elliptic curves. Authentication and Integrity-Protocols-message integrity with the aid of Hash functions-Entity authentication with symmetrical algorithm-Message authentication with digital signatures-Zero knowledge techniques.

### Module IV

Key Management and Network Security – General aspects of key management – key distribution for asymmetrical systems – key distribution for symmetrical algorithms- Network security-Fair cryptosystems.

### References :-

1. Jan C A – Basic Methods of Cryptography –Cambridge University Press
2. Thomas Calabrese, Thomson Learning - Information Security Intelligence: Cryptographic Principles & Applications .
3. Wenbo Mao, Modern Cryptography: Theory and Practice –Pearson Education
4. Dorothy Elizabeth Robling Denning, Cryptography and Data Security - Addison Wesley Publishing Co
5. Fine Worlds and Encryption - TMH
6. Niels Ferguson, Wiley - Bruce Schneier's Practical Cryptography
7. Micheal Welschenbac - Cryptography in C & C++
8. Rich Helton, Wiley = Cryptography & Algorithm

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## IT 705(E) DATA MINING AND WAREHOUSING

### MODULE I

Definition Data Mining, Data Mining- On What kind of Data, Data Mining Functionalities, Classification of Data Mining Systems, Major Issues in Data Mining.

### MODULE II

Data Warehouse and OLAP Technology: What is Data Warehouse, A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehouse to Data Mining.

### MODULE III

Data Preprocessing: Why preprocess the data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

### MODULE IV

Concept Description: Definition, Data Generalization and Summarization – Based Characterization, Analytical Characterization, Mining Class Comparisons, Mining Descriptive Statistical Measures in Large Databases, Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases.

### TEXT BOOK:

1. Jiawei Han & Micheline Kamber, “*Data Mining Concepts*”, Morgan Kaufmann Publishers

### REFERENCE:

1. Pudi, Data Mining & Data warehousing, Oxford
2. Alex Berson, Stephen J. Smith, "Data Warehousing, Data Mining and OLAP", McGraw Hill.
3. Margaret.H.Dunham ,”*Data Mining. Introductory and advanced topics*”, Pearson Education,2003.
4. Pieter Adriaans, Dolf Zantingo, "Data Mining", Addison Wesley, 1998
5. Pang- Ning Tan, Michael Steinbach & Vipin Kumar, “Introduction to Data Mining” Addison Wesley, 2006
6. Amitesh Sinha, Data Warehousing, Thomson Learning

*Type of questions for University Examination*

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## IT 706 COMPUTER NETWORK LAB

1. Familiarisation/Introduction to:
  - (a) Network components such as Modem, Gateways, Routers, Switches, Cables etc.
  - (b) Various network softwares, services and applications.
  - (c) Network trouble shooting Techniques.
2. Serial Port Programming
3. Parallel Port Programming
4. TCP/IP and socket Programming
5. Winsock Programming
6. RPC Programming
7. Performance modelling of networks.

### **Text Book:**

1. Youlu Zheng and Shakil Akhtar, Networks for Computer scientists & Engineers/Lab manual, Oxford Univ. Press
2. Douglas E.Comer, Hands on Networking with Internet Technologies, Pearson Education

**Note: 50% Marks is earmarked for continuous evaluation and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50% marks separately for the two components to be eligible for a pass in that subject.**

## IT 707 MINI PROJECT - MULTIMEDIA BASED

Multimedia project involving Painting and 3D Animation , 3D Titling, 3D Modeling and Animation, Working with sound, Frame and Video Capturing and special Effects, Authoring and Presentation. Projects can be done using software's like 3D Studio Max.

( Each student has to do separate project )

Each batch comprising of 3 to 5 students shall design. Each student shall submit a project report at the end of the semester. The project report should contain the design and engineering documentation including the Bill of Materials and test results. Product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations and aesthetics / ergonomic aspects taken care of in the project shall be given due weight.

*Guidelines for evaluation:*

i) Attendance and Regularity	10
ii) Work knowledge and Involvement	30
iii) End-Semester presentation & Oral examination	20
iv) Level of completion and demonstration of functionality/specifications	25
v) Project Report	15
<i>Total</i>	100 marks

*Note: External projects and R&D projects need not be encouraged at this level. Points (i) & (ii) to be evaluated by the project guide & co-ordinator and the rest by the final evaluation team comprising of 3 teachers including the project guide.*

## **IT 708 SEMINAR**

Each student shall give a 45 minute presentation of a topic followed by a 15 minutes discussion and elaboration. Marks will be awarded considering the relevance of the topic, report preparation, presentation, technical content, depth of knowledge, quality of references and the participation in the seminar.

Students shall individually prepare and submit a seminar report on a topic of current relevance related to the field of Computers either hardware or software. The reference shall include standard journals, conference proceedings, reputed magazines and textbooks, technical reports and URLs. The references shall be incorporated in the report following IEEE standards reflecting the state-of-the-art in the topic selected. Each student shall present a seminar for about 30 minutes duration on the selected topic. The report and presentation shall be evaluated by a team of internal experts comprising of 3 teachers based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the seminar report

## IT 709 PROJECT DESIGN

The major project work shall commence in the seventh semester and completed by the end of eighth semester. Students are expected to identify a suitable project and complete the analysis and design phases by the end of seventh semester.

Each batch comprising of 3 to 5 students shall identify a project related to the curriculum of study. At the end of the semester, each student shall submit a project synopsis comprising of the following.

- Application and feasibility of the project
- Complete and detailed design specifications.
- Block level design documentation
- Detailed design documentation including circuit diagrams and algorithms / circuits
- Bill of materials in standard format and cost model, if applicable
- Project implementation action plan using standard presentation tools

*Guidelines for evaluation:*

i) Attendance and Regularity	10
ii) Quality and adequacy of design documentation	10
iii) Concepts and completeness of design	10
iv) Theoretical knowledge and individual involvement	10
v) Quality and contents of project synopsis	10
<i>Total</i>	50 Marks

**Note:** Points (i)-(iii) to be evaluated by the respective project guides and project coordinator based on continuous evaluation. (iv)-(v) to be evaluated by the final evaluation team comprising of 3 internal examiners including the project guide.