

## IT 801 ELECTRONIC BUSINESS AND SERVICES

### Module I

**E-COMMERCE TO E-BUSINESS:** Linking Business with Technology - e-Business-Structural Transformation- Flexible Business Designs -Traditional Definitions of Value - Value in Terms of Customer Experience – Engineering the End-to-End Value Stream – Create the New Techno-Enterprise

**E-BUSINESS TREND SPOTTING:** Increase Speed of Service - Self-Service – Provide Integrated Solutions-Integrate Sales and Service - Customization and Integration - Customer Service Consistent and Reliable - Service Delivery - Contract Manufacturing - Increase Process Visibility -Employee Retention -Integrated Enterprise Applications - Multichannel Integration

### Module II

**E-BUSINESS DESIGN:** Technology -Constructing an e-Business Design - Self-Diagnosis - Reversing the Value Chain -Choosing a Narrow Focus -Case Study

**E-BUSINESS ARCHITECTURE:** Functional Integrated Apps -Integrating Application Clusters into an e-Business Architecture –Aligning the e-Business Design with Application Integration.

**CUSTOMER RELATIONSHIP MANAGEMENT:** Integrating Processes to Build Relationships -Customer Relationship Management -Definition -Organizing around the Customer -CRM Architecture -CRM Infrastructure -Implementing CRM -CRM Trends - Building a CRM Infrastructure

### Module III

**CHAIN MANAGEMENT:** Transforming Sales into Interactive Order Acquisition -Defining Selling-Chain Management - Business Forces Driving the Need for Selling -Technology Forces Driving the Need for Selling -Managing the Order Acquisition Process

**ENTERPRISE RESOURCE PLANNING:** The e-Business Backbone -ERP Decision - Enterprise Architecture Planning- ERP Implementation.

### Module IV

**SUPPLY CHAIN MANAGEMENT:** Inter enterprise Fusion -Defining Supply Chain Management – Basics of Internet-Enabled SCM- e-Supply Chain Fusion- Management Issues

**E-PROCUREMENT:** The Next Wave of Cost Reduction - Isolated Purchasing to Real-Time Process Integration -Operating Resource Procurement- Lack of Process Integration

### TEXT BOOKS:

1. Ravi Kalakota and Marcia Robinson, "e-Business : Roadmap for Success", Addison Wesley,1998
2. Gary P Schneider, Electronic Commerce, Thomson Learning

### REFERENCE:

1. Daniel Menasce, Virgilio Almeida, "Scaling for E-Business: Technologies, Models, Performance, and Capacity Planning", Prentice Hall,2000
2. Harvey Deitel, Paul Deitel , T. Nieto, Complete e-Business and e-Commerce Programming Training Course, Prentice Hall- Student Edition, 2001

*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 802 REAL TIME SYSTEMS

### Module I

Introduction: Basic Model, Characteristics and applications of real time systems, Safety and Reliability, Types of Real Time Tasks, Timing Constraints. Real Time Task Scheduling: clock driven scheduling, event driven scheduling, Rate monotonic algorithm. Scheduling Real time Tasks in Multiprocessor and distributed systems. Clocks in distributed real time systems.

### Module II

Resource sharing among real time tasks, Priority inversion, Priority Inheritance protocol, Highest Locker Protocol, Priority Ceiling Protocol, Handling task dependencies. Real Time operating system features, Unix as a real time operating system, Windows as a real time operating system, POSIX, Benchmarking real time systems.

### Module III

Real Time Communication: Basic concepts, Real time communication in a LAN, Bounded access protocols for LANs, Real time communication over packet switched networks, Routing, Resource reservation, Rate control, QoS Models.

### Module IV

Real Time data bases: Applications of real time data bases, real time database application design issues, characteristics of temporal data, concurrency control in real time databases, locking based concurrency control protocols, optimistic concurrency control protocols, speculative control protocols.

### Text Book:

1. Rajib Mall, Real Time Systems: Theory and Practice, Pearson Education, 2007

### Reference:

1. Jane W S Liu, Real Time Systems, Pearson Education
2. K.V.K.K Prasad, *Embedded / RealTime systems: “Concepts, Design and programming”*, Dreamtech Software Team, Wiley Dreamtech
3. K.V.K.K Prasad, *Programming for Embedded Systems*, Dreamtech Software Team, Wiley Dreamtech, 2005
4. Bruce Powel Douglass, Real Time UML, 3<sup>rd</sup> edition, Pearson Education
5. David E. Simon, *An Embeded Software Primer*, Pearson Education

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## IT 803 SOFTWARE PROJECT MANAGEMENT

### Module I

Project Management Organisation and Functions; Management products Management Organisation, Technical Organisation, Job Descriptions and Objectives, Setting Objectives for each project role. Project Planning Techniques – I : Steps in Planning, Product Breakdown Structure, Product Flow Diagrams, Activity Breakdown Activity Network (Arrow Diagram & Precedence Diagram), Other allied techniques like Gantt Chart, check list etc. Project Planning Techniques-II : Outline Product Descriptions, using standard Methods (SSADM, COMPACT), Prototyping, Turnkey Projects Procurement, Resource Allocation and Scheduling. Sizing and Estimating : Approaches to Sizing and Estimating, COCOMO Model Function Point Analysis.

### Module II

Planning the Software Project : Structure of Plan Components (Technical Plan, Resource Plan, Quality Considerations), Levels of Planning (Project Plans, State Plans, Detailed Plans, Individual Work Plans, Execution Plans), Planning Guidelines. Project Monitoring and Control : Project Initiation, End-Stage Assessment, Mid- Stage Assessment, Checkpoints, Project closure Project Measurement and Review, Quality Review, Technical Exceptions, Configuration Management. Quality Assurance, Quality Concepts, Quality Planning, Quality Review, Quality Characteristics, Technical Exceptions.

### Module III

Configuration Management : Configurations Identification, Configuration control, Configuration Status, Accounting, Configuration Audits.

### Module IV

Productivity Guidelines : Software Packages, Productivity Attributes, Productivity Tools and their selection, Establishing a Productivity Improvement Program. Team Management : Motivation Theories, Motivation Factors for Software Development, Leadership, Performance Evaluation.

### References :-

1. Harold Kerzner, Program Management-A System Approach Planning Scheduling And Controlling, CBS
2. Schwalbe, Information Technology Project Management Thomson Learning
3. Cleland D.L & King W.R :System Analysis And Project Management, Mcgraw Hill
4. Meredith J.R :Project Management-A Management Approach, Wiley-Ny
5. Charles.S.Parker, Management Information Systems – Strategy and Action, Mcgraw Hill
6. Annelies Von Maryrhause, Software Engineering Methods and Management, Academic Press.
7. Jame.R.Johnson, The Software Factory, QED Info.Sciences Inc.
8. Rogor.S.Pressman, Software Engineering, Mcgraw Hill, Int.Ed.
9. Kieron Conway, Software Project Management, From Concept to Deployment

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## IT 804(A) SOFTWARE TESTING METHODS AND TOOLS

### Module I

Principles of Testing-White Box Testing- Static Testing – Structural Testing – Black Box Testing – Integration Testing – System and Acceptance Testing – Functional and Non Functional Testing- Regression Testing.

### Module II

Testing of Object-Oriented Systems- Differences in OO Testing-Usability and Accessibility Testing- People and Organizational Issues in Testing-Common people Issues-Organization Structures for Testing Teams

### Module III

Test Management and Automation-Test Planning- Test Management- Test Process- Test Reporting- Software Test Automation-What to Automate-Scope of Automation- Design and Architecture for Automation- Generic Requirement for Test Tool/Framework-Process Model for Automation- Selecting a Test tool.

### Module IV

Test Metrics and Measurements- What are Metrics and Measurement?- Why Metrics in Testing-Types of Metrics- Project Metrics-Efforts Variance- Schedule Variance-Effort Distribution Across Phases – Progress Metrics – Test Defect Metrics – Development Defect Metrics –Productivity Metrics-Release Metrics.

### TEXT BOOKS:

1. Srinivasan Desikan, Gopalaswamy Ramesh, "Software Testing: Principles and Practices, Pearson Education, 2006.

### REFERENCE:

1. Graham, Dorothy Graham, Mark Fewster, Brian Marick, "Software Test
2. Automation: Effective Use of Test Execution Tools" Addison-Wesley
3. Tamres, Introducing Software Testing, Pearson Education
4. Michael R. Lyu, "Handbook of Software Reliability Engineering", McGraw-Hill
5. Kit, Software Testing in Real World, Pearson Education

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## CS/EB/EC/IT 804 B BIOINFORMATICS

### Module I

Basic Concepts of Molecular Biology: Cells - Chromosomes, DNA, RNA, Proteins, Central dogma of molecular biology, Genomes and Genes - Genetic code, Transcription, Translation and Protein synthesis. Web based genomic and proteomic data bases: NCBI, Gene Bank

### Module II

Sequence alignments – Dot plot-Pair-wise sequence alignments - local and global - Sequence similarity and distance measures - Smith-Waterman algorithm, Needleman-Wunch algorithm, Multiple sequence alignment –Sum-of-Pairs measure - Star and tree alignments – PAM and BLOSUM, Phylogenetic analysis

### Module III

Informational view of Genomic data, Genomic Signal Processing, DNA Spectrograms, Identification of protein coding regions, Gene expression, Microarrays, Microarray image analysis

### Module IV

Gene structure in Prokaryotes and Eukaryotes: Molecular Structure Prediction: Basic concepts and terminologies related to molecular structures, Basic molecular Visualization, RNA secondary structure prediction, Protein folding problem, Protein Threading, Protein Visualization, Introduction to Drug Discovery.

### Case Study

Software Tools: Use of Tools for basic and specialized sequence processing such as: BLAST, FASTA, RasMol, Phylip, ClustalW

### Text Books:

1. Setubal & Meidanis, *Introduction to Computational Molecular Biology*, Thomson:Brooks/Cole, International Student Edition, 2003
2. Claverie & Notredame, *Bioinformatics - A Beginners Guide*, Wiley-Dreamtech India Pvt Ltd, 2003.

### References:

0. Lesk, *Introduction to Bioinformatics*, Oxford University Press, Indian Edition, 2003
0. Higgins and Taylor, *Bioinformatics: Sequence, structure and databanks*, Oxford University Press, Indian Edition, 2003
0. Bergeron, *Bioinformatics Computing*, Prentice hall of India, 2003
0. Jiang, Xu and Zhang, *Current topics in Computational Molecular Biology*, Ane Books, New Delhi, 2004
0. S.C Rastogi & Namitha Mendiratta, *Bioinformatics method and application Genomics, Protinomics & drug discovery*, Prentice-Hall India Ltd, 2nd ed.
0. Dov Stekel, *Microarray, Bioinformatics*, Cambridge University Press, 2003

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## IT 804(C ) SOFT COMPUTING

### Module I

INTRODUCTION: Neuro-Fuzzy and Soft Computing.

FUZZY SET THEORY: Fuzzy Sets -Fuzzy Rules and Fuzzy Reasoning - Fuzzy Inference Systems.

### ModuleII

REGRESSION AND OPTIMIZATION: Least-Squares Methods for System Identification - Derivative-Based Optimization- Derivative-Free Optimization.

NEURAL NETWORKS: Adaptive Networks - Supervised Learning Neural Networks - Learning from Reinforcement – Unsupervised learning and Other Neural Networks.

### Module III

NEURO-FUZZY MODELING: ANFIS: Adaptive-Networks-based Fuzzy Inference Systems -Coactive Neuro-Fuzzy Modeling: Towards Generalized ANFIS.

ADVANCED NEURO-FUZZY MODELING: Classification and Regression Trees - Data Clustering Algorithms - Rule base Structure Identification.

### Module IV

NEURO-FUZZY CONTROL: Neuro-Fuzzy Control I -Neuro-Fuzzy Control II

ADVANCED APPLICATIONS: ANFIS Application- Fuzzy-Filtered Neural Networks- Fuzzy Theory and Genetic Algorithms in Game Playing-Soft Computing for Color Recipe Prediction.

### TEXT BOOKS:

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun & Eiji Mizutani, “Neuro Fuzzy and Soft Computing-A Computational Approach to Learning and Machine Intelligence”, Prentice Hall of India, 2004.

### REFERENCE:

1. John Yen and Riza Langrari, “Fuzzy Logic Intelligence Control& Information”, Pearson Education, 2003 .
2. Bart Kosko, “Neural Networks and Fuzzy Systems – A Dynamical System Approach to Machine Intelligence”, Prentice Hall of India Pvt Ltd, 1997.

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## IT/CS 804 (D) MOBILE COMPUTING

### Module 1

Review of wireless and mobile communication (covered in Advanced Computer Networks)-Mobile computing architecture-Pervasive Computing-Voice oriented data Communication, Operating System for Mobile Computing, Mobile Devices, cards and sensors, Mobile computing applications: messaging-SMS-MMS-GPRS applications-Mobile agents.

### Module 2

Wireless Internet-Mobile IP-wireless web-Web services and mobile web services-Wireless middleware-wireless gateway and mobile application servers-Wireless Access Protocol(WAP)-WAP protocol layers. Mobile database management:-data caching, transaction models, processing queries, Data recovery, QoS .Mobile Transport Layer

### Module 3

Cellular network- First Generation Networks-Second generation (2G): GSM-CDMA network .data over cellular network-2.5G network-GPRS-GPRS System Architecture and Protocol layers. EDGE. Third generation network(3G) network-MMS-introduction to 4G and 5G systems-Emerging wireless networks: Ultra wide band(UWB)-Free space optics(FSO)-Mobile ad-hoc network(MANET)-Wireless sensor networks-OFDM and Flash OFDM

### Module 4

Wireless security-WLAN security-cellular wireless network security-Mobile ad-hoc network security-Internet security protocols: VPNs and IPSec-Wireless middleware security-SSL for wireless web security-WAP security and WTLS. Client programming tools-using XML and UML for mobile computing –J2ME.

### Text Book:

1. Raj Kamal, *Mobile Computing*, Oxford University Press, 2007

### References:

1. Amjad Umar, *Mobile Computing and Wireless Communications*, NGE Solutions, 2004
2. Asoke Talukder, Roopa Yavagal, *Mobile Computing*, McGrawhill, 2006
3. Reza Behravanfar, Phillip Lindsay, Reza B'Far, *Mobile Computing Principles: designing and developing mobile applications with UML and XML*, Cambridge University Press, 2006.
4. U. HansMann, L Merk, M.S. Nicklous and T. Stober, *Principles of Mobile Computing*, 2/e- Spniyer, 2003
5. Schiller J, *Mobile Communications*, 2/e-Addison Wesley, 2003.

### Type of questions for University Examination

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## IT 804(E) GEOGRAPHICAL INFORMATION SYSTEMS

### Module I

**DATA AND INFORMATION:** Define a geographic information system-database operation from verbal descriptions - basic geographic data models from verbal descriptions -geographic information technologies.

**SCALES AND PROJECTIONS:** Calculate map scale using representative fractions -relationship between map scale and the detail and accuracy of geographic databases- Specify positions on the Earth's surface using geographic and plane coordinates - Recognize general categories and distortion characteristics of several common map projections - Plotting Map Projections.

### Module II

**CENSUS DATA AND THEMATIC MAPS:** Discriminate between different levels of measurement of attribute data -Use percentile and equal interval classification schemes to divide census attribute data into categories suitable for choropleth mapping -differences between counts, rates, and densities, and identify the types of map symbols that are most appropriate for representing each -metadata and the World Wide Web to assess the content and availability of attribute data produced by the Census Bureau.

**GEOCODING, TOPOLOGY:** address-referenced census data are matched to specific geographic locations -topology and encoded data -Files in terms of data model, features and attributes, and appropriate uses -Products that can be used for applications, including routing and allocation - Creating and Interpreting Thematic Maps.

### Module III

**LAND SURVEYS AND GPS:** key aspects of data quality, including resolution, precision, and accuracy -procedures land surveyors use to produce positional data, including traversing, triangulation, and trilateration . Global Positioning System satellites -calculating positions on the surface of the Earth- rationale and effects of selective availability.

**PHOTOGRAPHS AND REFERENCE MAPS:** Three dimensional view of the earth's surface from a stereoscopic view of two aerial photographs -difference between a vertical aerial photograph and an orthophoto -metadata and the World Wide Web to assess the content and availability of USGS topographic maps, Digital Raster Graphics, Digital Orthophoto Quadrangles, and Digital Line Graphs -Compare and contrast the characteristics and appropriate uses of DRGs, DOQs, DLGs - Choosing Geographic Data.

### Module IV

**REMOTELY SENSED IMAGE DATA:** Compare and contrast characteristics and applications of different types of remotely sensed data, including AVHRR, Landsat MSS and TM. and ERS Radar -World Wide Web to assess the availability, timeliness, and cost of satellite data - distinction between supervised and unsupervised means of automated image classification.

#### TEXT BOOK:

1. Christopher B. Jones, "Geographical Information Systems and Computer Cartography", Addison Wesley

#### REFERENCES:

1. Paul A. Longley, Michael F. Goodchild, David J Maguire, David W. Rhind, "Geographical Information Systems", John Wiley & sons Inc
2. Ian Hey wood, Sarah Cornelius, Steve Carver, "An Introduction to Geographical Information Systems", Addison Wesley
3. George B Korte, The GIS Book, 5<sup>th</sup> edition, Thomson Learning.

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## IT 805 PROJECT WORK

The project work commencing from the seventh semester shall be completed and the project report shall be submitted by each student by the end of eighth semester. There shall be an internal examination of the project that includes a presentation, demonstration and oral examination of the project work.

Each batch of students shall develop the project designed during the VII semester. The implementation phase shall proceed as follows:

A detailed algorithm level implementation, test data selection, validation, analysis of outputs and necessary trial run shall be done.

Integration of hardware and software, if applicable, shall be carried out.

A detailed project report in the prescribed format shall be submitted at the end of the semester. All test results and relevant design and engineering documentation shall be included in the report.

The work shall be reviewed and evaluated periodically

The final evaluation of the project shall be done by a team of minimum 3 internal examiners including the project guide and shall include the following.

- Presentation of the work
- Oral examination
- Demonstration of the project against design specifications
- Quality and content of the project report

*Guidelines for evaluation:*

Regularity and progress of work	30
Work knowledge and Involvement	100
End semester presentation and oral examination	50
Level of completion and demonstration of functionality/specifications	70
Project Report – Presentation style and content	50

*Total 300 marks*

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

## IT 806 VIVA-VOCE

Each student is required to appear for a viva-voce examination, and he/she has to bring his seminar report and project report for the same. The evaluation panel should contain at least one external and two internal examiners appointed by the University. There can be more than one panel in case the number of students is large.