

## ITU801 DATA WAREHOUSING AND DATA MINING

**Teaching Scheme: 03 L+ 00T**

**Total: 03**

**Credits: 03**

**Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE**

**Total Marks: 100**

**Duration of ESE: 2hrs.30min.**

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**Data ware house and OLAP Technology for data mining:** Data ware house, multidimensional data model, data ware house architecture, data ware house implementation.

**Data mining:** Data mining functions, classification and major issues. Data Preprocessing Data cleaning, data integration and transformation, data reduction, discrimination & concept hierarchy generation.

**Data mining primitives:** Concept, Data mining query language. Concept description: data generalization, Analytical characterization, mining class comparison.

**Classification and Prediction:** What is classification? What is prediction? , Issues regarding classification and prediction, Classification by decision tree induction, Bayesian classification, Classification by back propagation, k-nearest neighbor classifiers.

**Cluster Analysis:** What is cluster analysis?, types of data in clustering analysis, a categorization of major clustering methods, partitioning methods, hierarchical methods, model based clustering methods, outlier analysis.

**Application and trends in data mining:** Data mining applications, data mining systems and research prototypes, additional themes on data mining, trends in data mining.

### **Text Books:**

1. Data Mining Concepts and Technique's, Han and M.Kamber, 1<sup>st</sup> edition, Elsevier Pub. Indian Reprint, 2004.
2. Data Ware Housing, Data Mining and OLAP, Berson, 2<sup>nd</sup> Edition, Tata McGraw- Hill, 2004.

### **Reference Books:**

1. The Data Ware House Life Cycle Tool Kit, R. Kimball , 1<sup>st</sup> Edition, Wiley Press, John Wiley and Sons (ASIA) Pvt. Ltd,2001.
2. Data Mining Techniques, Arun K. Pujari, 2<sup>nd</sup> Edition, University Press (Orient Longman), 2003

## ITU802 NETWORK ADMINISTRATION AND SECURITY

**Teaching Scheme: 03 L+ 00T**

**Total: 03**

**Credits : 03**

**Evaluation Scheme : 15 CT1 + 15 CT2 +10 TA+ 60 ESE**

**Total Marks :100**

**Duration of ESE: 2hrs.30min.**

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**Introduction to Network Security:** passive and active attacks, authentication, integrity, access control, The model of internet work security, internet standards: internet society and RFC publications.

**Cryptography:** Encryption principles and various algorithms, standardization process, key distribution, public key cryptography and message authentication, digital signature. Network security applications: Kerberos, X.509 directory authentication services, e-mail security PGP (Pretty Good Privacy), operational description. MIME (Multipurpose Internet Mail Extensions), SMIME (Security/Multipurpose internet mail extensions) functionality.

**IP Security:** Overview, IP security architecture, Authentication header, Web Security: Web security requirements, secure socket layer, Transport layer security, Secure electronic transactions.

**Network Management Security:** Basic concepts of SNMP, Network management architecture and protocol architectures, proxies, services, SNMPv1 authentication service, access policy and proxy service, SNMPv2 architecture, message processing and user security model, view based access control.

**System Security:** Intruders, Intrusion technologies, password protection, password selection strategies, Intrusion detection.

**Viruses and related threats:** Nature of viruses, types, micro viruses and various antivirus approaches.

**Firewall:** Characteristics, types of firewalls, Firewall configuration, Trusted systems, data access control, the concept of the trusted systems.

**Text Book :**

1. Network Security Essentials, William Stallings, 3<sup>rd</sup> edition, Prentice Hall India, 2006.
2. Cryptography and Network Security, Atul Kahate, 2<sup>nd</sup> Edition, Tata McGraw-Hill Publishing Company Ltd., 2008

**Reference Books:**

1. Security for Telecommunication and Network management, Moshe Rozenblit, 1<sup>st</sup> Edition, Prentice Hall India, 2000.
2. Internet Security Protocols - Protecting IP Traffic, Uyless Black, 1<sup>st</sup> Edition, Pearson 2005

**ITU803 ELECTIVE-II**

**(A) ARTIFICIAL NEURAL NETWORK**

**Teaching Scheme: 03 L+ 00T**

**Total: 03**

**Credits: 03**

**Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE**

**Total Marks: 100**

**Duration of ESE: 2hrs.30min.**

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**Introduction To Neural Network :** History of Neural Networks, Biological Neural Networks, Artificial Neuron, Analysis of Neural networks, Characteristics of Neural Networks, Limitations of Neural Networks, Neural Network Applications.

**Perceptron:-**Overview of Perceptron, Pattern Recognition, Mathematical modeling of Simple Perceptron, Perceptron Learning Algorithms, Limitations of Perceptron.

**Multi-Layer Perceptron Networks:** Delta Learning Rule for the Output Layer, Generalized Delta Learning Rule, Backpropagation learning algorithm, Mathematical modeling of MLP Networks, Application to Function Approximation.

**Radial Basis Function (Rbf) Networks:** Least Square Estimator, Linear Neuron, Recursive Least Squares Algorithm, Basis Function Networks, Radial Basis Function Networks, RBF as Interpolation Networks, Generalized RBF as Approximation Networks, MLP vs. RBF Networks as Function Approximators.

**Hopfield Networks:** Hopfield Network, Energy Minimizing Networks, Analysis and Mathematical modeling of Hopfield Model, Designing Stable States (Energy Wells), Application to Optimization Problems.

**Associative Memory Networks:** Linear Feed forward Associative Memory Network, Recurrent Associative Memory Network, Bidirectional Associative Memory Network (BAM), Brain-State-in-a-Box (BSB) Network, Cross-Talk versus Perfect Recall.

**Kohonen Networks:** Self-Organization in Human Brain, Self-Organizing Neural Networks, Kohonen's Neural Network, Kohonen Learning Rule, Self-Organizing Feature Maps, Vector Quantization, Application to Data Compression.

**Text Books :**

1. Introduction to Artificial Neural Systems, Zurada, Jacek M., 1<sup>st</sup> Edition West Publishing Company, 1992.
2. Neural Networks, Simon Haykin, 1<sup>st</sup> Edition, MacMillan College Publishing Company, 1999.

**Reference Books:**

1. Artificial Neural Networks, Robert J. Schalkoff, 2<sup>nd</sup> Edition, McGraw-Hill, 1997
2. Neural Networks for Pattern Recognition, Christopher M. Bishop, 1<sup>st</sup> Edition Oxford University Press, Oxford UK, 1995.

**ITU803 ELECTIVE-II**

**(B) ADVANCED WEB TECHNOLOGY**

**Teaching Scheme : 03 L+ 00T**

**Total: 03**

**Credits : 03**

**Evaluation Scheme : 15 CT1 + 15 CT2 +10 TA+ 60 ESE**

**Total Marks :100**

**Duration of ESE: 2hrs.30min.**

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**Introduction:** Introduction to Microsoft .Net Framework, Building blocks in .Net, Drawback of previous languages. **C#.Net :** C#.Net overview, Types of application architecture, .Net initiative, .Net framework: components of .Net framework, Advantages, requirement of .Net, Features, C#.Net IDE, Data Types, Loops, Control structures, Cases, Operators, Creating forms, Procedures and functions, Form controls, Implementation of OOP, Creation of class and objects, Inheritance, Constructors, Exception handling.

**Component based programming:** Working with Private assembly, shared assembly, Using COM components developed in C# or other language.

**ADO.Net:** Introduction to ADO.Net, database, Writing XML file. ADO.Net architecture, Creating connection, Dataset and Data reader, Types of Data adapter and ADO controls, reading data into dataset and data adapter, Binding data to controls, Data table and Data row.

**Accessing and manipulating data with ADO.net:** Selecting data, Insertion, deletion, updating, sorting, How to fill dataset with multiple tables, Multi-threading, Working with multithreading, Synchronization of Threads.

**ASP.Net:** Difference between ASP and ASP.Net, Introduction to IIS, ASP.Net IDE. Creation of web forms, Using web form controls.

**ASP.Net objects and components:** Response, Server, Application, Session, ASP.Net scope, state, view state, post back and configuration, Object creation, Scripting, Drive, folder, file, Server components, Ad rotator, Content linker, Browser capabilities, Use and creation of global .aspx file, Using Application object, Events methods and collection, Using session object, enabling and disabling of session, Event, properties, methods, collection.

**ADO.Net in ASP.Net:** Connection, Dataset and data reader, Data table and Data row, Web.config introduction, Binding data with data grid, Accessing and manipulating data, Server control templates and Data binding techniques, Understand data access in .Net using ADO.Net, Understand various Server Control Templates available for Data Binding like Repeater, Data List and Data Grid Controls.

**ASP transactions and e-mail:** Transactions, Transaction db design, CDONTS object. Email sending web page creation.

**Text Books:**

1. Mastering Visual C#.net ,Jason Price & Mike Gaderlay, Paperback Edition, Sybex Publication, 2008.
2. C# , A Beginners Guide , Herbert Schildt , 1<sup>st</sup> Edition ,Osborne/McGraw Hill Publication, 2008.

**Reference Books:**

1. Programming in C#, Balguruswami, 2<sup>nd</sup> Edition, TMH, 2007
2. ASP.net 3.5 : A Beginners Guide, Sanders & William, 1<sup>st</sup> Edition, TMH,2008

**ITU803 ELECTIVE-II**  
**(C) SOFTWARE PLANNING AND MANAGEMENT - OBJECT**  
**ORIENTED APPROACH**

**Teaching Scheme: 03 L+ 00T**

**Total: 03**

**Credits: 03**

**Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE**

**Total Marks: 100**

**Duration of ESE: 2hrs.30min.**

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**Basics of Software Planning & Management Concepts:** Overviews of latest trends in software industry, software industry working environment, Case study regarding understanding of software industry set-up, Management practices prevalent in software industry, Introduction to use of object oriented concepts in software development

**Project Scheduling Concepts:** Concepts, Task set and Network, Scheduling, Software Quality concepts, Software Quality Assurance, Case Study on Project scheduling

**Software Development Reviews:** Software reviews, Formal Technical reviews, Software reliability, Software Quality Assurance Plan, Case study on SDR

**Object Orientation in SPM:** Models, Relationships, UML, Software Engineering practices, Use case Analysis, Architectural Analysis, Design Analysis

**Workflows:** Use case Model, Class Diagram, Object Diagram, Interaction Diagrams, sequence and collaboration diagram, Activity Diagram

**Text Books:**

1. Software Engineering: A Practitioner's Approach, Pressman R.S, 6<sup>th</sup> Edition, McGraw Hill, 2005.
2. The Unified modeling Language User Guide, Grady Booch, James Rumbaugh, Jacobson, 2<sup>nd</sup> Edition, Addison-Wesley, 2005
3. An Integrated Approach to Software Engineering: Pankaj Jalote, Springer Publication, 2005

**Reference Books:**

1. Software Engineering, Ian Sommerville, 7<sup>th</sup> Edition, Pearson Education Asia, 2004
2. Classical and Object Oriented Software Engineering ,Steve Schach, 6<sup>th</sup> Edition, McGraw Hill International, 2005
3. Object-Oriented Analysis and Design with Applications ,Grady Booch, Robert A. Maksimchuk, Michael W. Engle, Bobbi J. Young Ph.D., Jim Conallen, Kelli A. Houston, 3<sup>rd</sup> Edition, Addison Wesley Professional, 2007
4. A Concise Introduction to Software Engineering: Pankaj Jalote, Springer Publication, 2008

**ITU803 ELECTIVE-II**  
**(D) COMPUTER GRAPHICS**

**Teaching Scheme: 03 L+ 00T**

**Total: 03**

**Credits: 04**

**Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE**

**Total Marks: 100**

**Duration of ESE : 2hrs.30min.**

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**Computer Graphics and Graphics System :** Video display devices, Raster-Scan systems, Random-Scan systems, Graphics monitors and workstations, input devices, hard copy devices, Graphics software.

**Output primitives:** Point and Lines, Line drawing algorithms, loading the frame buffer, line function, circle and ellipse generating algorithms, curves, parallel curves algorithms, Pixel addressing, filled-area primitives, functions, Cell array, character generation.

**Attributes of output primitives:** Line and curve attributes, color and grayscale levels, area fill attributes. Character attributes, bundled attributes, anti aliasing.

**2-D geometric transformations:** basic transformations, matrix representations, Composite Transformations, other transformations, transformations between coordinate Systems, Affine transformations, transformation functions, Raster methods for transformations.

**Two-Dimensional viewing:** viewing coordinates, Window-to-view port coordinate transformation, viewing functions, clipping : point, line, polygon, curve, text, exterior.

**Structures and hierarchical modeling:** concepts, editing structures, basic modeling concepts, hierarchical modeling, GUI and interactive input methods : the user dialogue, input of graphical data, functions, initial values for input device parameters, interactive picture - construction techniques, virtual reality environments.

**Three dimensional concepts:** display methods, graphics, Bezier curves and surfaces, Bspline curves and surfaces, Beta-splines, Three dimensional geometric and modeling transformations : translation, rotation, scaling, three dimensional viewing : viewing pipeline, viewing coordinates, projections.

**Text Book :**

1.Computer Graphics ,D. Hearn, M.P.Baker , 2<sup>nd</sup> edition ,Pearson Education,1997.

**References :**

1. Computer Graphics Using Open GL ,F.S.Hill, 2<sup>nd</sup> edition, Pearson Education,2001.
2. Principles of Interactive Computer Graphics, W.M.Newman & R.F.Sproul, 2<sup>nd</sup> edition, McGraw Hill,1979.

**ITU803 ELECTIVE-II**  
**(E) DIGITAL IMAGE PROCESSING**

**Teaching Scheme: 03 L+ 00T**

**Total: 03**

**Credits: 03**

**Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE**

**Total Marks: 100**

**Duration of ESE: 2hrs.30min.**

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**Introduction:** Origin and application of DIP, Fundamental steps and components of an IP system, Elements of visual perception, Light and EM spectrum, Image sensing, acquisition, sampling and quantization, Basic relationships between pixels.

**Spatial Domain Image Enhancement:** Gray level transformations, Histogram processing. Enhancement using arithmetic/logic operations, Basics of spatial filtering, Smoothing spatial filters, sharpening spatial filters, combined methods.

**Frequency Domain Image Enhancement:** Fourier transform and the frequency domain, Smoothing frequency domain filters, Sharpening frequency domain filters, Homomorphic filtering, Implementation of 2-D Fourier transforms, FFT.

**Image restoration:** Noise models, Restoration in the presence of noise only- spatial filtering, Periodic noise reduction by frequency domain filtering, Linear, Position Invariant degradation, Estimation of degradation function, Inverse filtering, Wiener filtering. Constrained LS filtering.

**Geometric transformations:** spatial & gray level interpolation.

**Text-Book:**

- 1) Digital Image Processing, Gonzalez, R.C. & Woods R.E., 2<sup>nd</sup> Edition, Pearson Education, 2004.
- 2) Digital Image Processing & Computer Vision, Schalkoff R.J, John, 2<sup>nd</sup> Edition, Wiley & Sons, 2005.

**Reference Books:**

- 1) Digital Image Processing, Pratt W.K., 3<sup>rd</sup> Edition, John Wiley & Sons, 1991.
- 2) Computer Vision and Image Processing: A Practical Approach Using CVIPtools, 1<sup>st</sup> Edition, Prentice Hall, 1998.

**ITU804 ELECTIVE-III**  
**(A) ARTIFICIAL INTELLIGENCE**

**Teaching Scheme: 03 L+ 00T**

**Total: 03**

**Credits: 03**

**Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60ESE**

**Total Marks: 100**

**Duration of ESE: 2hrs.30min.**

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**Overview of Artificial Intelligence:** Knowledge, General concept,

**Introduction to LISP:** Syntax and numerical functions. Basic list manipulation function in LISP, Functions, predicates and conditional Input, output and local variables, iteration and recursion, Property list and arrays. Implementation using Prolog.

**Knowledge representation - I:** Syntax and semantics for propositional logic, Syntax and Semantics for FOPL, Properties of Wffs, Conversion to clausal form, Inference rules, the resolution principle, Nondeductive inference methods, Representation using rules.

**Knowledge representation - II:** Truth maintenance system, Default reasoning and closed world assumption, Predicate completion and circumscription, model and temporal logics, Overview of object oriented systems, object classes messages and methods, simulation examples using OOS program.

**Knowledge organization and manipulation:** Preliminary concept, Examples of search problems, Uniformed and blind search, Informed search, Searching AND-OR graphs, structure used in matching.

**Measures for matching:** distance matrices, qualitative measures, similarity measures, Partial matching, Indexing and retrieval technique, integrating knowledge in memory, Memory organization system.

**Knowledge Acquisition:** General concept in knowledge acquisition, learning by Induction, Analogical and explanation based learning: Analogical learning and reasoning, Explanation and learning.

**Expert system:** Architectures, Rules based system architecture, Nonproductive system architecture, Dealing with uncertainty, Knowledge acquisition and validation, Knowledge system building tools.

#### **Text Books**

1. Artificial Intelligence, P.H.Winston, 2<sup>nd</sup> Edition Addison- Wesley Publication Company, 1984.
2. Introduction to Artificial Intelligence E.Charniac and D.McDermott, 2<sup>nd</sup> Edition, Addison-Wesley Publishing Company, 2002.

#### **Reference Books**

1. Introduction to expert systems, Peter Jackson, 3<sup>rd</sup> Edition, Addison-Wesley Publishing Company, 1986.
2. Artificial Intelligence, E.Rich, K.K.Knight, 2<sup>nd</sup> Edition, Tata McGraw Hill, New Delhi, 1991.

### **ITU804 ELECTIVE-III**

#### **(B) NATURAL LANGUAGE PROCESSING**

**Teaching Scheme : 03 L+ 00T**

**Total: 03**

**Credits : 03**

**Evaluation Scheme : 15 CT1 + 15 CT2 +10 TA+ 60 ESE**

**Total Marks :100**

**Duration of ESE: 2hrs.30min.**

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**Sound :** Biology of Speech Processing; Place and Manner of Articulation; Word Boundary Detection; Argmax based computations; HMM and Speech Recognition.

**Words and Word Forms :** Morphology fundamentals; Morphological Diversity of Indian Languages; Morphology Paradigms; Finite State Machine Based Morphology; Automatic Morphology Learning; Shallow Parsing; Named Entities; Maximum Entropy Models; Random Fields.

**Structures :** Theories of Parsing, Parsing Algorithms; Robust and Scalable Parsing on Noisy Text as in Web documents; Hybrid of Rule Based and Probabilistic Parsing; Scope Ambiguity and Attachment Ambiguity resolution.

**Meaning :** Lexical Knowledge Networks, Wordnet Theory; Indian Language Wordnets and Multilingual Dictionaries; Semantic Roles; Word Sense Disambiguation; WSD and Multilinguality; Metaphors; Coreferences.

**Web 2.0 Applications :** Sentiment Analysis; Text Entailment; Robust and Scalable Machine Translation; Question Answering in Multilingual Setting; Cross Lingual Information Retrieval (CLIR).

#### **Text Book:**

1. Natural Language Understanding, Allen, James, 2<sup>nd</sup> Edition, Benjamin/Cumming, 1995.
2. Natural language processing: a Paninian perspective, 1<sup>st</sup> Edition, Vineet. Chaitanya, Rajeev Sangal, Akshar Bharati, Prentice-Hall Of India Pvt. Limited, 1996

#### **Reference Books:**

1. Speech and Language Processing, Jurafsky, Dan and Martin, James, 2<sup>nd</sup> Edition, Prentice Hall, 2008.
2. Foundations of Statistical Natural Language Processing, Christopher and Heinrich, Schutze, MIT Press, 1999.



**ITU804 ELECTIVE-III**  
**(C) FUNCTIONAL AND LOGIC PROGRAMMING**

**Teaching Scheme: 03 L+ 00T**

**Total: 03**

**Credits: 03**

**Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE**

**Total Marks: 100**

**Duration of ESE: 2hrs. 30min.**

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**Propositions :** Fully parenthesized propositions, Evaluation of constant propositions, Evaluation of proposition in a state. Precedence rules for operators, Tautologies, Propositions a sets of states and Transforming English to prepositional form

**Reasoning Using Equivalence Transformations :** The laws of equivalence, rules of substitution and transitivity, formal system of axioms and Inference rules. **NATURAL Deduction System:** Introduction to deductive proofs, Inference rules, proofs and sub-proofs, adding flexibility to the natural deduction system and developing natural deduction system proofs.

**Predicates :** Extending the range of a state, Quantification, Free and Bound Identifiers, Textual substitution, Quantification over other ranges and some theorems about textual substitution and states.

**Logic Programming :** Introduction to prepositional and predicate calculus, First-order predicate calculus, Format logical systems, PROLOG programming-Facts, Rules and queries, Implementations, Applications, Strengths and Weaknesses.

**Functional Programming :** Introduction to lambda calculus-Syntax and semantics, Computability and correctness. Features of Functional Languages-Composition of functions, Functions as first-class Objects, no side effects and clean semantics, LISP Programming-Data types and structures, Scheme dialect, primitive functions, functions for constructing functions and functional forms. Applications of functional languages and comparison of functional and imperative languages.

**Text Books:**

1. The Craft of Functional Programming, S. Thompson, Haskell, 2<sup>nd</sup> Edition, Addison-Wesley, 1999.
2. The Implementation of Functional Programming Languages, S. L. Peyton Jones, Prentice Hall, International Series in Computer Science, 1987.
3. The Art of Prolog: Advanced Programming Techniques, L. Stirling and E. Shapiro ,2<sup>nd</sup> Edition, MIT Press, 1994.

**References:**

1. Elements of Functional Programming, C. Reade, Addison-Wesley, 1989.
2. The Lambda Calculus: Its Syntax and Semantics, H. Barendregt ,North Holland, 1984.
3. Foundations of Logic Programming, J. W. Lloyd, Springer Verlag, 1987.

**ITU804 ELECTIVE-III**  
**(D) PARALLEL COMPUTING**

**Teaching Scheme: 03 L+ 00T**

**Total: 03**

**Credits: 03**

**Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE**

**Total Marks: 100**

**Duration of ESE: 2hrs.30min.**

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**Scalability and Clustering:** Evolution of Computer Architecture, Dimensions of Scalability, Parallel Computer Models, Basic Concepts Of Clustering, Scalable Design Principles,



Parallel Programming Overview, Processes, Tasks and Threads, Parallelism Issues, Interaction / Communication Issues, Semantic Issues in Parallel Programs.

**Enabling Technologies:** System Development Trends, Principles of Processor Design, Microprocessor Architecture Families, Hierarchical Memory Technology, Cache Coherence Protocols, Shared Memory Consistency, Distributed Cache Memory Architecture, Latency Tolerance Techniques, Multithreaded Latency Hiding.

**System Interconnects:** Basics of Interconnection Networks, Network Topologies and Properties, Buses, Crossbar and Multistage Switches, Software Multithreading, Synchronization mechanisms.

**Parallel Programming:** Paradigms and Programmability, Parallel Programming Models, Shared Memory Programming.

**Message Passing Programming:** Message Passing Paradigm, Message Passing Interface, Parallel Virtual Machine.

#### **Text Books:**

- 1.Introduction to Parallel Computing, Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, 2<sup>nd</sup> Edition, Addison Wesley,2003.
- 2.An Introduction to Parallel Algorithms, Joseph JaJa, Addison Wesley, 1992.

#### **Reference Books:**

1. The Sourcebook of Parallel Computing, Jack Dongarra, Geoffrey Fox, Ken Kennedy, Linda Torczon, William Gropp, 1<sup>st</sup> Edition , Berkeley Publication,2003.
2. Introduction to Parallel Algorithms and Architectures: Arrays, Trees, Hypercubes, F. T. Leighton, 1<sup>st</sup> Edition, Morgan Kaufmann Publishers, CA 1992.
3. Analysis and Design of Parallel Algorithms, Laxmivarahn and Dahl, 1<sup>st</sup> Edition,

### **ITU804 ELECTIVE-III**

#### **(E) HIGH PERFORMANCE NETWORKS**

**Teaching Scheme: 03L+ 00T**

**Total: 03**

**Credits: 03**

**Evaluation Scheme: 15 CT1 + 15 CT2 +10 TA+ 60 ESE**

**Total Marks: 100**

**Duration of ESE: 2hrs. 30min.**

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**Network Performance Analysis :** Objectives and requirements for Quality of Service (QoS) in high performance networks. Architecture of high performance networks (HPN), design issues, protocols for HPN, VHF backbone networks, virtual interface architectures, virtual interface for networking, High-speed switching and routing - internet and PSTN IP switching techniques, SRP protocols, SRP authentication, and key exchange, comparison of TCP/IP, FTP, TELNET, queuing systems, network modeling as a graph.

**Gigabit Ethernet :** Architecture, standards, interface, applications, network design.

#### **High speed networks :**

**Frame relay:** Frame relay protocols and services, frame relay congestion control.

**ATM:** Architecture, protocol, switching, traffic and congestion control, flow control, error detection and control, traffic management, ATM service categories, ATM in LAN environment, classical IP over ATM.

**ISDN:** ISDN overview, interfaces and functions, physical layer, Network layer, ISDN services.

**B-ISDN:** Driving forces and need, B-ISDN standards and services, B-ISDN Functional Architecture, B-ISDN Transmission structure, B-ISDN protocol architecture.

**ADSL and DSL Technologies :** Background and technological capabilities, Standards and associations, Architecture, Conceptual overview of VDSL, Deployment Case study, Market status and future.

**Fiber Optics Communication :** GPON (Gigabit capable Passive Optical Network), SONET/SDH and comparison with other available standards, SAN (Storage Area Networks) and Fiber Channel, DWDM, and CWDM.

**Wireless Networks :** Overview of GSM & CDMA, 3G mobile technologies, UMTS, EDGE, WiFi, WiMax.

**Text Books:**

1. ISDN and Broadband ISDN, William Stallings, 4<sup>th</sup> Edition, Pearson Education, 2001.
2. Computer Networks, Tanenbaum, 5<sup>th</sup> Edition, PHI, 2000.

**Reference Books:**

1. Mobile Communications, Jochen Schiller, Addison Wesley, 2<sup>nd</sup> Edition, Pearson Education, 2003.
2. Telecommunication Network Protocol Modeling And Analysis, M Shwartz, Addison Wesley, 2007.
3. Data Networks, Gallangar, 2<sup>nd</sup> Edition, Prentice Hall, 1992.
4. Data Communication Computer Networks, And Open Systems, Fred Halsall, 4<sup>th</sup> Edition, Addison Wesley, 2000
5. Telecommunication Network Design Algorithms, Kershanbaum, MGH.
6. High Speed Networks, William Stallings, 4<sup>th</sup> Edition, Pearson Education, 2000.

**ITU805 DATA WAREHOUSING AND DATA MINING LAB**

**Teaching Scheme: 02 P**

**Total: 02**

**Credit: 01**

**Evaluation Scheme: 25 ICA + 25 ESE**

**Total Marks: 50**

**Duration of ESE: 3hrs.**

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**Minimum Eight Experiments to be performed on following topics**

The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.

Aim of the list is to inform about minimum expected outcomes.

1. Implementation of Binning Methods for DATA SMOOTHING
2. Implementation of MIN/MAX normalization and Z-SCORE normalization.
3. Write a program for finding MEAN and MEDIAN of the given Data Set.  
DATA SET-(4,8,9,15,21,21,24,25,26,28,29,34)
4. Generate/Prepare HISTOGRAMS for given data using STATISTICA software.  
DATA SET-(1,1,5,5,5,5,5,8,8,10,10,10,12,14,14,14,15, 15, 15, 15, 15, 15,18, 18, 18, 18, 18, 18,20, 20, 20, 20, 20, 20, 20,25, 25, 25, 25, 25,28,28,30,30,30)
5. Prepare Regression Analysis of User Data Set using STATISTICA software.(linear & non linear)
6. Implement the STAR Schema of a DATAWAREHOUSE for Sales (Consider one example).
7. Implementation of K-MEANS algorithm for Clustering.

8. Prepare Correlation analysis using CHI-SQUARE method in STATISTICA software using given Data set
9. Write a program for calculating Term Frequency and Inverse Document Frequency for given table.
10. Write a program for predicting a class Label using Naïve BAYSIAN Classification for a given data set

**ICA** – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.

**ESE**- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

## **ITU806 NETWORK ADMINISTRATION AND SECURITY LAB**

**Teaching Scheme : 02 P**

**Total: 02**

**Credits : 01**

**Evaluation Scheme : 25 ICA + 25 ESE**

**Total Marks :50**

**Duration of ESE: 3hrs.**

### **Minimum Eight Experiments to be performed on following topics**

The sample list of program is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same .Aim of the list is to inform about minimum expected outcomes of course ITU806- Network Administration & Security.

1. Write a program to simulate RSA algorithm to encrypt and decrypt the data.
2. Write a program for Hamming Code generation for error detection and correction
3. Write a program for congestion control using Leaky bucket algorithm.
4. Program to read the source code of the web page and IP address of website.
5. Write programs to encrypt/decrypt messages with secret-key encryption algorithm using different ciphers and modes.
6. Write programs to generate one-way hash value and Message Authentication Code (MAC) for a message.
7. write programs to create secure channels using Public-Key encryption and Public-Key Infrastructure (PKI).
8. Write a program to Obtain The Information About The (A) Host (B) Network (C) Protocols (D) Domains.

**ICA** – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.

**ESE**- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

**ITU807 ELECTIVE-II**  
**(A) ARTIFICIAL NEURAL NETWORK LAB**

**Teaching Scheme : 02 P**

**Total 02**

**Credit : 01**

**Evaluation Scheme : 25 ICA + 25 ESE**

**Total Marks : 50**

**Duration of ESE: 3hrs.**

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The sample list of programs is given below. This list can be used as guideline for Problem statements but the scope of the laboratory should not be limited to the same.

Aim of the list is to inform about minimum expected outcomes.

1. Regression Analysis
2. The Back Propagation Algorithm
3. Multilayer Perceptions
4. Radial Basis Function Networks
5. Over-learning and Generalization
6. Probabilistic Neural Networks
7. Generalized Regression Neural Networks

**ICA** – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.

**ESE**- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

**ITU807 ELECTIVE-II**  
**(B) ADVANCED WEB TECHNOLOGY LAB**

**Teaching Scheme : 02 P**

**Total: 02**

**Credit : 01**

**Evaluation Scheme : 25 ICA + 25 ESE**

**Total Marks : 50**

**Duration of ESE : 3hrs.**

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**Minimum Eight Experiments to be performed on following topics**

The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.

1. Introduction to .Net framework.
2. a) Design Login form with validation.  
b) Design Registration form with validation of email address, date of birth, blank field, telephones and mobile numbers etc.
3. Design form, make it a class, create its object and access it from another form.
4. Design student class, marks class, inherits it in result class and access it using form.
5. Create instance of class using new operator of above example.
6. Design mark sheet of student using XML file and dataset.
7. Design employee details with help of database (back-end) using data adapter, data reader and datasets. Use data grid to display result.
8. Generation of database (data table) of employee or student with help of data tables of .Net.
9. To use multiple table design example of employee and department.
10. Design registration form of college using text box, text area, radio list, check list, button etc. using Autopostback property.
11. Simple application for following function: (1) Login (2) Surfing (3) Logout taking into considerations (Application, Session, Server object, global .asa file and their events, methods and collection) also demonstrates enabling and disabling of session.)
12. Creation of file, entry, reading data from a file.

13. Using components create:
  - (1) Advertisement (using Ad rotator)
  - (2) Book example (using Next function)
  - (3) find capabilities of browser (Browser object capabilities)
14. Online application (student, employee, product, shopping mall)
  - (a) Using dataset, data reader.
  - (b) Same application using data table and data row. (use data grid to display data)
  - (c) Bind the data to data grid using properties / templates.
  - (d) Display details (student, employee, product)

**ICA** – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.

**ESE**- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

## ITU807 ELECTIVE-II

### (C) SOFTWARE PLANNING AND MANAGEMENT -OBJECT ORIENTED APPROACH LAB

**Teaching Scheme: 02 P**

**Total: 02**

**Credit: 01**

**Evaluation Scheme: 25 ICA + 25 ESE**

**Total Marks: 50**

**Duration of ESE: 3hrs.**

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#### **Minimum Eight Experiments to be performed on following topics**

The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.

Aim of the list is to inform about minimum expected outcomes.

1. Draw one or more Use Case diagrams for capturing and representing requirements of the system. Use case diagrams must include template showing description and steps of the Use Case for various scenarios.
2. Draw one or more Package diagram to organize and manage your large and complex systems as well as their complex models.
3. Draw activity diagrams to display either business flows or like flow charts.
4. Draw basic class diagrams to identify and describe key concepts like classes, types in your system and their relationships.
5. Draw advanced class diagrams to depict advanced relationships, other classifiers like interfaces.
6. Draw sequence diagrams OR communication diagrams with advanced notation for your system to show objects and their message exchanges.
7. Draw state machine to model the behavior of a single object, specifying the sequence of events that an object goes through during its lifetime in response to events.
8. Draw component diagrams assuming that you will build your system reusing existing components along with a few new ones.
9. Draw deployment diagrams to model the runtime architecture of your system

**ICA** – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.

**ESE**- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

**ITU807 ELECTIVE-II**  
**(D) COMPUTER GRAPHICS LAB**

**Teaching Scheme : 02 P                      Total: 02**  
**Evaluation Scheme : 25 ICA + 25 ESE**  
**Duration of ESE: 3hrs.**

**Credit : 01**  
**Total Marks : 50**

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**Minimum Eight Experiments to be performed on following topics**

The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.

Aim of the list is to inform about minimum expected outcomes.

1. Program to draw line using DDA algorithm for all quadrants.
2. Program to draw line using Bresenham's algorithm for all quadrants.
3. Program to draw a Circle drawing using DDA and Bresenham algorithms.
4. Program for Polygon Filling using Flood and Boundary fill algorithm
5. Procedure to rotate a wheel
6. Implement 2D transformations with translation, rotation, reflection, shearing and scaling.
7. Program For Line clipping using Cohen-Sutherland algorithm
8. Program For Polygon clipping
9. Construct Bezier curves and Spline curves with 6 or more control points entered through mouse.
10. Animation using Segmentation.

**ICA** – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.

**ESE**- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

**ITU807 ELECTIVE-II**  
**(E) DIGITAL IMAGE PROCESSING LAB**

**Teaching Scheme: 02 P                      Total: 02**  
**Evaluation Scheme: 25 ICA + 25 ESE**  
**Duration of ESE: 3hrs.**

**Credit: 01**  
**Total Marks: 50**

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**Minimum Eight Experiments to be performed on following topics**

The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.

Aim of the list is to inform about minimum expected outcomes.

1. Write a MATLAB program to convert Gray scale image to negative.
2. Write a MATLAB program Log Transformation of image
3. Write a MATLAB program for Contrast stretching using piecewise Transformation
4. Write a MATLAB Program to eliminate Gaussian noise using Average Filtering
5. Write a MATLAB program to eliminate Paper and Salt noise with the help of Avg. Filtering.
6. Write a MATLAB program for enhancing an image using Laplacian filter
7. Write a MATLAB program to find bit planes of a given image

8. Write a MATLAB program Histogram Equalization

**ICA** – The Internal Continuous Assessment shall be based on practical record and knowledge or skills acquired. The performance shall be assessed experiment wise by using continuous assessment format, A & B.

**ESE**- The End Semester Exam for Practical shall be based on performance in one of the experiments and may be followed by sample questions.

**ITU808 PROJECT PHASE-II**

**Teaching Scheme: 06 P**

**Total: 06**

**Credit: 06**

**Evaluation Scheme: 75 ICA + 100 ESE**

**Total Marks: 175**

**Duration of ESE: 3hrs.**

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1. Project work decided in VII semester shall be continued.
2. Students should complete implementation of ideas given in synopsis, so that project work should be completed before end of semester.
3. Students shall submit the final project report in proper format as per guidelines given on the college website which shall include the work of both semesters.
4. For uniform and continuous evaluation, evaluation committee for each group shall be formed by Program Head in which guide must be a member. Internal marks should be awarded by committee at the end of semester based on continuous evaluation.
5. Final examination of project shall include demonstration, presentation of complete work and oral examination based on the project work.

**Note:**

**ICA:** The Internal Continuous Assessment shall be based on the active participation of the students in the Project work and knowledge / skill acquired. Oral examination shall be conducted on the Project report, by the panel of examiners consisting of Project Guide, Course Coordinator and Expert appointed by Program Head.

**ESE:** The End Semester Examination for Project shall consist of Demonstration if any, presentation and oral examinations based on the project report.

**ITU809 SELF STUDY IV**

**Teaching Scheme: 00**

**Total: 00**

**Credit: 02**

**Evaluation Scheme: 25 TA**

**Total Marks: 25**

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1] Self study - IV is based on one class test each on the basis of 20% curriculum of the courses ITU801, ITU802, ITU803 & ITU804 declared by respective course coordinator at the beginning of the semester

2] One faculty member shall be appointed as course coordinator for Self Study - IV and his/her work load shall be considered as 1 hr/week.