IT - 5th

Birla Institute of Technology, Mesra, Patna Campus
Department of Information Technology
Syllabus of 5th Semester

IT 5021 **DATA COMMUNICATIONS** **Credits: 3**

Module - I

Data Communications and Networking Overview: A Communications Model, Data Communications, Data Communication Networking.

Protocol Architecture: The Need for Protocol Architecture, A Simple Protocol Architecture, OSI, The TCP/IP Protocol Architecture

Module - II

Data Transmission: Concepts and Terminology, Analog and Digital Data Transmission, Transmission Impairments, Channel Capacity.

Guided and Wireless Transmission: Guided Transmission Media, Wireless Transmission, Wireless Propagation, Line-of-Sight Transmission.

Module - III

Signal Encoding Techniques: Digital Data Digital Signals, Digital Data Analog Signals, Analog Data Digital Signals, Analog Data Analog Signals.

Module - IV

Digital Data Communication Techniques: Asynchronous and Synchronous Transmission, Types of Errors, Error Detection, Error Correction, Line Configurations, Interfacing.

Module - V

Data Link Control: Flow Control, Error Control, High-Level Data Link Control (HDLC).

Multiplexing: Frequency Division Multiplexing, Synchronous Time Division Multiplexing, Statistical Time Division Multiplexing.

Module - VI

Circuit Switching and Packet Switching: Switching Networks, Circuit-Switching Networks, Circuit-Switching Concepts, Control Signaling, Soft switch Architecture, Packet-Switching Principles, X.25, and Frame Relay.

Module -VII

Asynchronous Transfer Model: Protocol Architecture, ATM Logical Connections, ATM Cells, Transmission of ATM Cells, ATM Service Categories, ATM Adaptation Layer.

Routing in Switched Networks: Routing in Circuit-Switching Networks, Routing in Packet-Switching Networks, Least-Cost Algorithms

Text Book:

1. W. Stallings - Data and Computer Communications, 7th Edn., Pearson Edn./ PHI, New Delhi, 2006

Reference Books:

1. B. A. Forouzan - Data Communications and Networking, 4th Edn. TMH, New Delhi 2006
2. P.C. Gupta – Data Communications and Computer Networks, PHI, New Delhi 2006

IT 5023 **SOFTWARE ENGINEERING PRINCIPLES** **Credits: 4**

MODULE – I

Introduction: *Some Definitions, FAQs about software engineering, The evolving role of software, Software characteristics, SW applications*

Software Processes: *Software process models, Waterfall model, the Prototyping model, Spiral model, RAD and Incremental model.*

MODULE – II

Project Management : Management activities, Project planning, Project scheduling, Risk Management.

MODULE – III

Software Requirements : Functional and non functional requirements, User requirements, System requirements, The software requirements document. IEEE standard of SRS, Quality of good SRS.,

Requirement Engineering Process : Feasibility study, Requirements elicitation and analysis, Requirements validation, Requirement management.

MODULE – IV

Software Design : Design Concepts and Principles, Architectural Design, Object oriented Design, User interface design

UML : Class diagram, Sequence diagram, Collaboration diagram

MODULE – V

Verification and Validation : Verification and Validation Planning, S/W inspection, static analysis.

Software Testing : Testing functions, Test care design, White Box testing, Black box testing, Unit testing, Integration Testing, System testing, Reliability.

MODULE – VI

Management : *SW cost estimation :* Estimation techniques, Algorithmic cost modelling, Project duration and staffing.

Quality Management : Quality assurance and standards, Quality planning, Quality control.

MODULE – VII

Software Change : Program Evolution Dynamic, S/W Maintance in detail.

Text Book :

I. Sommerville : Software Engineering, Pearson Education Publication, 7th ed.

Reference Books:

1. R. S. Pressman : Software Engineering : A Practiioners Approach, 5th Edn., TMA, New Delhi.
2. J. F. Peters & W. Pedrycz– Software Engineering, John Wiley & Sons,Inc. 2000
3. A.Behforooz & F.J. Hudson – Software Engineering Fundamentals, Oxford Univ. Press, New York, 2000.

IT 5025 PRINCIPLE OF SOFT COMPUTING Credits: 3

I FUZZY LOGIC

MODULE -I

Fuzzy Set Theory: Basic Definition and Terminology, Set Theoretic Operations, MF Formulation and Parameterization, MF of two dimension, Fuzzy Union, Intersection and Complement.

MODULE -II

Fuzzy Rules and Fuzzy Reasoning : Extension Principles and Fuzzy Relations, Fuzzy IF THEN Rules, Fuzzy Reasoning.

MODULE –III

Fuzzy Inference System Introduction, Mamdani Fuzzy Models, Other Variants, Sugeno Fuzzy Models, Tekamoto Fuzzy Models.

II GENETIC ALGORITHMS

MODULE –IV

Fundamentals of Genetic Algorithms: Basic Concepts Creation, Offsprings Encoding, Fitness functions, Reproduction, Genetic Modelling: Inheritance Operators, Cross over, Inversion and detection, Mutation operator, Bitwise operators.

ARTIFICIAL NEURAL NETWORKS :

MODULE -V

Introduction, Architecture, Back Propagation and feed Forward Networks, Offline Learning, Online Learning.

MODULE -VI

Supervised Learning of Neural Networks : Introduction, Perceptrons, Adaline, Back Propagation Multilayer Perceptrons, Back Propagation Learning Rules, Methods of Speeding. Radical Basis Function Networks, Functional Expansion Networks.

MODULE -VII

Unsupervised Learning : Competitive Learning Networks, Kohonen self-organising networks, Hebbian Learning, The Hopfield Network

Text Book :

1. J.S.R. Jang, C.T.Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing" PHI/Pearson Education, New Delhi 2004.
2. S. Rajasekaran & G.A. Vijayalakshmi Pai, PHI, New Delhi 2003

Reference Book:

1. T. J. Ross, " Fuzzy Logic with Engineering Applications." TMH, New York, 1997.

IT 5027 **DESIGN OF COMPUTER ALGORITHMS** **Credits: 4**

MODULE-I

Introduction: Some linear and non-linear Data structures, Asymptotic notation to measure complexity, of algorithms, Analysis of algorithms efficiency, Analysis of non recursive & rec ursive algorithms, Space and Time trade-offs

MODULE-II&III

Divide & Conqure: Merge Sort, Quick sort, Binary search, Large integer- multiplication, Strassens matrices multiplication, Closest pair & convex hull problems

Decrease & Conquer: DFS& BFS, decrease-by –a-constant-factor algorithms, Variable-Size-decrease algorithms

Transform & Conquer: Horner's Rule & Binary exponentiation, Problem reduction : Input enhancement in string matching

MODULE- IV

Greedy Techniques: Knapsack problem, Job-scheduling, Prim's & Krushkal algorithms, Dijkstra's algorithm, Huffman coding alg.,

MODULE- V

Dynamic Programming: Warshall's & Floyd's algorithm, Optional binary search trees, Knapsack problem ,

MODULE- VI

Backtracking, Branch and Bound Methods.

MODULE-VII

Limitations of Algorithm Power: Lower bound arguments-decision trees, P,NP & NP Complete problem, Approximation algorithms for NP-hard problems

Text Book:

1. Thomas H. Cormen, An Introduction to Algorithms, PHI publication,2009

Reference Books:

1. Fundamentals of Computer algorithms,Horowitz & sahni,Galgothia publications.
2. Introduction to Design & Analysis of Algorithms, Anany Levitin,Pearson Education 2003.

MSH 1131 **PRINCIPLES OF MANAGEMENT** **Credits: 3**

Module-1:

Introduction of Management: Definition, Nature, Objective, Functions of Management, Managerial Skills, Managerial Role.

Module-2:

Evolution of Management Thought: Classical Theory- Max Weber's Beaurocratic Theory's, Taylor's Scientific Theory, Fayol's Functional Theory's.

Module-3:

Planning: Definition, Nature, Purpose, Importance, Types of planning, and Types of plan.

Module-4:

Organizing: Definition, Basic concepts of organization, Organizing process and its importance, Formal & Informal organization, Tall & Flat structure, Span of control.

Module-5:

Staffing: Recruitment, Selection, Placement, Training & Development, Performance Appraisal.

Module-6:

Directing: Meaning Leadership- Styles and Theories, Motivation, Maslow theory of motivation, Communication process.

Module-7:

Controlling : Nature, Purpose, Basic Elements of Control and Process.

Books Recommended

1. Elements of Management – Koontz and O'Donnell
2. Principles and Practices of Management – L.M.Prasad
3. Management Today – principles and Practices by Gene Burton & Manab Thakur
4. Management by Stoner & Freeman.