Information Technology Project Management | Syllabus | Marking Scheme | IOE | Computer Engineering

Project Management
CT

Lecture : 3 **Year : IV**
Tutorial : 1 **Part : I**
Practical : 0

Course objectives:
The objectives of this course are to make the students able to plan monitor and control project and project related activities

1. **Introduction** **(2 hours)**
   Definition of project and project management, Project objectives, classification of projects, project life cycle
2. **Project Management Body of Knowledge** **(4 hours)**
   Understanding of project environment, general management skill, effective and ineffective project managers, essential interpersonal and managerial skills, energized and initiator, communication, influencing, leadership, motivator, negotiation, problem solver, perspective nature, result oriented, global illiteracies, problem solving using problem trees.
3. **Portfolio and Project Management Institutes' (PMI) Framework** **(2 hours)**
   Portfolio, project management office, drivers of project success, inhibitors of project success
4. **Project Management** **(4 hours)**
   Advantages of project management, project management context as per PMI, Characteristics of project life cycles, representative project life cycles, IT Product Development Life Cycle, Product Life Cycle and Project Life Cycle, System Development methodologies, role and responsibilities of key project members
5. **Project and Organizational structure** **(2 hours)**
   System view of project management, functional organization, matrix organization, organizational structure influences on projects
6. **Project Management Process Groups** **(2 hours)**
   Project management processes, Overlaps of process groups in a phase, mapping of project management process groups to area of knowledge

7. **Project Integration Management** **(4 hours)**
   Develop project charters Develop preliminary project scope statement, Develop project management plan, Direct and manage project execution, monitor and control project work, Integrated change control, close project, project scope management, Create Work Break Down Structure, Scope verification, Scope control.
8. **Project Time Management** **(4 hours)**
   Activity definition, decomposition of activities, activity attributes, Activity sequencing, precedence relationship, network diagram, precedence diagram method, arrow diagramming method, Activity resources estimating, determining resource requirements, Schedule development and control, principles of scheduling, milestones, forward pass, backward pass, critical path method, critical chain technique, gantt chart, schedule control.
9. **Project Cost Management** **(4 hours)**
   Cost and project, cost management, Cost estimating, types of cost estimates, estimating process and accuracy, enterprise environmental factors, organizational process assets, cost estimating tools, Cost budgeting, cost aggregation, deriving budget from activity cost, Cost control process, cost control methods, earned value management, EVM benefits, variance analysis.
10. **Project quality management** **(3 hours)**

Quality theories, Quality planning, project quality requirements, cost of quality, quality management plan, Quality assurance, quality audit, approach to a quality audit, Quality control process, control chart, pareto charts, testing of IT system, the test life cycle.

11. **Project Communication Management (3 hours)**
    Importance of communication management, Communications planning process, communication requirement analysis, organizing and conducting effective meeting, Information distribution process, Performance reporting process, integrated reporting system
12. **Project Risk Management (4 hours)**
    Understanding Risk, project risk, Risk management planning process, risk management plan, Risk identification, risk identification techniques, Qualitative risk analysis process, Quantitative risk analysis process, modeling techniques, Risk response planning, resolution of risk, strategies for negative risks or threats, strategies for positive risks or opportunities, Risk monitoring and control process.
13. **Project Procurement Management (3 hours)**
    Procurement management process flow, Plan purchases and acquisition process, enterprise environmental factor, organizational process assets, Plan contracting process, standard forms, evaluation criteria, Request seller response process, Select seller process, Contract administration process, Contract closure process
14. **Developing Custom Processes for IT projects (3 hours)**
    Developing it project management methodology, Moving forward with customized management processes, Certified associate in project management, Project management maturity, Promoting project Excellency through awards and assessment , Certification process flow, Code of ethics, Future trends.
15. **Balanced scorecard and ICT project management (1 hour)**

References:

1. The Project Manager's Guide to Software Engineering's Best Practices, M. C. Christensen and R.H. Thayer,2001,IEEE computer Society
2. Clifford F. Gray, Erik W. Larson, Project Management: The Management Process, McGraw Hill
3. A Project Management Primer, Nick Jenkins, 2006
4. A handbook of Project Management, Trevor L Young, 2002, Kogan Page India Private Ltd.
5. Balance Supply and Demand, M. Gentle, 04 DEC 2007,Compuware
6. IT project Management : Kelkar (2nd Edition)

Evaluation schema:

The question will cover all the chapters of the syllabus. The evaluation scheme will be as indicated in the table below.

Chapters	Hours	Marks Distribution*
1	2	4
2	4	7
3	2	4
4	4	7
5	2	4
6	2	4
7	4	7
8	4	7
9	4	7
10	3	5
11	3	5
12	4	7

13	3	5
14	3	5
15	1	2
Total	45	80

* There may be minor deviation in marks distribution.

Organization and Management Syllabus and Marking Scheme | Computer Engineering | IOE

ORGANIZATION AND MANAGEMENT
ME…

Lecture : 3 **Year : IV**
Tutorial : 1 **Part : I**
Practical : 0

Course Objectives:

- Acquire knowledge in the field of organizational management and internal organization of companies required for managing an enterprise
- Acquire knowledge in the field of personnel management, motivation and leadership for developing managerial skills
- Gain knowledge for starting a small scale unit independently
- Gain knowledge on case study and management information system.

1. Introduction

1.1 Organization (2 hours)

1.1.1 System approach applied to Organization
1.1.2 Necessity of Organization
1.1.3 Principles of Organization
1.1.4 Formal and Informal Organizations

1.2 Management (4 hours)

1.2.1 Functions of Management
1.2.2 Levels of Management
1.2.3 Managerial Skills
1.2.4 Importance of Management
1.2.5 Models of Management

1.3 Theory of Management (6 hours)

1.3.1 Scientific Management Approach
1.3.2 Administrative Management Approach
1.3.3 Behavioral Management Approach
1.3.4 Modern Management Theories

1.4 Forms of Ownership (2hours)

1.4.1 Single Ownership – Advantages and limitations
1.4.2 Partnership – Types of Partners – Advantages and limitations
1.4.3 Joint Stock Company – Formation of Joint Stock Company – Advantages and limitations
1.4.4 Co – operative Societies – Types of Co – operatives – Advantages and limitations
1.4.5 Public Corporations – Advantages and limitations

1.5 Organizational Structure (2 hours)

1.5.1 Line Organization – Advantages and dis – advantages
1.5.2 Functional Organization – Advantages and dis – advantages
1.5.3 Line and Staff Organization – Advantages and dis – advantages
1.5.4 Committee Organization – Advantages and dis – advantages

1.6 Purchasing and Marketing Management (4 hours)

1.6.1 Purchasing – Introduction

1.6.2 Functions of Purchasing Department
1.6.3 Methods of Purchasing
1.6.4 Marketing – Introduction
1.6.5 Functions of Marketing
1.6.6 Advertising

2. Personal Management (8 hours)

2.1 Introduction
2.2 Functions of Personal Management
2.3 Development of Personal Policy
2.4 Manpower Planning
2.5 Recruitment and Selection of manpower – Scientific selection
2.6 Training and Development of manpower
2.7 Job Analysis, Job Evaluation and Merit Rating
2.8 Wages and Incentives

3. Motivation, Leadership and Entrepreneurship (6 hours)

3.1 Motivation
3.1.1 Human needs
3.1.2 Maslow's Hierarchy of needs
3.1.3 Motivation – Introduction
3.1.4 Types of Motivation
3.1.5 Attitude Motivation; Group Motivation; Executive Motivation
3.1.6 Techniques of Motivation
3.1.7 Motivation Theories
3.1.7.1 McGregor's Theory X - Y
3.1.7.2 Fear and Punishment Theory
3.1.7.3 Alderfer's ERG Theory
3.1.7.4 MacClelland's Theory of learned needs
3.1.7.5 Herzberg's Hygiene Maintenance Theory
3.1.7.6 Vroom's Expectancy/ Valency Theory

3.2 Leadership - Introduction (2hours)

3.1.1 Qualities of a good Leader
3.1.2 Leadership Style
3.1.3 Blakes and Mouton's Managerial Grid
3.1.4 Leadership Approach
3.1.5 Leadership Theories

3.3 Entrepreneurship – Introduction (2 hours)

3.1.6 Entrepreneurship Development
3.1.7 Entrepreneurial Characteristics
3.1.8 Need for Promotion of Entrepreneurship
3.1.9 Steps for establishing small scale unit

4. Case Studies (2 hours)

4.1 Introduction
4.2 Objectives of case study
4.3 Phases of case study
4.4 Steps of case study
4.5 Types of case studies

5. Management Information System (5 hours)

5.1 Data and Information
5.2 Need, function and Importance of MIS
5.3 Evolution of MIS
5.4 Organizational Structure and MIS
5.5 Computers and MIS
5.6 Classification of Information Systems

5.7 Information Support for functional areas of management

5.8 Organizing Information Systems

Note: Students have to submit a case study report after visiting an industrial organization outside or inside the Kathmandu valley.

Reference:

1. H. B. Maynard, "*Industrial Engineering Handbook*" , Editor – in – Chief, 4th Edition, McGraw Hill, 19xx
2. E. S. Buffa and R. K. Sarin "*Modern Production / Operations Management",* 8th Edition, Wiley, 1987
3. H. J. Arnold and D. C. Feldman "*Organizational Behavior" ,* McGraw – Hill, 1986
4. J. A. Senn, "*Information Systems in Management "* , 4th Edition, Wadsworth Inc., 1990
5. P. Hershey and K. H. Blanchard, "*Management of Organizational Behavior – Utilizing Human Resources "*, 4thEdition, Prentice – Hall Inc., 1982
6. M. Mahajan, "*Industrial Engineering and production Management*" ,Dhanpat Rai and Co. (P) Ltd. , Delhi, 2002
7. S. Sadagopan, "*Management Information System",* Prentice Hall of India Pvt Ltd, 1997
8. C. B. Mamoria "*Personnel Management*", Himalaya Publishing House – 1989
9. O. P. Khanna, "*Industrial Engineering and Management*" , Dhanpat Rai Publications (P) Ltd., 2007

Evaluation Scheme:

The questions will cover all the chapters of the syllabus. The evaluation scheme will be as indicated in the table below:

units	Chapters	Hours	Marks Distribution*
1	1.1& 1.2	6	8 or 16
	1.6	4	8
2	1.3	6	8
	1.4 & 1.5	4	8
3	2	8	16
4	3.1	6	8
	3.2 & 3.3	4	8
5	4 & 5	7	8 or 16
Total		45	80

* There may be minor deviation in marks distribution.

Energy Environment and Society | Syllabus | Marking Scheme | IOE | IV-I part

ENERGY, ENVIRONMENT AND SOCIETY

EX

Lecture : 2
Year : IV

Tutorial : 0
Part : I

Practical : 0

Course Objective:

After the completion of this course students will understand the various types of energy sources and their environmental impact. This course is also focused on role of engineers for creating better and responsible society.

1. Technology and Development (3 hours)

1.1. Introduction to Technology

1.2. Appropriate Technology

1.3. Role of Appropriate Technology in Transformation of Society

1.4. Importance of Technology Transfer

1.5. Impact of technology on Society

2. Energy Basics (4 hours)

2.1. Importance of Energy in achieving Maslow's hierarchy of Needs, Human Development Index and Energy Consumption

2.2. Current Energy Trends, Demand and Supply of Energy in World and Nepal

2.3. Introduction to Global warming, Clean Development Mechanism, and Sustainability Issues

2.4. Conventional and Non-Conventional/Renewable Energy Sources

2.5. Conventional Energy Sources: Fossil fuel, Nuclear Energy

3. Renewable Energy Sources (14 hours)

3.1. Solar Energy

3.1.1. Solar radiation

3.1.2. Solar thermal energy

3.1.3. Solar Cell (Photovoltaic Technology)

3.2. Hydropower

3.2.1. Water sources and power

3.2.2. Water turbines and hydroelectric plants

3.2.3. Hydro Power Plant Classification (pico, micro, small, medium, large)

3.3. Wind Energy

3.3.1. Availability of Wind Energy sources

3.3.2. Wind turbines, wind parks and power control

3.4. Geothermal Energy

3.4.1. Sources of Geothermal Energy

3.4.2. Uses of Geothermal Energy

3.5. Bio-mass and Bio-energy

3.5.1. Synthetic fuels from the biomass

3.5.2. Thermo-chemical, physio-chemical and bio-chemical conversion

3.5.3. Bio-fuel cells

3.6. Hydrogen Energy and Fuel Cell

3.6.1. Basics of electrochemistry

3.6.2. Polymer membrane electrolyte (PEM) fuel cells

3.6.3. Solid oxide fuel cells (SOFCs)

3.6.4. Hydrogen production and storage

3.6.5. Coal-fired plants and integrated gassifier fuel cell (IGFC) systems

4. Environmental Impact of Energy sources (4 hours)

4.1. Emission hazard

4.2. Battery hazard

4.3. Nuclear hazard

5. Energy Storage (3 hours)

5.1. Forms of energy storage

5.2. Hybrid vehicles

5.3. Smart grid systems

5.4. Batteries

5.5. Super-capacitors

6. Relevant International/national case studies (2 hours)

References:

1. Godfrey Boyle, “Renewable Energy, Power for a sustainable future”, Oxford University Press, latest edition
2. Aldo V. da Rosa, "Fundamentals of Renewable Energy Processes"

Evaluation Scheme:

The questions will cover all the units of the syllabus. The evaluation scheme will be as indicated below:

Unit	Hour	Marks Distribution
1	3	4
2	4	5
3	14	20
4	4	4
5	3	4
6	2	3

Total	30	40

* There may be minor deviation in marks distribution.

Distributed System | Syllabus | Marking Scheme | IOE

Distributed Systems
CT….

Lecture : 3
Year : IV
Tutorial : 1
Part : I
Practical : 1.5
Course Objective:
The objective of the course is to be familiar with different aspect of the distributed system, middleware, system level support and different issues in designing distributed algorithms.

1. Introduction (4 hours)
1.1 Introduction to Distributed Systems
1.2 Examples of Distributed Systems
1.3 Main Characteristics
1.4 Advantages and Disadvantages of Distributed System
1.5 Design Goals
1.6 Main Problems
1.7 Models of Distributed System
1.8 Resource Sharing and the Web Challenges
1.9 Types of Distributed System: Grid, Cluster, Cloud

2. Distributed Objects and File System (7 hours)
2.1 Introduction
2.2 Communication between distributed objects
2.3 Remote Procedure Call
2.4 Events And Notifications
2.5 Java RMI Case Study
2.6 Introduction to DFS
2.7 File Service Architecture
2.8 Sun Network File System
2.9 Introduction to Name Services
2.10 Name Services and DNS
2.11 Directory and Discovery Services

2.12 Comparison of Different Distributed File Systems

3. Operating System Support (3 hours)

3.1 The operating system layer
3.2 Protection
3.3 Process and threads
3.4 Communication and invocation
3.5 Operating system architecture

4. Distributed Heterogeneous Applications and CORBA (3 hours)

4.1 Heterogeneity in Distributed Systems
4.2 Middleware
4.3 Objects in Distributed Systems
4.4 The CORBA approach
4.5 CORBA services

5. Time and State in Distributed Systems (5 hours)

5.1 Time in Distributed Systems,
5.1.1 Physical Clocks
5.1.2 Logical Clocks
5.1.3 Vector Clocks
5.1.4 Clock Synchronization
5.2 Causal Ordering of Messages
5.3 Global State and State Recording
5.4 Distributed debugging

6. Coordination and Agreement (4 hours)

6.1 Mutual Exclusion in Distributed Systems
6.2 Algorithms for Mutual Exclusion
6.3 Distributed Elections
6.4 Multicast communication
6.5 Consensus

7. Replication (4 hours)

7.1 Reasons for Replication
7.2 Object Replication
7.3 Replication as Scaling Technique
7.4 Fault Tolerant Services
7.5 High Available Services
7.6 Transaction with Replicated Data

8. Transaction and Concurrency Control (6 hours)

8.1 Transactions
8.2 Nested Transaction
8.3 Locks
8.4 Optimistic Concurrency Control
8.5 Timestamp Ordering
8.6 Comparison of Methods For Concurrency Control
8.7 Introduction to Distributed Transactions
8.8 Flat and Nested Distributed Transactions
8.9 Atomic Commit Protocols
8.10 Concurrency Control in Distributed Transactions
8.11 Distributed Deadlocks

8.12 Transaction Recovery

9. Fault Tolerance (4 hours)

9.1 Introduction to Fault Tolerance
9.2 Process Resilience
9.3 Reliable Client Server Communication
9.4 Distributed Commit
9.5 Recovery

10. Case Studies (5 hours)

10.1 CORBA
10.2 Mach
10.3 JINI
10.4 TIB/Rendezvous

Practical:

1. Implementation of Election Algorithm.
2. Simulation for Clock Synchronization in Distributed System using Lamport's Algorithm.
3. Implementation of Banker's Algorithm for avoiding Deadlock
4. Experiment on DFS
5. Case Study – CORBA,JINI, Mach, TIB/Rendezvous

Reference:

1. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems Concepts and Design", Third Edition, Pearson Education.
2. A.S. Tanenbaum, M. VanSteen, "Distributed Systems", Pearson Education.
3. Mukesh Singhal, "Advanced Concepts in Operating Systems", McGraw-Hill Series in Computer Science.

Evaluation Scheme:

The questions will cover all the chapters of the syllabus. The evaluation scheme will be as indicated in the table below.

Chapters	Hours	Marks Distribution*
1	4	8
2	7	16
5	5	8
6	4	8
7	4	8
8	6	8

9	4	8
3,4,10	11	16
Total	**45**	**80**

*There may be minor deviation in marks distribution

Computer Network | Syllabus | Marking Scheme | IOE | Computer Engineering

COMPUTER NETWORKS
CT….

Lecture : 3 **Year : IV**
Tutorial : 1 **Part : I**
Practical : 3

Course Objective:
To understand the concepts of computer networking, functions of different layers and protocols, and know the idea of IPV6 and security.

1. Introduction to Computer Network (5 hours)

1.1 Uses of Computer Network
1.2 Networking model client/server, p2p, active network
1.3 Protocols and Standards
1.4 OSI model and TCP/IP model
1.5 Comparison of OSI and TCP/IP model
1.6 Example network: The Internet, X.25, Frame Relay, Ethernet, VoIP, NGN and MPLS, xDSL.

2. Physical Layer (5 hours)

2.1 Network monitoring: delay, latency, throughput
2.2 Transmission media: Twisted pair, Coaxial, Fiber optic, Line-of-site, Satellite
2.3 Multiplexing, Circuit switching, Packet switching, VC Switching, Telecommunication switching system (Networking of Telephone exchanges)
2.4 ISDN: Architecture, Interface, and Signaling

3. Data Link Layer (5 hours)

3.1 Functions of Data link layer
3.2 Framing
3.3 Error Detection and Corrections,

3.4 Flow Control
3.5 Examples of Data Link Protocol, HDLC, PPP
3.6 The Medium Access Sub-layer
3.7 The channel allocation problem
3.8 Multiple Access Protocols
3.9 Ethernet,
3.10 Networks: FDDI, ALOHA, VLAN, CSMA/CD, IEEE 802.3, 802.4, 802.5, and 802.11.

4. Network Layer (9 hours)

4.1 Internetworking &devices: Repeaters, Hubs, Bridges, Switches, Router, Gateway
4.2 Addressing: Internet address, classful address
4.3 Subnetting
4.4 Routing: techniques, static vs. dynamic routing , routing table for classful address
4.5 Routing Protocols: RIP, OSPF, BGP, Unicast and multicast routing protocols
4.6 Routing algorithms: shortest path algorithm, flooding, distance vector routing, link state routing; Protocols: ARP, RARP, IP, ICMP

5. Transport Layer (5 hours)

5.1 The transport service: Services provided to the upper layers
5.2 Transport protocols: UDP, TCP
5.3 Port and Socket
5.4 Connection establishment, Connection release
5.5 Flow control & buffering
5.6 Multiplexing & de-multiplexing
5.7 Congestion control algorithm: Token Bucket and Leaky Bucket

6. Application Layer (5 hours)

6.1 Web: HTTP & HTTPS
6.2 File Transfer: FTP, PuTTY, WinSCP
6.3 Electronic Mail: SMTP, POP3, IMAP
6.4 DNS
6.5 P2PApplications
6.6 Socket Programming
6.7 Application server concept: proxy caching, Web/Mail/DNS server optimization
6.8 Concept of traffic analyzer: MRTG, PRTG, SNMP, Packet tracer, Wireshark.

7. Introduction to IPV6 (4 hours)

7.1 IPv6- Advantages
7.2 Packet formats
7.3 Extension headers
7.4 Transition from IPv4 to IPv6: Dual stack, Tunneling, Header Translation
7.5 Multicasting

8. Network Security (7 hours)

8.1 Properties of secure communication
8.2 Principles of cryptography: Symmetric Key and Public Key
8.3 RSA Algorithm,
8.4 Digital Signatures

8.5 Securing e-mail (PGP)
8.6 Securing TCP connections (SSL)
8.7 Network layer security (IPsec, VPN)
8.8 Securing wireless LANs (WEP)
8.9 Firewalls: Application Gateway and Packet Filtering, and IDS

Practical:

1. Network wiring and LAN setup
2. Router Basic Configuration
3. Static and Dynamic Routing
4. Creating VLAN
5. Router access-list configuration
6. Basic Network setup on Linux
7. Setup of Web Server, DNS Server, DHCP Server
8. Virtualizations

References:

1. A.S. Tanenbaum, "Computer Networks", 3rd Edition, Prentice Hall India, 1997.
2. W. Stallings, "Data and Computer Communication", Macmillan Press, 1989.
3. Kurose Ross, "Computer Networking: A top down approach", 2ndEdition, Pearson Education
4. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", 3rd Edition, Morgan Kaufmann Publishers

Evaluation Scheme:

The questions will cover all the chapters of the syllabus. The evaluation scheme will be as indicated in the table below.

Chapters	Hour	Marks Distribution*
1	5	8
2	5	8
3	5	8
4	9	16
5	5	8
6	5	8
7	4	8
8	7	16
Total	**45**	**80**

*There may be minor deviation in marks distribution

DIGITAL SIGNAL ANALYSIS AND PROCESSING | Syllabus | Marking Scheme | IOE | Computer Engineering

DIGITAL SIGNAL ANALYSIS AND PROCESSING
CT….

Lecture : 3 **year : IV**
Tutorial : 1 **Part : I**
Practical : 3/2

Course Objectives:
To introduce digital signal processing techniques and algorithms.

1. Discrete time signals and systems **[8 hours]**

1.1. Discrete time signal, basic signal types
1.2. Energy signal, power signal
1.3. Periodicity of discrete time signal
1.4. Transformation of independent variable
1.5. Discrete time Fourier series and properties
1.6. Discrete time Fourier transform and properties
1.7. Discrete time system properties

1.8. Linear time invariant (LTI) system convolution sum, properties of LTI system
1.9. Frequency response of LTI system
1.10. Sampling of continuous time signal, spectral properties of sampled signal.

2. Z-transform [4 hours]

2.1. 2.1 Defintion, convergence of Z-transform and region of convergence
2.2. 2.2 Properties of Z-transform (linearity, time shift, multiplication by exponential sequence, differentiation, time reversal, convolution, multiplication)
2.3. 2.3 Inverse z-transform by long division and partial fraction expansion.

3. Analysis of LTI system in frequency domain [6 hours]

3.1. Frequency response of LTI system, response to complex exponential
3.2. Linear constant co-efficient difference equation and corresponding system function
3.3. Relationship of frequency response to pole-zero of system
3.4. Linear phase of LTI system and its relationship to causality.

4. Discrete filter structures [8 hours]

4.1. FIR filter, Structures for FIR filter (direct form, cascade, frequency sampling, lattice)
4.2. IIR filter, structures for IIR filter (direct form I, direct form II, cascade, lattice, lattice ladder)
4.3. Quantization effect (truncation, rounding), limit cycles and scaling.

5. FIR filter design [6 hours]

5.1. 5.1 Filter design by window method, commonly used windows (rectangular window, Hanning window, Hamming window)
5.2. 5.2 Filter design by Kaiser window
5.3. 5.3 Filter design by frequency sampling method
5.4. 5.4 Filter design using optimum approximation, Remez exchange algorithm.

6. IIR filter design 6 [hours]

6.1. Filter design by impulse invariance method
6.2. Filter design using bilinear transformation
6.3. Design of digital low pass Butterworth filter
6.4. Properties of Chebyshev filter, properties of elliptic filter, properties of Bessel filter, Spectral transformation.

7. Discrete Fourier transform [7 hours]

7.1. Discrete Fourier transform (DFT) representation, properties of DFT (linearity, time shift, frequency shift, conjugation and conjugate symmetry, duality, convolution, multiplication), circular convolution
7.2. Fast Fourier Transform (FFT) algorithm (decimation in time algorithm, decimation in frequency algorithm)
7.3. Computational complexity of FFT algorithm.

Practical:

1. Introduction to DSP tools.
2. Signal generation and manipulation
3. Convolution
4. Cascade of second order systems
5. IIR filter
6. FIR filter

References

1. Alan V. Oppenheim, Ronald W. Schafer, John R. Buck, "Discrete-Time Signal Processing", Pearson Education.
2. John G. Proakis, Dimitris G. Manolakis, "Digital Signal Processing", Prentice Hall.

Evaluation Scheme

Marks distribution for all the chapters in the syllabus is shown in the table below.

Unit	Hours	Mark Distribution*
1	8	9
2	4	6
3	6	10
4	8	10
5	6	15
6	6	15
7	7	15
Total	**45**	**80**

Data Mining | Syllabus | Marking Scheme | IOE | Computer Engineering

Data Mining
[CT725]

Lecture : 3
Tutorial : 1
Practical : 1.5

Year : IV
Part : I

Course Objective:

This course introduces the fundamental principles, algorithms and applications of intelligent data processing and analysis. It will provide an in depth understanding of various concepts and popular techniques used in the field of data mining.

1. Introduction (2 hours)

1.1. Data Mining Origin

1.2. Data Mining & Data Warehousing basics
2. Data Preprocessing (6 hours)
2.1. Data Types and Attributes
2.2. Data Pre-processing
2.3. OLAP & Multidimensional Data Analysis
2.4. Various Similarity Measures
3. Classification (12 hours)
3.1. Basics and Algorithms
3.2. Decision Tree Classifier
3.3. Rule Based Classifier
3.4. Nearest Neighbor Classifier
3.5. Bayesian Classifier
3.6. Artificial Neural Network Classifier
3.7. Issues : Overfitting, Validation, Model Comparison
4. Association Analysis (10 hours)
4.1. Basics and Algorithms
4.2. Frequent Itemset Pattern & *Apriori* Principle
4.3. FP-Growth, FP-Tree
4.4. Handling Categorical Attributes
4.5. Sequential, Subgraph, and Infrequent Patterns
5. Cluster Analysis (9 hours)
5.1. Basics and Algorithms
5.2. K-means Clustering
5.3. Hierarchical Clustering
5.4. DBSCAN Clustering
5.5. Issues : Evaluation, Scalability, Comparison
6. Anomaly / Fraud Detection (3 hours)
7. Advanced Applications (3 hours)
7.1. Mining Object and Multimedia
7.2. Web-mining
7.3. Time-series data mining

Practical:
Using either MATLAB or any other DataMining tools (such as WEKA), students should practice enough on real-world data intensive problems like IRIS or Wiki dataset.

References:

- Pang-NingTan, Michael Steinbach and Vipin Kumar, Introductionto Data Mining, 2005, Addison-Wesley.
- Jiawei Han and Micheline Kamber, *Data Mining: Concepts and Techniques*, 2nd Edition, 2006, Morgan Kaufmann.

Evaluation Scheme:
The question will cover all the chapters of the syllabus. The evaluation scheme will be as indicated in the table below:

Chapters	Hours	Marks Distribution*
1	2	4
2	6	10
3	12	20
4	10	18

5	9	16
6	3	6
7	3	6
Total	45	80

*There may be minor variation in marks distribution.

Project A | Syllabus | Marking Scheme | IOE | Computer Engineering

Project
EX/CT … … …

Lecture : 0
Tutorial : 0
Practical : 3

Year : IV
Part : I

Course Objectives:

The objective of this project work is to develop hands-on experience of working in a project. During the course, students have to design and complete a functional project which should require integration of various course concepts. Students will develop various skills related to project management like team work, resource management, documentation and time management.

1. Group formation (Not exceeding 4 persons per group)
2. Project concept development (software engineering concept must include for computer engineering and hardware / software elements include electronics & communication engineering)
3. Proposal preparation (proposal content: title, objective, scope of project, methodology, expected outcome, hardware/software element, list of equipment, and historical background and reviewed should be clearly reflected)
4. Project documentation (follow the project documentation guideline)

Evaluation Scheme:
Project (Part A): Internal Evaluation is done on the basis of Project Proposal, Regular activities, Progress Report and Presentation.
Project (Part B): Internal and Final Evaluation is done on the basis of Regularity of the work, Completeness of project, Documentation, Progress Presentation and Final Presentation.