

Dr. Babasaheb Ambedkar Technological University, Lonere - 402 103				
B. Tech. Information Technology				
Semester IV				
Code	Course of Study	L	P	C
CEIT 401	Probability Statistics and Queuing Theory	4	0	8
CEIT 402	Data Communication	4	0	8
CEIT 403	Microprocessors and Microcontrollers	4	0	8
CEIT 404	Data Structures	4	0	8
IT 405	*Elective I	3	0	6
ID 406	History of Science & Technology*			4
IT 407	Programming Laboratory III **		4	4
IT 408	Programming Laboratory IV ***		2	2
XC 409	NSS/NCC/Sports/Arts			
	Total	19	6	48
	Elective - I: Management information Systems *Self Study Course (Objective University Level Common Exam.) **Microprocessors and Microcontrollers, Data Communication ***Data Structures			

CEIT401: Probability Statistics and Queuing Theory

Unit 1

[8 hrs.]

Probability Theory:

Definition of probability: classical, empirical and axiomatic approach of probability, Addition theorem of probability, Multiplication theorem of probability, Bayes' theorem of inverse probability, Properties of probabilities with proofs, Examples.

Unit 2

[8 hrs.]

Random Variable and Mathematical Expectation:

Definition of random variables, Probability distributions, Probability mass function, Probability density function, Mathematical expectation, Joint and marginal probability distributions, Properties of expectation and variance with proofs, Examples.

Unit 3

[8 hrs.]

Theoretical Probability Distributions:

Binomial distribution, Poisson distribution, Normal distribution, Fitting of binomial distributions,

Properties of binomial, poisson and normal distributions, Relation between binomial and normal distributions, Relation between poisson and normal distributions, Importance of normal distribution, Examples.

Unit 4

[8 hrs.]

Correlation:

Introduction, Types of correlation, Correlation and causation, Methods of studying correlation, Karl pearson's correlation coefficient, Spearman's rank correlation, Coefficient, Properties of Karl pearson's correlation coefficient, Properties of Spearman's rank correlation coefficient, Probable errors, Examples.

Unit 5

[8 hrs.]

Linear Regression Analysis:

Introduction, Linear and non-linear regression, Lines of regression, Derivation of regression lines of y on x and x on y, Angle between the regression lines, Coefficients of regression, Theorems on regression coefficient, Properties of regression coefficient, Examples.

Unit 6

[8 hrs.]

Queuing Theory:

Introduction, Queuing systems, The input or arrival pattern, The service pattern and service discipline, Notation, Performance measures, Little's formula, Relation between the probabilities of states, M/M/1/ ∞ systems, Examples.

Text Books:

1. S. C. Gupta, *Fundamentals of Statistics*, 46th edition, Himalaya publishing house, 2010.
2. G.V. Kumbhojkar, *Probability and Random Processes*, 14th edition, C. Jamnadas and co., 2010.
3. G. Haribaskaran, *Probability, Queuing Theory and Reliability Engineering*, 6th edition, Laxmi publications, 2010.

Reference Books:

1. Kishor S. Trivedi, *Probability, Statistics with Reliability, Queuing and Computer Science Applications*, 2nd edition, Wiley India Pvt. Ltd., 2008.

CEIT402: Data Communication

Unit 1

[8 hrs.]

Introduction:

Components of communication, Data representation, Data flow, Communication model, Network, Network topologies, Network connection, Network categories, LAN, WAN, MAN, Internet.

Network Models: Layered tasks, OSI Model – Layered architecture, Layers in OSI model TCP/IP model, Comparison.

Data and Signals:

Analog and digital data, Analog and digital signals, Periodic and non-periodic signals, Sine wave, Parameters of sine wave, Time and frequency domain, Composite signals, Bandwidth, Digital signal-bit rate, Baseband and broadband transmission, Transmission impairments, Nyquist bit rate, Shannon capacity, Performance: Throughput, Latency, Bandwidth-delay product, Jitter.

Unit 2

[8 hrs.]

Analog Transmission:

Digital to analog conversion- Amplitude shift keying, Frequency shift keying, Phase shift keying,

Quadrature amplitude Modulation, Analog to analog Conversion - Amplitude modulation, Frequency modulation, Phase modulation.

Multiplexing: Need of multiplexing, Introduction, Multiplexer and demultiplexer, Frequency division multiplexing, Wavelength division multiplexing, Time division multiplexing – Statistical TDM, Synchronous TDM, Data rate management in TDM.

Unit 3

[8 hrs.]

Digital Transmission:

Digital to digital conversion, Signals element, Data element, Signal rate, Data rate, DC-component, Self synchronization, Line coding schemes - NRZ, NRZI, Bipolar AMI, Pseudoternary, Manchester, Differential manchester. Block coding schemes - 4B/5B, 8B/10B, Scrambling –HDB3, B8ZS, Analog to digital conversion: Pulse code modulation, Delta modulation, Transmission modes- serial and parallel transmission.

Unit 4

[8 hrs.]

Transmission Media:

Guided Media – Twisted pair cable, Co-axial cable, Fiber optic cable, Performance of each, Unguided media – Radio waves, Microwaves, Infrared.

Introduction to fiber optics: Nature of light, Fiber characteristics, Sources and detectors, Connectors and splices.

Unit 5

[8 hrs.]

Error Detection and Correction:

Introduction: Types of errors, Redundancy, Detection versus correction, Forward error correction and retransmission, Modular arithmetic, Block Coding: error detection, error correction, Hamming distance, Minimum hamming distance, Linear block codes, Cyclic Codes: Cyclic Redundancy check, Hardware implementation, Polynomials, Cyclic code analysis, Checksum: Concept, One's component, Internet checksum.

Unit 6

[8 hrs.]

Multiple Access:

Random Access Protocol: ALOHA, CSMA, CSMA/CD, CSMA/CA, Controlled access: Reservation,

Polling, Token passing, Channelization: FDMA, TDMA, CDMA.

Cellular Phones and Satellite Networks:

Frequency reuse principle, roaming, Three generations, Satellite networks: Orbits, GEO, MEO, LEO satellite.

Text Books:

1. Schweber, *Data Communication*, 1st edition, Tata McGraw Hill publication, 2009.
2. Behrouz Forouzan, *Data Communications and Networking*, 4th edition, Tata McGraw Hill publication, 2010.
3. Stalling, *Data Communications and Computer Network*, PHI publication.

CEIT403: Microprocessors and Microcontrollers

Unit 1

[8 hrs.]

Architecture of Microprocessors:

General definitions of mini computers, Microprocessors, Micro controllers and digital signal processors.

Overview of 8085 microprocessor, Overview of 8086 microprocessor, Signals and pins of 8086 microprocessor.

Unit 2

[8 hrs.]

Assembly language of 8086:

Description of Instructions, Assembly directives, Assembly software programs with algorithms.

Unit 3

[8 hrs.]

Interfacing with 8086:

Interfacing with RAMs, ROMs along with the explanation of timing diagrams, Interfacing with peripheral ICs like 8255, 8254, 8279, 8259, 8259 etc., Interfacing with keyboards, LEDs, LCDs, ADCs, and DACs etc.

Coprocessor 8087: Architecture of 8087, interfacing with 8086. Data types, Instructions and programming.

Unit 4

[8 hrs.]

Architecture of Micro controllers:

Overview of the architecture of 8051 microcontroller, Overview of the architecture of 8096 16 bit microcontroller.

Assembly language of 8051: Description of Instructions, Assembly directives, Assembly software programs with Algorithms.

Unit 5

[8 hrs.]

Interfacing with 8051:

Interfacing with keyboards, LEDs, 7 segment LEDs, LCDs, Interfacing with ADCs, Interfacing with DACs, etc.

Unit 6

[8 hrs.]

High end processors:

Introduction to 80386 and 80486.

Text Books:

1. Douglas Hall, *8086 Microprocessor, Architecture and Programming*, PHI publication.
2. Muhammad Ali Mazidi, *The 8051 Microcontrollers & Embedded System*, Pearson Education India publication.
3. Turley, *Advanced 80386 Programming*, McGraw Hill publication.

Reference Books:

1. Liu, Gibson, *Microcomputer system – The 8086/8088 Family*, PHI publication.
2. John F.Uffenbeck, *The 8086/8088 Family Design, Programming and Interfacing*, PHI publication.
3. Intel 8086, 80386, 80486 manuals.
4. A. K. Ray and K. M. Bhurchandi, *Advanced Microprocessors and Peripherals*, Tata McGraw Hill publication.

CEIT404: Data Structures

Unit 1

[8 Hrs]

Introduction:

Data, Data types, Data structure, Abstract Data Type (ADT), representation of Information, characteristics of algorithm, program, analyzing programs, time and space complexity, Big 'O' and 'Ω' notation, best average and worst cases.

Unit 2

[8 Hrs]

Arrays:

Concept of sequential organization, linear and non-linear data structure, storage representation, array processing sparse matrices, transpose of sparse matrices.

Unit 3

[8 Hrs]

Linked Lists:

Concept of linked organization, singly and doubly linked list and dynamic storage management, circular linked list, operations such as insertion, deletion, concatenation, traversal of linked list, dynamic memory management, garbage collection.

Unit 4

[8 Hrs]

Stacks and Queues:

Introduction, stack and queue as ADT, representation and implementation of stack and queue using sequential and linked allocation, Circular queue and its implementation, Application of stack for expression evaluation and expression conversion, recursion, priority queue.

Unit 5

[8 Hrs]

Trees and Graphs:

Basic terminology, binary trees and its representation, insertion and deletion of nodes in binary tree, binary search tree and its traversal, threaded binary tree, Heap, Balanced Trees. Terminology and representation of graphs using adjacency matrix, Warshall's algorithm.

Unit 6

[8 Hrs]

Searching and Sorting:

Sequential, binary searching, skip lists – dictionaries, linear list representation, skip list representation, operations – insertion, deletion and searching. Insertion sort, selection sort, radix sort. File handling.

Text Books:

1. Mark Allen Weiss, *Data structures and algorithms analysis in C++*, Second edition, Pearson Education.
2. S. Lipschutz, *Data Structures*, McGraw Hill Pub.
3. Y. Langsm, M. Augenstin, A. Tanenbaum, *Data Structure using C and C++*, Pearsons Education Asia Pub.
4. Trembley and Sorenson, *Introduction to Data Structures*, PHI Pub.

Reference Books:

1. E. Horowitz, S. Sahani, *Data Structure and Algorithms*, Galgotia Pub.
2. Thomas Cormen, *Introduction to Algorithms*, PHI.

IT405: Management Information Systems (Elective-I)

Unit 1

[8 hrs.]

Introduction to Information System:

Foundations of information systems: Need and objective of information systems, Components and resources of information systems, Types of information systems: Operations support systems and management support systems.

Management Information Systems: Definition, Role and impact of MIS, Functions of the managers: planning, organizing, staffing, coordinating and directing, MIS as a support to the management.

Management of Business: Concept of corporate planning, Essentiality of strategic planning, Development of business strategies, Types of strategies, MIS for business planning.

Unit 2

[8 hrs.]

Decision Support Systems:

Concept and philosophy, Characteristics, Components of DSS, Tools, Using decision support systems: What-if analysis, Sensitivity analysis, Goal-seeking analysis, Optimization analysis, GDSS, Programming languages for DSS, Data warehouse in decision making, Data mining for decision support, Artificial intelligent systems, Knowledge based expert systems, GIS for decision making process.

Unit 3

[8 hrs.]

Electronic Commerce Systems (eCommerce):

Introduction, Scope, B2C, B2B and C2C, C2G, G2G, Essential e-Commerce processes, Electronic payment processes, M commerce, E-governance, Basic principles and emerging trends.

Customer Relationship Management (CRM): Introduction, What is CRM? Three phases of CRM, Benefits, Challenges and trends in CRM, E-ERM.

Supply Chain Management: Role of SCM, Benefit, Challenges and trends in SCM.

Unit 4**[8 hrs.]****Applications of MIS:**

Applications in manufacturing sector: HR management, Marketing, management, Finance management, Materials management, Marketing management.

Applications in service: Banking, Insurance, Airline, Hotel, Hospital, Education.

Cross-Functional Enterprise Systems: Introduction, Collaboration systems in manufacturing, Enterprise application integration, Transaction processing systems.

Unit 5**[8 hrs.]**

Enterprise Management Systems (EMS): Introduction, Enterprise resource planning (ERP) systems: Basic features, Benefits, Selection, Implementation, EMS and MIS.

BPO Services: Business process outsourcing, What is BPO?, Voice BPO, Inbound call center services, Outbound call center services, Non-voice BPO, Scope of BPO, Challenges in BPO management.

ITES: Objectives of ITES, ITES Services and applications like Medical Transcription, Document processing.

Unit 6**[8 hrs.]**

Security and Ethical Challenges: Introduction, Ethical responsibility of business professionals, Cyber crime, Hacking, Cyber theft, Software piracy, Patents, Copy writes, Privacy issues, Health issues, Cyber laws and Information technology act.

Disaster management: System controls and audits, Contingency management and their solutions.

Global Management of Information Technology: Cultural, Political and geo-economic challenges, Platforms and data access issues.

Text Books:

1. O'Brien James, *Management Information Systems*, 7th edition, Tata McGraw-Hill

publication.

2. Rober Schulthesis, Mary Sumner, *Management Information System*, Tata McGraw-Hill publication.
3. Arpita Gopal, Chandrani Singh, *E-world Emerging trends in Information Technology*, Excel Books.

Reference Books:

1. K.C. Laudon, J.P. Loudon, *MIS Managing Digital Firm*, Person Education.
2. W. Jawadekar, *Management Information Systems*, 2nd edition, Tata McGraw-Hill publication, 2002.

IT407: Programming Laboratory III
Microprocessors and Microcontrollers Lab

List of experiments:

1. Write an assembly language program for 8086 and 8051 to perform 8 bit, 16bit addition and subtraction.
2. Write an assembly language program for 8086 and 8051 to perform 8 bit, 16 bit multiplication and to perform 16 bit by 8 bit division.
3. Write an assembly language program for 8086 and 8051 to perform conversion from two ASCII numbers to packed BCD and BCD to Hex.
4. Write an assembly language program to implement 8051 Timer/counter programming.
5. Write an assembly language program to implement 8051 serial communication programming.
6. Write an assembly language program to implement 8051 interrupt programming.
7. Write an assembly language program to interface 8086 to ADC and DAC.
8. Write an assembly language program to interface 8051 to LCD, ADC, sensors.

Data Communication Lab

List of experiments:

1. Study of Sampling theorem.
2. Study of Amplitude Modulation, Frequency Modulation, Phase Modulation.
3. Study of Frequency Division Multiplexing and Demultiplexing.
4. Study of Time Division Multiplexing and Demultiplexing
5. Study of Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK)
6. Study of Stop and Wait protocol.
7. Study of Sliding Window protocol.
 - (a) Go Back n
 - (b) Selective Repeat
8. Study of ALOHA and CSMA.
9. Study of CSMA/CD.
10. Study of token passing access method.

IT408: Programming Laboratory IV

Data Structures Lab

List of experiments:

1. Implementation of Single linked list.
2. Implementation of Double linked list.
3. Implementation of sequential representation of Stack and Queue.
4. Implementation of linked representation of Stack and Queue.
5. Implementation of Tree traversal methods (Inorder, Preorder, Postorder).
6. Implementation of sequential and linked representation of Graph.
7. Implementation of Graph traversal methods (DFS, BFS).
8. Implementation of Sorting methods: Insertion Sort, Radix Sort, Bubble Sort, Selection Sort.
9. Implementation of Searching methods: Linear Search, Binary Search.