

AL-FALAH UNIVERSITY

(University with NAAC 'A' Grade accredited institutions)

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Syllabus

B. Tech (CSE) 5th Semester

[Under Choice Based Credit System (CBCS) Scheme]



(Applicable from 2015-16 Batches)

Department of Computer Science & Engineering

www.alfalahuniversity.edu.in

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AL-FALAH UNIVERSITY

Scheme of Studies & Examination

Bachelor of Technology (Computer Science & Engineering)

Semester – V

S. No.	Course No.	Course Type	Subject	Teaching Schedule				Examination Schedule (Marks)				Credits
				L	T	P	Total	Marks of Class work	Theory	Practical	Total	
1	MAT-301	C.S	Numerical Methods & Optimization Techniques	3	1	-	4	60	90	-	150	4
2	CSE-301	PC-1	Python Programming & Machine Learning	3	1	-	4	60	90	-	150	3
3	CSE-303	PC-2	Theory of Automata & Computation	3	1	-	4	60	90	-	150	3
4	CSE-305	PC-3	Core Java Programming	3	1		4	60	90	-	150	3
5	-----	PE-I	Program Elective - I	3	1	-	4	60	90	-	150	3
6	-----	OE-I	Open Elective - I	3	1	-	4	60	90	-	150	3
7	CSE-313	Lab-1	Core Java Lab	-	-	2	2	60	-	40	100	1
8	CSE-315	Lab-2	Python Lab	-	-	2	2	60	-	40	100	1
9	CSE-317	-----	Professional Training	-	-	2	2	Grade	-	---	Grade	4
			TOTAL	18	7	6	31	480	540	80	1100	25

- PC – Program Core
- PE – Program / Departmental Elective
- OE – Open Elective
- C.S – Compulsory Subject

Program Electives:

CSE-307 Computer Graphics & Multimedia
 CSE-309 Data Mining and Data Warehousing
 CSE-311 Network Security & Management

Open Electives:

EC-305 Microprocessor & Interfacing
 EC-309 Digital Communication System
 EC-311 Data Communication
 MBA-401 Entrepreneurship
 ME-313 Flexible Manufacturing Process
 ME-318 CAD and CAM

MAT-301: NUMERICAL METHODS & OPTIMISATION TECHNIQUES

L T P
3 1 0

Credits: 4

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

NOTE: The question paper will have nine questions in all. Question number-1 will be compulsory and will be of conceptual nature covering the entire syllabus. There after there will be four sections and each section will have two questions. Candidates will be required to attempt at least one question from each section. All questions carry equal marks and the duration of examination will be 2.30 hrs.

COURSE OBJECTIVES:

- Study the techniques of representing a statistical data geometrically and their analysis which reflect data properties more transparently and comprehensively.
 - Establish the understanding towards interpolation, numerical differentiation, numerical Integration and numerical solutions of ordinary differential equations.
 - Know about optimization, its applications in engineering and classical methods for one dimensional linear and non-linear optimization problems.
 - Get the concept of unconstrained non-linear optimization problem and techniques to deal with like gradient methods dynamic programming and integer programming.
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Unit-I

Errors approximation-Numbers and their accuracy, Absolute, relative and percentage errors. Curve fitting-Method of Least Square to fit a curve (Straight line, parabola and some standard forms), Solution of non-linear equations - Intermediate Value Property, Bisection Method, Secant method and Newton-Raphson Method, Simultaneous Linear Equations-Gauss-Jordan method, Jacobi's Iteration Method, Gauss-Seidal Iteration Method.

Unit-II

Operators $\Delta, \nabla, \delta, \mu, E$, Introduction to interpolation, Newton's Forward & Backward interpolation formula, Lagrange's Interpolation formula, Newton's Divided Difference formula.

Numerical differentiation: Forward, Backward and Central formulae for numerical differentiation, Numerical Integration-Newton-Cotes Quadrature formula, Trapezoidal Rule, Simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ rule, Weddle's Formula.

Numerical Solution of ordinary Differential Equations-Taylor series method, Euler and modified Euler method, Runge-Kutta Method, Milne's predictor and corrector method.

Unit-III

Engineering Applications of optimization, Statement of an optimization problem, Classification of optimization problem, Classical Methods for Single variable optimization without constraints

Non-linear Optimization I- Unimodal function, Fibonacci and Golden section method, Quadratic and Cubic Interpolation methods

Unit-IV

Non-Linear Optimization II: Multivariable optimization without any constraints and with Equality/ Inequality Constraints, Kuhn-Tucker conditions, Univariate method, Powell's method, Gradient of a function, Steepest Descent(Cauchy) method, Conjugate Gradient (Fletcher-Reeves) method, Penalty function method.

Text Book:

- Numerical Methods in Engineering & Science, B. S. Grewal.
- Introductory Methods of Numerical Analysis, S.S. Sastry.
- Engineering Optimization Theory & Practice, Singiresu S.Rao.

CSE-301: PYTHON PROGRAMMING & MACHINE LEARNING

L T P
3 1 0

Credits: 3

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

NOTE: The question paper will have nine questions in all. Question number-1 will be compulsory and will be of conceptual nature covering the entire syllabus. There after there will be four sections and each section will have two questions. Candidates will be required to attempt at least one question from each section. All questions carry equal marks and the duration of examination will be 2.30 hrs.

COURSE OBJECTIVES:

- a) To understand the fundamentals Python language.
 - b) To understand the use of python in server side programming and in data analytics.
 - c) To use python in Artificial intelligence and scientific computing.
 - d) To understand the importance of machine learning in Computer Science.
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Unit-I

Introduction to Python: The basic elements of python, Compilers & IDE, Setting up environment variables, Basic syntax, Standard data types and variables used in python, common operators and Decision making (If-Else & Nesting)

Branching Programs, Control Structures (Loops & control statements), Global variables, Structured Types: Strings, Tuples, Lists and Dictionaries, Date and time.

Unit-II

Scoping and Abstraction: Functions and scoping, Specifications, Recursion, Modules, Files, System Functions and Parameters, Files I/O and Exception handling.

Classes and Object-Oriented Programming: Abstract Data Types and Classes, Inheritance, Encapsulation and Information Hiding.

Unit-III

Simple Algorithms and Data structures: Search Algorithms, Sorting Algorithms, Hash Tables, Regular expressions, Networking and Multithreaded programming, Sending and receiving mail using SMTP.

Database handling: Introduction, establishing connection, executing queries, transactions and error handling.

Unit-IV

Introduction to Machine Learning: Basic concepts: Definition of learning systems, Goals and applications of machine learning. Aspects of developing a learning system: training data, concept representation, function approximation, Applications of machine learning.

Types of Learning: Supervised learning and unsupervised learning. Overview of classification: setup, training, test, validation dataset, over fitting. Classification Families: linear discriminative, non-linear discriminative, decision trees, probabilistic (conditional and generative), nearest neighbor.

Text Books:

- Python Programming: An Introduction to Computer Science, By John M. Zelle.
- Programming Python: Powerful Object-Oriented Programming By Mark Lutz, O'Reilly Publications.
- Introduction to Machine Learning - Ethem Alpaydin, MIT Press, Prentice hall of India.

Reference Books:

- Core Python Programming By Wesley J Chun, Prentice Hall.

CSE-303: THEORY OF AUTOMATA & COMPUTATION

L T P

3 1 0

Credits: 3

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

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COURSE OBJECTIVES:

- a) To understand the fundamentals of finite machines.
 - b) To understand the basics of grammars of machines.
 - c) To understand the concepts of normal forms.
 - d) To understand the concept of Turing machines.
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Unit-I

Finite Automata and Regular Expressions: Finite State Systems, Basic Definitions Non-Deterministic finite automata (NFA), Deterministic finite automata (DFA), Equivalence of DFA and NFA Conversion of NFA to DFA Finite automata with E-moves, Regular Expressions, Equivalence of finite automata and Regular Expressions, Regular expression conversion and vice versa.

Introduction to Machines: Concept of basic Machine, Properties and limitations of FSM. Moore and mealy Machines, Equivalence of Moore and Mealy machines, state and prove Arden's Method.

Unit-II

Properties of Regular Sets: The Pumping Lemma for Regular Sets, Applications of the pumping lemma, Closure properties of regular sets, Myhill-Nerode Theorem and minimization of finite Automata, Minimization Algorithm.

Grammars: Definition, Context free and Context sensitive grammar, Ambiguity regular grammar, Reduced forms, Removal of useless Symbols, unit production and null production Chomsky Normal Form (CNF), Greibach Normal Form (GNF).

Unit-III

Pushdown Automata: Introduction to Pushdown Machines, Application of Pushdown Machines.

Turing Machines: Deterministic and Non-Deterministic Turing Machines, Design of T.M, Halting problem of T.M., PCP Problem.

Unit-IV

Chomsky Hierarchies: Chomsky hierarchies of grammars, unrestricted grammars, Context sensitive languages, Relation between languages of classes.

Computability: Basic concepts, Primitive Recursive Functions.

Text Book:

- Introduction to automata theory, language & computations- Hopcroft & O.D.Ullman, R Mothwani, 2001, AW

Reference Books:

- Theory of Computer Sc.: K. L. P.Mishra & N.Chandrasekaran, 2000.
- Introduction to formal Languages & Automata-Peter Linz, 2001, Narosa Publ..
- Introduction to languages and the Theory of Computation by John C. Martin 2003, T.M.H.

CSE-305: CORE JAVA PROGRAMMING

L T P
3 1 0

Credits: 3

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

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COURSE OBJECTIVES:

- a) To understand the fundamentals of Object oriented concepts in java.
 - b) To understand the basics of java features.
 - c) To understand the concepts of exception handling in java.
 - d) To understand the concept of packages & libraries in java.
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Unit-I

Introduction of Java Programming: Overview of Java platform, Java tools, Java Byte Code, Object Oriented, Programming Principles, Elementary Programming Concepts, Variables & Identifiers, keywords, Data types, Operators, Expression, Constants, Statements, Arrays.

Classes & Packages: Introduction and Defining, Classes, methods, fields, Initializing fields, Static members, Constructors and Finalizers referencing objects, Using packages & Sub packages, Access specifiers.

Unit-II

Inheritance: nested and inner class, Extending classes, Abstract class, Interface, Super keyword, Final keyword, · Final classes, Constructors & Inheritance, Dynamic Binding, Overloading and Overriding methods.

String Handling: String and String Buffer class, String Operations, Character Extractions, Data Conversion, Modifying strings. **Collection:** Collection Framework, ArrayList class, ListIterator interface, HashSet class, TreeSet class, Priority Queue class, Map interface, HashMap class, TreeMap class, Hashtable class, Comparable and Comparator, Properties class

Unit-III

Exception Handling and Input and Output package: Introduction to exception, Try and catch block, throw, throws and finally block, Inbuilt exceptions, User-defined exceptions, Byte streams, Character streams, File IO basics, Object serialization – reader and write.

AWT, Event Handling and Applet programming, Layout Manager Layout, Manager, AWT Controls, Various Events and Listeners ,Adapter classes ,Applet fundamentals, Applet lifecycle, Creating and running applets, advantages and restrictions.

Unit-IV

Swings: Swing Features, Model View Controller, Architecture for swings, Swing Controls. Component Organizers, JApplet , Frame, JButton, JCheckBox, JtextField, JtabbedPane, JinternalFrame , JscrollPane, JLabel, JList, JTrees, JTables, JDialog, File chooser, Color chooser ,Menu Handling.

Multithreading: What are Threads, Life cycle of threads, · Running Multiple threads, The Runnable interface, Threads priorities Daemon, Thread states, thread groups Synchronization and Interthread Communication Deadlocks.

Text Book:

- The Complete Reference java 2 by Herbert Schildt. Tata McGrawHill
- Java Programming Advanced topics by Joe Wigglesworth – Paula Lumby. Thomson Learning
- Core Java I - By Cay S. Horstmann and Gary Cornell
- Core Java II - By Cay S. Horstmann and Gary Cornell

CSE-307: COMPUTER GRAPHICS AND MULTIMEDIA

L T P
3 1 0

Credits: 3

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

NOTE: The question paper will have nine questions in all. Question number-1 will be compulsory and will be of conceptual nature covering the entire syllabus. There after there will be four sections and each section will have two questions. Candidates will be required to attempt at least one question from each section. All questions carry equal marks and the duration of examination will be 2.30 hrs.

COURSE OBJECTIVES:

- To understand the fundamentals of computer graphics.**
 - To understand the basic algorithms used in graphics.**
 - To understand the concepts of dimension used in graphics and projection.**
 - To understand the concept of multimedia systems.**
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Unit-I

Introduction and Overview of Graphics Systems:- Use of Computer graphics, Video Display Devices, Refresh Cathode-Ray Tubes, Raster and Random Scan Displays, Color CRT Monitors, Direct View Storage Tubes, Flat Panel Displays.

Three-Dimensional Viewing Devices, Stereoscopic & Virtual Reality Systems, Raster and Random Scan Systems, Different Input and Hard Copy Devices, Graphics Software.

Unit-II

Output Primitives: - Points and Lines, Line Drawing Algorithms (DDA & Bresenham's) Circle and Ellipse Generating Algorithms, Conic Sections.

Two-Dimensional Geometric Transformations:- Different types of transformations and their matrix representations, Homogeneous Coordinates, Composite Transformations, transformations between Coordinate Systems, Affine transformations, Window-to-Viewport Coordinate transformation, Clipping-Point, Line, Polygon, Curve and Text Clipping.

Unit-III

Three-Dimensional Concepts and Object Representation:- Three Dimensional Display Methods, Polygon Surfaces, Curved Lines & Surfaces, Quadric Surfaces, Spline Representations, Cubic Spline interpolation methods, Bezier Curves and Surfaces.

Three Dimensional Transformations and Viewing: Translation, Rotation, Scaling, Reflection, Shears, Composite Transformations, Projections- Parallel and Perspective, Projection Transformations, Clipping.

Visible Surface Detection Methods: Depth Buffer Method, A-Buffer Method, Scan-Line Method AND Area Subdivision Method.

Unit-IV

Introduction to Multimedia Systems Design:

An Introduction – Multimedia applications – Multimedia System Architecture – Defining objects for Multimedia systems – Multimedia Data interface standards – Multimedia Databases

Compression & Decompression – Data & File Format standards – Multimedia I/O technologies - Digital voice and audio – video image and animation – Full motion video – Multimedia Authoring & User Interface – Hypermedia messaging -

Text Book:

- D. Hearn & M.P. Baker - Computer Graphics, 2/e , Pearson Education, New Delhi, 2005
- Prabat K Andleigh and Kiran Thakrar, "Multimedia Systems and Design", PHI, 2005

Reference Books:

- W.M. Newman. et. al.- Principle of Interactive Computer Graphics, Mc Graw Hill Publication, New Delhi, 1995.

CSE-309: DATA MINING AND DATA WAREHOUSING

L T P
3 1 0

Credits: 3

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

NOTE: The question paper will have nine questions in all. Question number-1 will be compulsory and will be of conceptual nature covering the entire syllabus. There after there will be four sections and each section will have two questions. Candidates will be required to attempt at least one question from each section. All questions carry equal marks and the duration of examination will be 2.30 hrs.

COURSE OBJECTIVES:

- a) To understand the fundamentals of data warehouse features.
 - b) To understand the data handling tools used in data warehouses.
 - c) To understand the concepts of data mining algorithms.
 - d) To understand the mining associated concepts in industry.
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Unit-I

Need for data warehouse, definition, goals of data warehouse, Data Mart, Data warehouse architecture, extract and load process (ETL), clean and transform data.

Schema: star, snowflake and galaxy schemas for multidimensional databases, fact and dimension data, Designing fact tables. Partitioning: partitioning strategy – horizontal partitioning and vertical partitioning.

Unit-II

Data warehouse and OLAP technology, multidimensional data models and different OLAP operations, OLAP Server: ROLAP, MOLAP and HOLAP.

Data warehouse implementation, efficient computation of data cubes, processing of OLAP queries, indexing OLAP data.

Unit-III

Data preprocessing, data integration and transformation, data reduction, Discretization and concept Hierarchy Generation, Data mining primitives, Types of Data Mining, Data Mining query language, Architectures of data mining. Data generation & Summarization based characterization, Analytical characterization, mining class comparisons, and mining descriptive statistical measures in large data bases.

Mining Association Rules in large databases: Association rule mining, single dimensional Boolean association rules from Transactional DBS, Multi level association rules from transaction DBS, multidimensional association rules from relational DBS and DWS, Correlation analysis, Constraint based association mining.

Unit-IV

Classification and Prediction: Classification by decision tree induction, Back propagation, Bayesian classification, classification based in association rules, Prediction, classifier accuracy.

Cluster analysis, partitioning and hierarchical methods, Density based methods; Grid based methods, web mining, Temporal and spatial data mining.

Text Book:

1. W.H.Inmon: Building Data Ware House, John Wiley & Sons.
2. S. Anahory and D.Murray: Data warehousing, Pearson Education, ASIA.
3. Jiawei Han & Micheline Kamber: Data Mining - Concepts & Techniques, Harcourt India PVT
4. Michall Corey, M.Abbey, I Azramson & Ben Taub: Oracle 8i Building Data Ware Housing, TMH.

CSE-311: NETWORK SECURITY AND MANAGEMENT

L T P
3 1 0

Credits: 3

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

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COURSE OBJECTIVES:

- a) To understand the fundamentals of network security systems.
 - b) To understand the cryptography basics.
 - c) To understand the concepts of security parameters.
 - d) To understand the communication based management protocols in industry.
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Unit-I

Introduction: Codes and Ciphers – Some Classical systems – Statistical theory of cipher systems Complexity theory of crypto systems – Stream ciphers, Block ciphers.

Unit-II

Stream Ciphers: Rotor based system – shift register based systems – Design considerations for stream ciphers – Cryptanalysis of stream ciphers – Combined encryption and encoding.

Block Ciphers – DES and variant, modes of use of DES. Public key systems – Knapsack systems – RSK – Diffie Hellman Exchange – Authentication and Digital signatures, Elliptic curve based systems.

Unit-III

Security: Hash function – Authentication: Protocols – Digital Signature standards. Electronics Mail Security – PGP (Pretty Good Privacy) MIME, data Compression technique. IP Security: Architecture, Authentication Header, Encapsulating security Payload – Key Management.

Web security: Secure Socket Layer & Transport Layer security, secure electronic transactions. Firewalls Design principle, established systems.

Unit-IV

Telecommunication Network Architecture, TMN management layers, Management information Model, Management servicing and functions, Structure of management information and TMN information model.

SNMP v1, SNMP2 & SNMP3, RMON1 & 2, Broadband Network Management (ATM, HFC, DSL), ASN

Text Books:

- Cryptography and Network Security: Principles & Practices, 2nd Edition by Upper Saddle River, PHI
- Network Management Principles & Practices by Subramanian, Mani (AWL)
- SNMP, Stallings, William (AWL) Reference Books
- SNMP: A Guide to Network Management (MGH) • Telecom Network Management by H.H. Wang (MGH)
- Network Management by U. Dlack (MGH)

MBA-401: ENTREPRENEURSHIP

L T P
3 1 0

Credits: 2

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

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COURSE OBJECTIVES:

This course aims to acquaint the students with challenges of starting new ventures and enable them to investigate, understand and internalize the process of setting up a business.

Unit-I

Entrepreneurship: Concept, knowledge and skills requirement; characteristics of successful entrepreneurs; role of entrepreneurship in economic development; entrepreneurship process; factors impacting emergence of entrepreneurship; managerial vs. entrepreneurial approach and emergence of entrepreneurship

Unit-II

Starting the venture: generating business idea – sources of new ideas, methods of generating ideas, creative problem solving, opportunity recognition; environmental scanning, competitor and industry analysis; feasibility study – market feasibility, technical/operational feasibility, financial feasibility: preparing business plan; preparing project report; presenting business plan to investors

Unit-III

Functional plans: marketing plan – marketing research for the new venture, steps in preparing marketing plan, contingency planning; organizational plan – form of ownership, designing organization structure, job design, manpower planning.

Unit-IV

Sources of finance: debt or equity financing, commercial banks, venture capital; financial institutions supporting entrepreneurs; legal issues – intellectual property rights patents, copy rights, trade marks, licensing; franchising

Text Book:

- Hisrich, Robert D., Michael Peters and Dean Shepherd, Entrepreneurship, Tata McGraw Hill, New Delhi
- Barringer, Brace R., and R. Duane Ireland, Entrepreneurship, Pearson Prentice Hall, New Jersey (USA)
- Lall, Madhurima, and Shikha Sahai, Entrepreneurship, Excel Books, New Delhi.

Reference Books:

- Charantimath, Poornima, Entrepreneurship Development and Small Business Enterprises, Pearson Education, New Delhi

EC-305: MICROPROCESSOR AND INTERFACING

L T P
3 1 0

Credits: 2

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

NOTE: The question paper will have nine questions in all. Question number-1 will be compulsory and will be of conceptual nature covering the entire syllabus. There after there will be four sections and each section will have two questions. Candidates will be required to attempt at least one question from each section. All questions carry equal marks and the duration of examination will be 2.30 hrs.

COURSE OBJECTIVES:

- a) To understand the Intel 8085/8086 architecture.
 - b) Become familiar with the architecture and the instruction set of an Intel microprocessor
 - c) Learn assembly language and programming. The design of various types of digital and analog interfaces would also be learnt.
 - d) Connect peripheral devices and circuits to microprocessors
 - e) Design and develop the hardware and software for microprocessor based systems
 - f) Interpret specifications for 8085 & 8086 microprocessor or peripheral chip
 - g) Develop the assembly level programs and provide the basic information of the processors
 - h) Provide solid foundation for interfacing the external devices to the processor
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Unit-I

THE 8085 PROCESSOR: Introduction to microprocessor, 8085 microprocessor, Architecture, instruction set, interrupt structure, and Assembly language programming.

Unit-II

THE 8086 MICROPROCESSOR ARCHITECTURE : Architecture, block diagram of 8086, details of sub-blocks such as EU, BIU; memory segmentation and physical address computations, program relocation, addressing modes, instruction formats, pin diagram and description of various signals

Unit-III

INSTRUCTION SET OF 8086 : Instruction execution timing, assembler instruction format, data transfer instructions, arithmetic instructions, branch instructions, looping instructions, NOP and HLT instructions, flag manipulation instructions, logical instructions, shift and rotate instructions, directives and operators, programming examples.

Unit-IV

INTERFACING DEVICE : 8255 Programmable peripheral interface, interfacing keyboard and seven segment display, 8254 (8253) programmable interval timer, 8259A programmable interrupt controller, Direct Memory Access and 8237 DMA controller.

Text Book:

- Microprocessor Architecture, Programming & Applications with 8085 by Ramesh S Gaonkar, Wiley Eastern Ltd.
- The Intel Microprocessors 8086- Pentium processor by Barry B. Brey published by PHI

Reference Books:

- Microprocessors and interfacing by Douglas Hall published by TMH
- The 8088 & 8086 Microprocessors by Walter A. Triebel & Avtar Singh published by Pearson/PHI
- Microcomputer systems: the 8086/8088 Family: architecture, Programming & Design by Yu-Chang Liu & Glenn A Gibson published by PHI
- Advanced Microprocessors and Interfacing by B. Ram published by TMH

EC-309: DIGITAL COMMUNICATION SYSTEM

L T P
3 1 0

Credits: 2

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

NOTE: The question paper will have nine questions in all. Question number-1 will be compulsory and will be of conceptual nature covering the entire syllabus. There after there will be four sections and each section will have two questions. Candidates will be required to attempt at least one question from each section. All questions carry equal marks and the duration of examination will be 2.30 hrs.

COURSE OBJECTIVES:

- Introduce the basic concepts of Digital Communication in baseband and pass band domains and to give an exposure to error control coding techniques
 - Study signal space representation of signals and discuss the process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals
 - To understand baseband and band pass signal transmission and reception techniques
 - Study Digital modulation techniques & concept of equalization
 - Learn error control coding which encompasses techniques for the encoding and decoding of digital data streams for their reliable transmission over noisy channel
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Unit-I

INTRODUCTION: Analog and digital communication, Discrete signals. Introduction to analog pulse communication systems, Digital Communication System, elements of digital communication system, Functional Description, Channel classification.

PERFORMANCE MEASURE: Geometric representation of Signals, Bandwidth, Mathematical Models of Communication channel.

Unit-II

BASEBAND FORMATTING AND RECEPTION TECHNIQUES SAMPLING: Impulse sampling, Natural Sampling, Sampler Implementation; Quantization Uniform and Non uniform; Encoding Techniques for Analog Sources Temporal waveform encoding Spectral waveform encoding, Model based encoding, Comparison of speech encoding methods.

NOISE IN COMMUNICATION SYSTEMS: Receiving Filter Correlator type, Matched Filter type; Equalizing Filter Signal and system design for ISI elimination, Implementation, Eye Pattern analysis; Synchronization; Detector, Maximum Likelihood Detector, Error Probability, Figure-of-Merit for Digital Detection.

Unit-III

BASEBAND & LINE CODING TECHNIQUES ERROR CONTROL CODES: Block Codes, Convolution Codes, Concept of Error Free Communication; Classification of line codes, desirable characteristics and power spectra of line codes.

LINE CODING: Polar/Unipolar/Bipolar NRZ and RZ; Manchester, differential encoding

Unit-IV

BANDPASS SIGNAL TRANSMISSION AND RECEPTION MEMORY LESS MODULATION METHODS: Representation and Spectral characteristic, ASK, PSK, QAM, QPSK, FSK; Band pass receiving filter, Error performance; Coherent and Non-coherent detection systems. **EQUALIZATION:** Inter symbol interference (ISI), Purpose of equalization, Eye pattern, Nyquist criterion for zero ISI, fixed equalizer. Design of equalizer, Adaptive equalizer.

Text Book:

- Digital Communication by Amitabha Bhattacharya published by TMH
- Digital Communications by Simon Haykin published by John Wiley, Wiley Student Edition

Reference Books:

- Fundamentals of Communication Systems by John.G. Proakis, Masoud Salehi published by Pearson Education
- Introduction to Digital Communication by Michael. B. Pursley published by Prentice Hall
- Digital Communications by Bernard Sklar published by Pearson Education

EC-311: DATA COMMUNICATION

L T P
3 1 0

Credits: 3

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

NOTE: The question paper will have nine questions in all. Question number-1 will be compulsory and will be of conceptual nature covering the entire syllabus. There after there will be four sections and each section will have two questions. Candidates will be required to attempt at least one question from each section. All questions carry equal marks and the duration of examination will be 2.30 hrs.

COURSE OBJECTIVES:

- Explain the importance of data communications and the Internet in supporting business communications and daily activities and explain the role of protocols in networking.
 - Explain how communication works in data networks and the Internet.
 - Design, calculate, and apply subnet masks and addresses to fulfill networking requirements.
 - Analyze the features and operations of various application layer protocols such as Http, DNS, and SMTP.
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Unit-I

DIGITAL COMMUNICATION: Introduction, digital communication, Shannon limit for information capacity, digital radio, digital amplitude modulation, frequency shift keying (FSK), phase shift keying (PSK), quadrature amplitude modulation (QAM), band width efficiency, carrier recovery, differential phase shift keying, (DPSK), clock recovery, probability of error & bit error rate, trellis encoding.

Unit-II

DATA COMMUNICATIONS: Introduction, history of data communication, standard organization for data communication, data communication circuits, data communication codes, error control, synchronization, data communications hardware
SERIAL INTERFACES: RS-232, RS-449 & RS-530, CCITT X.21, parallel interfaces: centronics parallel interfaces.
Telephone network: DDD network, private- line service, the telephone circuit, data modems: synchronous modems, asynchronous modems, modem synchronization

Unit-III

DATA COMMUNICATIONS PROTOCOLS AND NETWORK CONFIGURATIONS: Introduction, open system interconnection (OSI), data transmission mode, asynchronous protocols, synchronous protocols, public data network, integrated services digital network (ISDN), local area networks, token pass ring, Ethernet.

Unit-IV

MULTIPLEXING: Introduction, time division multiplexing, T1 digital carrier system, CCITT time division multiplexed carrier systems, CODECS, COMBO chips, line encoding, T-CARRIERS, frame synchronization, bit interleaving VS word interleaving, frequency division multiplexing, AT&T's FDM hierarchy, composite base band signal, formation of a master group.

INTERNET AND TCP/IP : Introduction, history, use of Internet, accessing the Internet, Internet addresses, security on the internet, authentication, firewalls, intranet and extranet, TCP/IP reference model, domain name service, world wide web.

Text Book:

Electronic Communications Systems by Wayne Tomasi published by Pearson Education
Data Communication and Networking by Behroyz A. Forauzan published by TMH

Reference Books:

- Computer Networks by Andrew S. Tanenbaum published by Pearson Education
- Data Communications, Computer Networks and Open Systems by Fred Halsall published by Addison Wesley

ME-313: FLEXIBLE MANUFACTURING SYSTEMS

L T P
3 1 0

Credits: 3

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

NOTE: The question paper will have nine questions in all. Question number-1 will be compulsory and will be of conceptual nature covering the entire syllabus. There after there will be four sections and each section will have two questions. Candidates will be required to attempt at least one question from each section. All questions carry equal marks and the duration of examination will be 2.30 hrs.

COURSE OBJECTIVES:

- Classify** and distinguish FMS and other manufacturing systems including job-shop and mass production systems.
 - Understand** the working at processing stations and also the material handling systems used in FMS environments.
 - Understand** tool management in FMS.
 - Understanding** the production management problems in the current modern manufacturing era.
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Unit-I

Introduction and description: Limitations of conventional manufacturing; Need for FMS; Introduction, definition & basic components of FMS; Significance of FMS; General layout and configuration of FMS; Principle objectives of FMS; Benefits and limitations of FMS; Area of application of FMS in industry; Various hardware and software required for an FMS; CIM technology; Hierarchy of CIM, FMS Justification.

Manufacturing Cell: Introduction, description and classification of a manufacturing cell; Unattended machining; Cellular versus flexible manufacturing.

Unit-II

Turning and machining centers: Introduction, types, construction and operation performed on turning center; Automated features and capabilities of turning centers; General advantages and disadvantages of vertical and horizontal machining centers.

FMS features: Pallet and part loading and programming options in machining centers; Automated features and capabilities of a machining centers.

Unit-III

Computer control and software for flexible manufacturing systems: Introduction, composition of FMS; Hierarchy of computer control, computer control of work center and assembly lines; FMS supervisory computer control, types of software specification and selection, trends.

Cutting tools and tool management: Introduction, control of cutting tools; Tool management; Tool strategies; Tool preset; Identification and data transfer; Tool monitoring and fault detection.

Unit-IV

Applications of FMS and factories of future: FMS application in machining; Sheet metal fabrication; Prismatic component production; Aerospace application; FMS development towards factories of the future; Artificial intelligence and expert systems in FMS – design philosophy and characteristics for future.

FMS installation and implementation: FMS installation, FMS implementation.

Text Book:

- Automation, Production Systems and Computer Integrated Manufacturing M P Groover Prentice Hall of India, New Delhi
- CAD/CAM MP Groover , EW Zimmers Prentice Hall of India Approach to Computer Integrated Design and Manufacturing Nanua Singh, John Wiley and Sons.

ME-318: CAD/CAM

L T P

3 1 0

Credits: 3

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

NOTE: The question paper will have nine questions in all. Question number-1 will be compulsory and will be of conceptual nature covering the entire syllabus. There after there will be four sections and each section will have two questions. Candidates will be required to attempt at least one question from each section. All questions carry equal marks and the duration of examination will be 2.30 hrs.

COURSE OBJECTIVES:

- Understand the basic structure of computer hardware and software in relation to computer aided design and manufacturing.
 - Illustrate the 2 – D and 3 – D transformations of basic entities like line, circle and ellipse.
 - Get acquainted with basic geometric commands used in solid modeling.
 - Gain knowledge about product cycle of CAD/CAM and computer graphics.
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Unit-I

Overview of CAD/CAM systems: Concepts of CAD/CAM, product cycle, engineering design and its phases; Conventional and computer aided design processes – advantages and disadvantages; CAD/CAM hardware – basic structure, CPU, memory types, input/output and storage devices; Software associated with designing and manufacturing.

Geometric transformations: Representations and transformations of points and lines – arbitrary rotation about origin and through different angles; 2 – dimensional and 3 – dimensional transformations like translations, rotations, scaling, reflection and their combinations.

Unit-II

Geometric and surface modeling: Function and requirements; Curve fitting and curve fairing techniques – 2D, wire frame and 3D shadowing; Representation of

- Plane curve like straight line, circle, ellipse, parabola and hyperbola.
- Space curve like cubic spline, parabolic blending, Bezier curve and B – spline curve.
- Bezier surface, B – spline surface, Coon's surface and surface of revolution.

3-D geometric modeling: Concept of solid models and entities and solid representation; Half-space, boundary representation (B-rep) and constructive solid geometry (CSG) modeling techniques; Feature based and parametric based modeling;

Familiarity with Boolean operations such as sweep, soft, extrude, filleting, chamfer, spline etc.

Unit-III

Surface manipulation and data exchange: Surface manipulation – displaying, segmentation, trimming and intersection both for 2D and 3D objects; Evolution of data and data exchange format – shape based and product based formats; IGES and PDES data presentation and structure; STEP architecture implementation; ACIS and DXF.

Mechanical assembly: Concept of assembly modeling; Part modeling and its presentation; Assembly modeling, part modeling and their representation; Hierarchical relationship; Mating conditions; Representation schemes; Graph structure and location graph; Generation of assembly sequences, precedence diagram; Assembly analysis; Designing 3D models like machine parts, hidden line and surface removal.

Unit-IV

Numerical control and part programming : Numerical control and its objectives; Motion and axis of machine tools; Point to point and continuous path moving; Computer numerical control (CNC); CNC machine tools and their structure – machining center and turning center; Part programming fundamentals – manual part programming and computer aided part programming ; Direct numerical control (DNC) and adaptive control.

CAD/CAM areas of application: Brief overview and salient features of CIM (computer integrated manufacturing) and FMS (flexible manufacturing system); Process planning and computer aided process planning; Concurrent engineering and design for manufacture; Rapid prototyping and reverse engineering and computer aided quality control.

Text Book:

- Automation, Production Systems and Computer Integrated Manufacturing M P Groover Prentice Hall of India, New Delhi
- CAD/CAM MP Groover , EW Zimmers Prentice Hall of India Approach to Computer Integrated Design and Manufacturing Nanua Singh, John Wiley and Sons.

CSE-313: CORE JAVA LAB

L T P C
0 0 2 1

Internal: 60 Marks
External: 40 Marks
Total: 100 Marks

Duration of Exam: 2 Hrs.

Practical's List

1. Develop a Java package with simple Stack and Queue classes. Use JavaDoc comments for documentation.
2. Design a class for Complex numbers in Java. In addition to methods for basic operations on complex numbers, provide a method to return the number of active objects created.
3. Design a Date class similar to the one provided in the java.util package.
4. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism.
5. Design a Java interface for ADT Stack. Develop two different classes that implement this interface, one using array and the other using linked-list. Provide necessary exception handling in both the implementations.
6. Write a Java program to read a file that contains DNA sequences of arbitrary length one per line (note that each DNA sequence is just a String). Your program should sort the sequences in descending order with respect to the number of 'TATA' subsequences present. Finally write the sequences in sorted order into another file.
7. Develop a simple paint-like program that can draw basic graphical primitives in different dimensions and colors. Use appropriate menu and buttons.
8. Develop a scientific calculator using event-driven programming paradigm of Java.
9. Develop a template for linked-list class along with its methods in Java.
10. Design a thread-safe implementation of Queue class. Write a multi-threaded producer-consumer application that uses this Queue class.
11. Write a multi-threaded Java program to print all numbers below 100,000 that are both prime and Fibonacci number (some examples are 2, 3, 5, 13, etc.). Design a thread that generates prime numbers below 100,000 and writes them into a pipe. Design another thread that generates Fibonacci numbers and writes them to another pipe. The main thread should read both the pipes to identify numbers common to both.
12. Develop a multi-threaded GUI application of your choice.

CSE-315: PYTHON LAB

L T P C
0 0 2 1

Internal: 60 Marks
External: 40 Marks
Total: 100 Marks

Duration of Exam: 2 Hrs.

Practical's List

1. Develop programs to understand the control structures of python
2. Develop programs to learn different types of structures (list, dictionary, tuples) in python
3. Develop programs to learn concept of functions scoping, recursion and list mutability.
4. Develop programs to understand working of exception handling and assertions.
5. Develop programs for data structure algorithms using python – searching, sorting and hash tables.
6. Develop programs to learn regular expressions using python.
7. Develop chat room application using multithreading.
8. Learn to plot different types of graphs using PyPlot.
9. Implement classical ciphers using python.
10. Draw graphics using Turtle.