

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**B.Tech. II - I Sem. (CSE)**

**(13A03304) ENGINEERING GRAPHICS**

**Course Objective:**

- *By studying the engineering drawing, a student becomes aware of how industry communicates technical information. Engineering drawing teaches the principles of accuracy and clarity in presenting the information necessary about objects.*
- *This course develops the engineering imagination i.e., so essential to a successful design, By learning techniques of engineering drawing changes the way one things about technical images.*
- *It is ideal to master the fundamentals of engineering drawing first and to later use these fundamentals for a particular application, such as computer aided drafting. Engineering Drawing is the language of engineers, by studying this course engineering and technology students will eventually be able to prepare drawings of various objects being used in technology.*

**UNIT I**

**Introduction to Engineering Drawing:** Principles of Engineering Graphics and their Significance- Conventions in Drawing-Lettering – BIS Conventions. Curves used in Engineering Practice.

- a) Conic Sections including the Rectangular Hyperbola- General method only,
- b) Cycloid, Epicycloid and Hypocycloid

**UNIT II**

**Projection of Points & Lines:** Principles of orthographic projection – Convention – First angle projections, projections of points, lines inclined to one or both planes, Problems on projections, Finding True lengths.

**UNIT III**

**Projections of Planes:** Projections of regular plane surfaces- plane surfaces inclined to one or both planes.

**Projections of Solids:** Projections of Regular Solids with axis inclined to one plane.

**UNIT IV**

**Sections and Developments of Solids:** Section Planes and Sectional View of Right Regular Solids-Prism, cylinder, Pyramid and Cone. True shapes of the sections. Development of Surfaces of Right Regular Solids-Prism, Cylinder, Pyramid, Cone.

**UNIT V**

**Isometric and Orthographic Projections:** Principles of isometric projection- Isometric Scale- Isometric Views- Conventions- Isometric Views of lines, Planes Figures, Simple solids (cube,

cylinder and cone). Isometric projections of spherical parts. Conversion of isometric Views to Orthographic Views.

**Text Books:**

1. *Engineering Drawing, N.D. Bhatt, Charotar Publishers*
2. *Engineering Drawing, K.L. Narayana & P. Kannaih, Scitech Publishers, Chennai*

**Reference Books:**

1. *Engineering Drawing, Johle, Tata McGraw-Hill Publishers*
2. *Engineering Drawing, Shah and Rana, 2/e, Pearson Education*
3. *Engineering Drawing and Graphics, Venugopal/New age Publishers*
4. *Engineering Graphics, K.C. John, PHI, 2013*
5. *Engineering Drawing and Graphics, Venugopal / New age Publishers*
6. *Engineering Drawing, B.V.R. Gupta, J.K. Publishers*

**Suggestions:**

1. *Student is expected to buy a book mentioned under „Text books“ for better understanding.*
2. *Students can find the applications of various conics in engineering and application of involute on gear teeth. The introduction for drawing can be had on line from:*
  - *Introduction to engineering drawing with tools – youtube*
  - *Http-sewor. Carleton.ca /- g kardos/88403/drawing/drawings.html*
  - *Conic sections-online. red woods.edu*

*The skill acquired by the student in this subject is very useful in conveying his ideas to the layman easily.*

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**(13A54303) PROBABILITY AND STATISTICS**

**Course Objective:**

- *To help the students in getting a thorough understanding of the fundamentals of probability and usage of statistical techniques like testing of hypothesis, ANOVA, Statistical Quality Control and Queuing theory*

**Learning Outcome:**

- *The student will be able to analyze the problems of engineering & industry using the techniques of testing of hypothesis, ANOVA, Statistical Quality Control and Queuing theory and draw appropriate inferences*

**UNIT I**

Conditional probability – Baye’s theorem. Random variables – Discrete and continuous Distributions – Distribution functions. Binomial and poison distributions Normal distribution – Related properties.

**UNIT II**

Test of Hypothesis: Population and Sample - Confidence interval of mean from Normal distribution - Statistical hypothesis - Null and Alternative hypothesis - Level of significance - Test of significance - Test based on normal distribution - Z test for means and proportions; Small samples - t- test for one sample and two sample problem and paired t-test, F-test and Chi-square test (testing of goodness of fit and independence).

**UNIT III**

Analysis of variance one way classification and two way classification (Latic square Design and RBD)

**UNIT IV**

Statistical Quality Control: Concept of quality of a manufactured product -Defects and Defectives - Causes of variations - Random and assignable - The principle of Shewhart Control Chart-Charts for attribute and variable quality characteristics- Constructions and operation of X-bar Chart, R-Chart, P-Chart and C-Chart.

**UNIT V**

Queuing Theory: Pure Birth and Death process, M/M/1 & M/M/S & their related simple problems.

**Text Books:**

1. *Probability & Statistics for engineers by Dr. J. Ravichandran WILEY-INDIA publishers.*
2. *Probability & Statistics by T.K.V. Iyengar, S.Chand publications.*

**Reference Books:**

1. *Probability & Statistics by E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.*
2. *Statistical methods by S.P. Gupta, S.Chand publications.*
3. *Probability & Statistics for Science and Engineering by G.Shanker Rao, Universities Press.*
4. *Probability and Statistics for Engineering and Sciences by Jay L.Devore, CENGAGE.*
5. *Probability and Statistics by R.A. Jhonson and Gupta C.B.*

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### (13A01403) ENVIRONMENTAL SCIENCE

#### **Course Objective:**

- *To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.*

#### **UNIT I**

**MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES:** – Definition, Scope and Importance – Need for Public Awareness.

**NATURAL RESOURCES :** Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

#### **UNIT II**

**ECOSYSTEMS:** Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

- a. Forest ecosystem.
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

**BIODIVERSITY AND ITS CONSERVATION:** Introduction 0 Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-soports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

#### **UNIT III**

**ENVIRONMENTAL POLLUTION:** Definition, Cause, effects and control measures of :

- a. Air Pollution.
- b. Water pollution
- c. Soil pollution

- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution
- g. Nuclear hazards

**SOLID WASTE MANAGEMENT:** Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

#### UNIT IV

**SOCIAL ISSUES AND THE ENVIRONMENT:** From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

#### UNIT V

**HUMAN POPULATION AND THE ENVIRONMENT:** Population growth, variation among nations. Population explosion – Family Welfare Programme. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

**FIELD WORK:** Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, birds – river, hill slopes, etc..

#### **Text Books:**

1. *Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press, 2005.*
2. *Environmental Studies by Palanisamy, Pearson education, 2012.*
3. *Environmental Studies by R.Rajagopalan, Oxford University Press, 2<sup>nd</sup> edition, 2011.*

#### **Reference Books:**

1. *Textbook of Environmental Studies by Deeksha Dave and E.Sai Baba Reddy, Cengage Publications, 2<sup>nd</sup> edition, 2012.*
2. *Text book of Environmental Science and Technology by M.Anji Reddy, BS Publication, 2009.*
3. *Comprehensive Environmental studies by J.P.Sharma, Laxmi publications, 2<sup>nd</sup> edition, 2006.*
4. *Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Printice hall of India Private limited, 2<sup>nd</sup> edition, 1996.*
5. *Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited, 3<sup>rd</sup> edition, 2007.*

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**(13A05301) DATA STRUCTURES**

**Course Objective:**

- *To develop skills to design and analyze linear and non linear data structures.*
- *Develop algorithms for manipulating linked lists, stacks, queues, trees and graphs.*
- *Develop recursive algorithms as they apply to trees and graphs.*
- *To develop a base for advanced computer science study.*

**Learning Outcome:**

*At the end of the course students will be assessed to determine whether they are able to*

- *Study variety of advanced abstract data type (ADT) and data structures and their Implementations.*
- *Identify and apply the suitable data structure for the given real world problem*

**UNIT I**

**Introduction and Overview:** System Life Cycle, Definition, Overview of Data Structures

**Linked Lists:** Single Linked Lists – Insertion and Deletion, Double Linked Lists – Insertion and Deletion.

**Stacks:** Definition, The Abstract Data Type, Array Representation, Linked Representation, Applications.

**Queues:** Definition, The Abstract Data Type, Array Representation, Linked Representation, Circular Queues, Applications.

**UNIT II**

**Sorting:** Motivation, Quick Sort, Merge Sort, Insertion Sort, and Heap Sort.

**Trees:** Introduction, Representation of Trees, Binary Trees, Binary Tree Traversal and Tree Iterators, Additional Binary Tree Operations, Threaded Binary Trees, Binary Search Trees, Selection Trees.

**UNIT III**

**Graphs:** The Graph Abstract Data Type, Elementary Graph Operations.

**Skip Lists and Hashing:** Dictionaries, Linear List Representation, Skip List Representation, Hash Table Representation, Static and Dynamic Hashing.

**UNIT IV**

**Priority Queues:** Definition and Applications, Single and Double Ended Priority Queues, Linear Lists, Heaps, Leftist Trees, Binomial Heaps, Fibonacci Heaps, Pairing Heaps.

## **UNIT V**

**Efficient Binary Search Trees:** Optimal Binary Search Trees, AVL Trees, Red – Black Trees, Splay Trees.

**Multiway Search Trees:** m – way Search Trees, B – Trees, B<sup>+</sup> - Trees

### **Text Books:**

1. *Fundamentals of Data Structures in C++ by Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Universities Press, Second Edition.*
2. *Data Structures, Algorithms and Applications in C++ by Sartaj Sahni, Universities Press, Second Edition*

### **Reference Books:**

1. *Data Structures and Algorithms Using C++ by Ananda Rao Akepogu and Radhika Raju Palagiri, Pearson Ed.*
2. *Classic Data Structure by D. Samanta, Eastern Economy Edition.*
3. *Data Structures and Algorithms Made Easy by Narasimha Karumanchi, Second Edition, Written in C/C++, CareerMonk Publications, Hyderabad*
4. *ADTs, Data Structures and Problem Solving with C++, Larry Nyhoff, Pearson*
5. *Data Structures using C++, D.S.Malik, 2<sup>nd</sup> Edition, Cengage Learning*
6. *Data Structures through C++, Yashavant P.Kanetkar, BPB Publication*
7. *Data Structures using C and C++, Yedidyah Langsam.Moshe J.Augenstein Aaron M.Tenenbaum, 2<sup>nd</sup> Edition,PHI*
8. *Data Structures using C & C++, Rajesh K.Shukla, Wiley-India*

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**(13A04305) DIGITAL LOGIC DESIGN**

**Course Objective:**

- *Acquire the skills to manipulate and examine Boolean algebraic expressions, logical operations, Boolean functions and their simplifications.*
- *Understand the fundamental principles of digital design.*
- *Acquaint with classical hardware design for both combinational and sequential logic circuits.*

**Learning Outcome:**

- *Ability to interpret, convert and represent different number systems and binary arithmetic.*
- *Able to design sequential and combinational circuits*
- *Able to design different units of a digital computer.*

**UNIT I**

**Binary Systems:** Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Compliments, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic.

**Boolean Algebra And Logic Gates:** Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, Integrated Circuits

**UNIT II**

**Gate – Level Minimization:** The Map Method, Four Variable Map, Five-Variable Map, Product of Sums Simplification, Don't-Care Conditions, NAND and NOR Implementation, Other Two Level Implementations, EX-OR Function, Other Minimization Methods

**UNIT III**

**Combinational Logic:** Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers

**UNIT IV**

**Synchronous Sequential Logic:** Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Design Procedure, Registers, Shift Registers, Ripple Counters, Synchronous Counters, Other counters

## **UNIT V**

**Memory And Programmable Logic:** Random access memory, memory decoding, Error Detection and Correction, Read-only Memory, Programmable Logic Array, Programmable Array Logic.

**Digital Logic Circuits:** RTL and DTL Circuits, Transistor-Transistor Logic (TTL), Emitter-Coupled Logic (ECL), MOS, CMOS Logic, Comparisons of Logic Families

### **Text Books:**

1. *Digital Design, M.Morris Mano, Micheal D. Ciletti, 5<sup>th</sup> Edition, 2013, Pearson.*

### **Reference Books:**

1. *Digital Logic & State Machine Design, David J. Comer, Oxford University Press, 3<sup>rd</sup> Reprinted Indian Edition, 2012*
2. *Digital Logic Design, R.D. Sudhakar Samuel, Elsevier*
3. *Fundamentals of Logic Design, 5/e, Roth, Cengage*
4. *Switching and Finite Automata Theory, 3/e, Kohavi, Jha, Cambridge.*
5. *Digital Logic Design, Leach, Malvino, Saha, TMH*
6. *Modern Digital Electronics, R.P. Jain, TMH*

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**(13A05302) DISCRETE MATHEMATICS**

**Course Objective:**

- *Understand the methods of discrete mathematics such as proofs, counting principles, number theory, logic and set theory.*
- *Understand the concepts of graph theory, binomial theorem, probability distribution function in analysis of various computer science applications.*

**Learning Outcome:**

- *Able to apply mathematical concepts and logical reasoning to solve problems in different fields of Computer science and information technology.*
- *Able to apply the concepts in courses like Computer Organization, DBMS, Analysis of Algorithms, Theoretical Computer Science, Cryptography, Artificial Intelligence, etc.,*

**UNIT I**

**The Language of Logic:** Propositions, Logical Equivalences, Quantifiers, Arguments, Proof Methods.

**The Language of Sets:** The Concepts of a Set, Operations with Sets, Computer Operations with Sets, The Cardinality of a Set, Recursively Defined Sets.

**Functions:** The concept of Functions, Special Functions, Properties of Functions, The Pigeonhole principle, Composite Functions, Sequences and the Summation Notation.

**UNIT II**

**Relations:** Boolean Matrices, Relations and Digraphs, Computer Representations of Relations, Properties of Relations, Operations on Relations, Transitive Closure, Equivalence Relations, Partial and Total Ordering.

**Lattices & Boolean Algebra:** Lattices as Partially Ordered Sets, Properties of Lattices, Lattices as Algebraic Systems, Sublattices, Direct Product and Homomorphism, Boolean Algebra, Boolean Functions

**UNIT III**

**Algebraic Structures:** Algebraic Systems, Semigroups and Monoids, Groups - Subgroups and Homomorphism, Cosets and Lagrange's theorem, Normal Subgroups.

**Combinatorics:** The Fundamental Counting Principles, Permutations, Derangements, Combinations, Permutations and Combinations with Repetitions, The Binomial Theorem, The Generalized Inclusion-Exclusion Principle.

#### **UNIT IV**

**Induction and Algorithms:** The Division Algorithm, Divisibility Properties, Nondecimal Bases, Mathematical Induction, Algorithm Correctness, The Growth Functions, Complexity of Algorithms.

**Recursion:** Recursively Defined Functions, Solving Recurrence Relations, Generating Functions, Recursive Algorithms, Correctness of Recursive Algorithms, Complexities of Recursive Algorithms.

#### **UNIT V**

**Graphs:** Computer Representation of Graphs, Isomorphic Graphs, Paths, Cycles, and Circuits, Eulerian and Hamiltonian Graphs, Planar Graphs, Graph Coloring, Digraphs, Dags, Weighted Digraphs, DFS and BFS Algorithms.

**Trees:** Trees, Spanning Trees, Minimal Spanning Trees, Kruskal's and Prim's Algorithm

#### **Text Books:**

1. *Discrete Mathematics with Applications*, Thomas Koshy, 2003, Elsevier Academic Press.
2. *Discrete Mathematical Structures with Applications to Computer Science*, J.P. Tremblay and R. Manohar, 1975, TMH.

#### **Reference Books:**

1. *Discrete and Combinatorial Mathematics, Fifth Edition*, R. P. Grimaldi, B.V. Ramana, Pearson
2. *Discrete Mathematics Theory and Applications*, D.S Malik and M.K. Sen, Cengage Learning
3. J .L.Mott, A.Kandel, T.P .Baker, *Discrete Mathematics for Computer Scientists and Mathematicians, second edition 1986, Prentice Hall of India*
4. C.L.Liu, *Elements of Discrete Mathematics, Second Edition 1985, McGraw-Hill Book Company. Reprinted 2000*
5. *Discrete Mathematics*, Norman L. Biggs, Second Edition, OXFORD Indian Edition.
6. K.H.Rosen, *Discrete Mathematics and applications, 5<sup>th</sup> Edition 2003, TataMcGraw Hillpublishing Company*
7. *Graph Theory with Applications to Engineering & Computer Science: Narsingh Deo, PHI (2004)*
8. "Discrete Mathematical Structures" Jayant Ganguly, Sanguine

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**(13A99304) ELECTRICAL & ELECTRONICS ENGINEERING LAB**

**PART- A: ELECTRICAL LAB**

1. Verification of Superposition Theorem.
2. Verification of Thevenin's Theorem.
3. Open Circuit Characteristics of D.C.Shunt Generator.
4. Swinburne's Test on DC Shunt Machine (Predetermination of Efficiency of a Given DC Shunt Machine Working as Motor and Generator).
5. Brake Test on DC Shunt Motor. Determination of Performance Characteristics.
6. OC & SC Tests on Single-Phase Transformer (Predetermination of Efficiency and Regulation at Given Power Factors).

**PART- B : ELECTRONICS LAB**

**(Any Six Experiments)**

1. P-N Junction Diode and Zener Diode Volt-Ampere Characteristics.
2. Bipolar Junction Transistor in CB Configuration-Input and Output Characteristics, Computation of  $\alpha$ .
3. Half-Wave Rectifier- a) Without Filter b) With Capacitor Filter.
4. Full-Wave Rectifier- a) Without Filter b) With Capacitor Filter.
5. Bipolar Junction Transistor in CE Configuration-Input and Output Characteristics, Computation of  $\beta$ .
6. Junction field effect Transistor in Common Source Configuration Output and Transfer Characteristics.
7. Verification of Logic Gates- AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.

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**(13A05303) DATA STRUCTURES LAB**

Week 1

- a) Write a Program to Implement Stack Operations by using Array and Linked Lists.
- b) Write a Program to Implement the Operations of Double Linked Lists

Week 2

- a) Write a C program that uses stack operations to convert a given infix expression into its postfix
- b) Write a Program to Implement Queue Operations by using Array and Linked Lists.

Week 3

Write a Program to Implement Circular Queue Operations by using Array and Linked Lists.

Week 4

Write a Program to Sort the set of elements by using  
i) Quick Sort    ii) Heap Sort.    iii) Merge Sort

Week 5

Write a Program to Implement the Binary Search Tree Operations.

Week 6

Write a Program to Perform the Tree Traversal Techniques by using the Iterative Method

Week 7

Write C programs for implementing the following graph traversal algorithms:  
a)Depth first traversal    b)Breadth first traversal

Week 8

Write a Program to Implement All functions of a Dictionary by using Hashing

Week 9

Write a Program to Implement Skip List Operations.

Week 10

Write a Program to Implement Insertion, Deletion and Search Operations on SPLAY Trees.

Week 11

Write a program to Implement Insertion and Deletion Operations on AVL Trees  
Week 12

Write a Program to Implement Insertion and Deletion Operations on B – Trees

**Note:** Use Classes and Objects to implement the above programs.

**References:**

1. *Object Oriented Programming with ANSI & Turbo C++, Ashok N.Kamthane, Pearson Education*
2. *Data Structures using C++, D.S.Malik, 2<sup>nd</sup> Edition, Cengage Learning*
3. *Data Structures through C++, Yashavant P.Kanetkar, BPB Publication*
4. *Data Structures using C and C++, Yedidyah Langsam.Moshe J.Augenstein Aaron M.Tenenbaum, 2<sup>nd</sup> Edition, PHI*
5. *Data Structures using C & C++, Rajesh K.Shukla, Wiley-India*
6. *ADTs, Data Structures and Problem Solving with C++, Larry Nyhoff, Pearson*

