CHE110:ENVIRONMENTAL STUDIES

L:2 T:2 P:0 Credits:4

Course Outcomes: Through this course students should be able to

CO1 :: describe the current environmental issues and associated problems.

CO2 :: understand various environmental issues through basic knowledge of environment and its various components.

CO3 :: outline various environment policies and practices.

CO4 :: explore new approaches to reduce various types of environmental pollution.

Unit I

Introduction and natural resources : multidisciplinary nature, scope and importance of environmental studies, concept of sustainability and sustainable development goals, natural resources and classification, land resources, land degradation, soil erosion and desertification, forest resources, causes and impacts of deforestation, water resources, use and over-exploitation of surface and ground water, conflicts over water, energy resources, renewable and non renewable energy resources, use of alternate energy sources, growing energy needs, conservation of natural resources and human role

Unit II

Ecosystems : What is an ecosystem? structure and function of ecosystem, Energy flow in an ecosystem: food chains, food webs and ecological succession, ecological pyramids, Case studies of the following ecosystems : a)forest ecosystem b) grassland ecosystem c) desert ecosystem d) aquatic ecosystem

Unit III

Biodiversity and conservation : Levels of biological diversity : genetic, species and ecosystem diversity, hot spots of biodiversity, ecosystem and biodiversity services, ecological, economic, social, aesthetic and Informational value, threats to biodiversity: habitat loss, poaching of wildlife, biological invasions, endangered and endemic species in India, Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity, biogeographic zones of India, India as a mega diversity nation

Unit IV

Environmental pollution : environmental pollution, types, causes, effects and controls of air, water, soil, noise and radiation pollution, ill-effects of Fireworks, Pollution case studies

Unit V

Environmental Policies & Practices : Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture, Environment Laws: Environment Protection Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD), Solid waste management: Control measures of urban and industrial waste, role of tribal populations in policy making, human wildlife conflicts

Unit VI

Human Communities and the Environment : Human population growth: Impacts on environment, human health and welfare, Environmental movements : Chipko, silent valley, bishnois of Rajasthan, environmental ethics, role of Indian and other religions and cultures in environmental conservation, public awareness, disaster management, floods, droughts, earthquake, cyclones and landslides

Text Books:

1. PERSPECTIVE IN ENVIRONMENTAL STUDIES by ANUBHA KAUSHIK, C P KAUSHIK, NEW AGE INTERNATIONAL PUBLISHERS

References:

1. TEXT BOOK OF ENVIRONMENTAL STUDIES 2E by D. DAVE AND S. S. KATEWA, CENGAGE LEARNING

ECE249:BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

L:3 T:1 P:0 Credits:4

Course Outcomes: Through this course students should be able to

CO1 :: Understand the fundamental behavior of circuit elements and DC networks.

CO2 :: Learn the fundamental behavior and notations of AC circuits.

CO3 :: Discuss the working principles and applications of transformers.

CO4 :: Analyze the working of various semiconductor devices and its applications.

CO5 :: Distinguish between combinational and sequential logic system.

CO6 :: Explore the functionality of digital circuits under real and simulated environment.

Unit I

Fundamentals of D.C. circuits : resistance, inductance, capacitance, voltage, current, power and energy concepts, ohm's law, Kirchhoff's laws, voltage division rule, current division rule, star–delta transformation, mesh and nodal analysis, dependent and independent sources, superposition theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem

Unit II

Fundamentals of A.C. circuits : alternating current and voltage, definitions of amplitude and phase, average and RMS value of an AC signal, RL, RC and RLC circuits, power calculation in RL, RC and RLC circuits, Transformer- working, principle, and turn ratio, Instrument transformers, Auto-transformer

Unit III

Fundamental of semiconductor devices : PN junction diode and its applications, Bipolar junction transistor (PNP and NPN), MOSFET (working and applications), Op-amp (features and virtual ground concept), Op-amp (inverting and non-inverting)

Unit IV

Introduction to number system and logic gates : Number system (conversion and codes), logic gates, CMOS logic gates, boolean algebra, SOP and POS, K- Map (up to 4 variables)

Unit V

Introduction to Combinational Logic Circuits : Adders, Subtractors, Comparators, Multiplexers and De-multiplexers, multiplexer design, Decoders, Encoders

Unit VI

Introduction to Sequential Logic Circuits : Basic sequential circuits: SR-latch, D-latch, D flip-flop, JK flip- flop, T flip-flop, Master Slave JK flip flop, Conversion of basic flip-flop, Registers: Operation of all basic Shift Registers, Counters: Design of Asynchronous, Synchronous counters, Ring counter and Johnson ring counter

Text Books:

1. FUNDAMENTALS OF ELECTRICAL ENGINEERING AND ELECTRONICS by B.L.THERAJA, S. CHAND & COMPANY

References:

1. BASIC ELECTRICAL ENGINEERING BY D.C. KULSHRESTHA, MC GRAW HILL by D.C. KULSHRESTHA, MC GRAW HILL

2. . DIGITAL FUNDAMENTALS BY THOMAS L. FLOYD , R. P JAIN, PEARSON by THOMAS L. FLOYD , R. P JAIN, PEARSON

3. DIGITAL INTEGRATED ELECTRONICS by H. TAUB AND D. SCHILLING, MCGRAW HILL EDUCATION

ECE279:BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY

L:0 T:0 P:2 Credits:1

Course Outcomes: Through this course students should be able to

CO1 :: Understand the fundamental behaviour and notations of DC and AC circuits.

CO2 :: Discuss the working principles and applications of transformer.

CO3 :: Illustrate functionality of the digital trainer kit to verify basic logic truth table.

CO4 :: Explore the performance of combinational circuits on digital trainer kit.

CO5 :: Evaluate the application of sequential circuit on digital trainer kit.

CO6 :: Analyze the digital circuits and compare its theoretical and actual performance.

List of Practicals / Experiments:

Kirchhoff voltage law and Kirchhoff current law

- Verification of Kirchhoff voltage law and Kirchhoff current law using hardware.

Turn ratio of a transformer

- To understand the principle of turn ratio of a transformer using hardware.

Distribution Board

- To learn the use of kit-kat fuse, MCB, energy meter, house wiring, and connections of switches.

Comparison of different lighting sources

- To compare the efficiency of incandescent lamps, fluorescent lamps, CFL, and LED-based light sources.
- Switching control of a single lamp by using 2-way switches.

Thevenin's and Norton's theorems

- Verification of Thevenin's and Norton's theorems in DC circuits using hardware.

Analysis and Synthesis of Boolean Expressions using Basic Logic Gates

- Understanding the combinational logic by implementing the boolean function using basic logic gates

Analysis and Synthesis of Arithmetic Expressions using Adders/Subtractors

- To design and analyze the circuit for Full adder and Full subtractor using Logic Gates.

Analysis and Synthesis of Logic Functions using Multiplexer.

- Understanding the combinational logic by implementing the boolean function using multiplexer

Analysis and Synthesis of Sequential Circuits using Flip-Flops

- Understanding the sequential logic by implementing the flip flop with the help of logic gates

Analysis of Functions of BCD-TO-7-segment Decoder / Driver and Operation of 7-segment LED Display

- To visualize the output of decade counter on seven segment display

Text Books:

1. FUNDAMENTALS OF ELECTRICAL ENGINEERING AND ELECTRONICS by B.L.THERAJA, S Chand Publishing

References:

1. DIGITAL DESIGN PRINCIPLES AND PRACTICES PEARSON by JOHN F. WAKERLY, PEARSON

2. DIGITAL INTEGRATED ELECTRONICS by H. TAUB AND D. SCHILLING, MC GRAW HILL

CSE101:COMPUTER PROGRAMMING

L:2 T:0 P:2 Credits:3

Course Outcomes: Through this course students should be able to

CO1 :: discuss the various approaches towards solving a particular problem using the C language constructs

CO2 :: write programs to solve different problems using C constructs irrespective of the compilers

CO3 :: plan the process of code reuse by forming a custom library of one's own functions

CO4 :: complete the understanding and usage of one of the building blocks of data structures namely pointers

CO5 :: categorize the theoretical knowledge and insights gained thus far to formulate working code

CO6 :: validate the underlying logic and formulate code which is capable of passing various test cases

Unit I

Basics and introduction to C : The C character set, Identifiers and keywords, Data types, Constants and variables, Expressions, Arithmetic operators, Unary, Relational, Logical, Assignment and conditional operators, Bitwise operators

Unit II

Control structures and Input/Output functions : If, If else, Switch case statements, While, For, Do-while loops, Break and continue statements, Goto,Return, Type conversion and type modifiers, Designing structured programs in C, Formatted and unformatted Input/Output functions like printf(), Scanf(), Puts(), Gets() etc

Unit III

User defined functions and Storage classes : Function prototypes, Function definition, Function call including passing arguments by value and passing arguments by reference, Math library functions, Recursive functions, Scope rules (local and global scope), Storage classes in C namely auto, Extern, Register, Static storage classes

Unit IV

Pointers in C : Pointer declaration and initialization, Pointer operators, Pointer expressions and arithmetic, Operations on pointers, Passing pointer to a function, Pointer and one dimensional array, Pointer to a group of one dimensional arrays, Array of pointers, types of pointers –dangling , wild, null, generic (void)

Arrays in C : Declaring and initializing arrays in C, Defining and processing 1D and 2D arrays, Array applications, Passing arrays to functions, inserting and deleting elements of an array, Searching including linear and binary search methods, Sorting of array using bubble sort

Unit V

Dynamic Memory Management : Dynamic Memory Management functions (malloc, calloc, realloc and free), Memory leak

File I/O : The FILE structure, Opening and closing files, Text and binary files, Reading, writing and appending files, Random access of files

Unit VI

Strings,Derived types including structures and unions : Defining and initializing strings, Reading and writing a string, Processing of string, Character arithmetic, String manipulation functions and library functions of string, Declaration of a structure, Definition and initialization of structures, Accessing structures, Structures and pointers, Nested structures, Declaration of a union

List of Practicals / Experiments:

List of Practicals / Experiments :

- Basics and introduction to C :•Programs to explore different data types and usage. •Programs for different type of operators and the usage.
- Control structures and Input/Output functions :•Programs on decision making constructs as if, if else and switch. •Programs on formatted and unformatted functions as printf(),scanf(),gets() and puts().

- User defined functions, Storage classes :•Program to explore different prototypes. •Program to differentiate between call by value, call by address. •Program to demonstrate storage classes as auto, register, extern, static.
- Arrays in C and pointers in C :•Program to demonstrate memory arrangement of 1D and 2D array. •Program to demonstrate operations on array as insertion, deletion, searching (linear, binary). •Program to demonstrate bubble sort•Program to demonstrate type of pointers. •Program to demonstrate pointer vs array name.
- Dynamic memory Management and File I/O:•Program to demonstrate dynamic memory management functions (malloc(),calloc(),realloc() and free(). •Program to create text and binary file with different modes.
- Strings, User defined types including structures and unions :•Program to demonstrate string operations. •Program to demonstrate structure and nested structures. •Program to differentiate between structure and union.

Text Books:

1. PROGRAMMING IN C by ASHOK N. KAMTHANE,, Pearson Education India

References:

1. PROGRAMMING IN ANSI C by E. BALAGURUSAMY, Tata McGraw Hill, India
2. C HOW TO PROGRAM by PAUL DEITEL AND HARVEY DEITEL, Pearson Education India

CSE121:ORIENTATION TO COMPUTING-II

L:1 T:0 P:0 Credits:1

Course Outcomes: Through this course students should be able to

CO1 :: understand the need for data science and big data along with its tools, job roles, and skill set

CO2 :: discuss the use of AI and machine learning in different fields along with its tools, job roles, and skill set

CO3 :: recognize the attacks, malware, tools, job roles, and skill set for cyber security

CO4 :: identify various DevOps and software testing tools, job roles, skill sets, and their applications in IT companies

CO5 :: analyze different types of cloud model implementations and services along with their tools, job roles, and skill set

CO6 :: describe the differentiation and usefulness of various front-end and back-end technologies along with their tools, job roles, and skill set

Unit I

Data Science & Big Data : Data science and its need, Applications of data science/Big data, Data science Lifecycle with use case, Big data and its 3Vs, Challenges of Big data, Skill needed for Big data, Tools usage like Apache Hadoop, Tableau, R language, Excel, Big Data on the Cloud, Use of Big Data in different areas, Job roles and skillset for Data science and Big data

Unit II

Artificial Intelligence & Machine Learning : Introduction to AI, ML and Deep Learning, Expert systems, Fuzzy systems, Augmented Reality, Use of AI in different fields - NLP, Healthcare, Agriculture, Social media monitoring, Tools and techniques for implementing AI, Google Translator, Driverless Car, ALEXA, Siri, ChatGPT, Current trends and opportunities, Job roles and skillset for AI and ML

Unit III

Introduction to Cyber Security : Introduction to cyber security, Information security concepts, Threats, Types of malware, Types of attacks, Use of cyber security in different industries like Healthcare, Manufacturing, E-commerce, Tools for cyber security assessment like nmap, wireshark, maltego, AI based cyber threat intelligence solutions, Cyber security opportunities in market and skillset

Unit IV

DevOps & Software Engineering : Introduction to DevOps, DevOps Vs Traditional Software Development Models, DevOps Tools : Git, Docker, Selenium, Mavin, Puppet, Ansible, Kubernetes, Nagios, Fundamentals of testing, Objectives of Testing, Types of Testing, Levels of testing, Applications of software testing in IT companies, Career opportunities in the field of DevOps and software testing with skillset

Unit V

Introduction to Cloud Computing : Introduction to cloud computing, Uses of cloud computing in applications services, Platform deployments, Types of cloud model implementations, Types of cloud services, Data analytics, Virtualization, Tools and techniques for implementing, Job roles and skillset for cloud computing

Unit VI

Introduction to Full Stack Web Development and UI/UX : Introduction to Web Development, User Interface Design, frontend, backend, databases, CRUD applications, Languages such as HTML, CSS, PHP, Java Scripts, and frameworks, Tools such as VS Code will be used as an editor for website development, Single page applications, responsive websites, mobile first development, Job roles and skillset for full stack and UI/UX

References:

1. BIG DATA by ANIL MAHESHWARI, MC GRAW HILL

2. PRINCIPLES OF SOFT COMPUTING by S.N. SIVANANDAM, S.N. DEEPA, WILEY

3. HTML, CSS, AND JAVASCRIPT ALL IN ONE, SAMS TEACH YOURSELF by JULIE C. MELONI, JENNIFER KYRNIN, PEARSON

References:

4. CLOUD COMPUTING: FUNDAMENTALS, INDUSTRY APPROACH AND TRENDS by RISHABH SHARMA, WILEY

CSE320:SOFTWARE ENGINEERING

L:3 T:0 P:0 Credits:3

Course Outcomes: Through this course students should be able to

CO1 :: recall various software development life cycle models and write software requirement specifications

CO2 :: construct software design from requirement specifications by following a structured and organized process

CO3 :: apply the constructs of unified modelling language for object modelling

CO4 :: analyze and explain fundamentals of testing, levels of testing and various types of testing techniques

CO5 :: assess project progress using project management techniques

CO6 :: examine various software quality standards and the current trends in the area of software engineering

Unit I

Introduction to software engineering : Evolution and impact of software engineering, Software life cycle models, Waterfall model, Prototyping model, Evolution and spiral models, Feasibility study, Functional and non-functional requirements, Requirement gathering, Requirement analysis and specification

Unit II

Issues in software design : Basic issues in software design, Modularity, Cohesion, Coupling and layering, Function oriented software design, Data flow diagram and structure chart

Unit III

Object modelling : User interface design, unified process, Object modelling using UML, use case model development, Coding standards and code review techniques

Unit IV

Testing : Fundamentals of testing, Black box testing techniques, White box testing techniques, Levels of testing, Test cases

Introduction to selenium : Feature of selenium, Versions of selenium, Record and play back

Unit V

Software project management : Project managment, Project planning and control, Cost estimation, Project scheduling using PERT and GANTT charts, Software configuration management

Unit VI

Quality management : Quality management, ISO and SEI CMMI, PSP and six sigma, Computer aided software engineering, Software maintenance, Software reuse, Component based software development

Advance techniques of software engineering : Agile development methodology, Scrum, Aspect oriented programming, Extreme Programming, Adaptive software development, Rapid application development (RAD), Software coloning

Text Books:

1. FUNDAMENTALS OF SOFTWARE ENGINEERING by RAJIB MALL, PRENTICE HALL

References:

1. SOFTWARE ENGINEERING by IAN SOMMERVILLE, PEARSON

2. SOFTWARE ENGINEERING:A PRACTITIONER APPROACH by ROGER S.PRESSMAN, MCGRAW HILL EDUCATION

3. SOFTWARE ENGINEERING FUNDAMENTALS by ALI BEHFOROOZ AND FREDERICKS J. HUDSON, OXFORD UNIVERSITY PRESS

INT306:DATABASE MANAGEMENT SYSTEMS

L:3 T:0 P:2 Credits:4

Course Outcomes: Through this course students should be able to

CO1 :: explain the Database components and logical design of databases

CO2 :: practice relational constructs like algebra, constraints and SQL

CO3 :: possess knowledge on the different issues involved in the design and implementation of relational database system

CO4 :: learn the transaction management systems in single and concurrent environment

CO5 :: practice programming constructs such as functions, stored procedures and triggers that can be shared by multiple forms

CO6 :: discuss file organization techniques, reports and data management applications

Unit I

Introduction to Databases : purpose of database systems, components of dbms, applications of dbms, three tier dbms architecture, data independence, database schema, instance, data modeling, entity relationship model, relational model

Unit II

Relational query language : relational algebra, introduction to data definition language, data manipulation, data control and transaction control language, integrity constraints, database keys, SQL basic operations, Aggregate functions, Sql joins, set operators, views, subqueries

Unit III

Relational Database Design : data integrity rules, functional dependency, need of normalization, first normal form, second normal form, third normal form, boyce codd normal form, multivalued dependencies, fourth normal form, join dependencies, fifth normal form and pitfalls in relational database design

Unit IV

Database Transaction Processing : transaction system concepts, desirable properties of transactions, schedules, serializability of schedules, concurrency control, recoverability

Unit V

Programming constructs in Database : flow control statements, functions, stored procedures, cursors, triggers, exception handling

Unit VI

File Organization and Trends in Databases : file organizations and its types, indexing, types of indexing, hashing, hashing techniques, introduction to big data, nosql systems

List of Practicals / Experiments:

SQL,PL/SQL

- Set Operations, Basic Structure, Aggregate functions, DDL, DML, DCL
- Views,Nested Queries, Joins, Complex Queries
- Language elements, Subprograms
- Packages, Cursors, Triggers

Data Manipulation

- Add New Rows to a Table
- Change the Data in a Table
- Use the DELETE and TRUNCATE Statements
- How to save and discard changes with the COMMIT and ROLLBACK statements
- Implement Read Consistency
- Describe the FOR UPDATE Clause

Retrieve Data using the SQL SELECT Statement

- List the capabilities of SQL SELECT statements
- Generate a report of data from the output of a basic SELECT statement
- Use arithmetic expressions and NULL values in the SELECT statement
- Invoke Column aliases
- Concatenation operator, literal character strings, alternative quote operator, and the DISTINCT keyword
- Display the table structure using the DESCRIBE command

Aggregated Data Using the Group Functions

- Usage of the aggregation functions in SELECT statements to produce meaningful reports
- Describe the AVG, SUM, MIN, and MAX function
- How to handle Null Values in a group function?
- Divide the data in groups by using the GROUP BY clause
- Exclude groups of date by using the HAVING clause

Usage of Subqueries to Solve Queries

- Use a Subquery to Solve a Problem
- Single-Row Subqueries
- Group Functions in a Subquery
- Multiple-Row Subqueries
- Use the ANY and ALL Operator in Multiple-Row Subqueries
- Use the EXISTS Operator

SET Operators

- Describe the SET operators
- Use a SET operator to combine multiple queries into a single query
- Describe the UNION, UNION ALL, INTERSECT, and MINUS Operators
- Matching the SELECT statements
- Use the ORDER BY Clause in Set Operations

Creating Views

- Create, modify, and retrieve data from a view
- Perform Data manipulation language (DML) operations on a view
- How to drop a view?

Manipulating Data by Using Subqueries

- Using Subqueries to Manipulate Data
- Inserting by Using a Subquery as a Target
- Using the WITH CHECK OPTION Keyword on DML Statements
- Using Correlated Subqueries to Update and Delete rows

Introduction to PL/SQL

- PL/SQL Overview
- List the benefits of PL/SQL Subprograms
- Overview of the Types of PL/SQL blocks
- Create a Simple Anonymous Block
- Generate the Output from a PL/SQL Block

PL/SQL Identifiers

- List the different Types of Identifiers in a PL/SQL subprogram
- Usage of the Declarative Section to Define Identifiers
- Use of variables to store data
- Scalar Data Types
- %TYPE Attribute
- Bind Variables
- Sequences in PL/SQL Expressions

Write Executable Statements

- Basic PL/SQL Block Syntax Guidelines
- How to comment code?
- SQL Functions in PL/SQL
- Data Type Conversion
- Nested Blocks
- Operators in PL/SQL

Explicit Cursors

- Understand Explicit Cursors
- Declare the Cursor
- How to open the Cursor?
- Fetching data from the Cursor
- How to close the Cursor?
- Cursor FOR loop
- Explicit Cursor Attributes
- FOR UPDATE Clause and WHERE CURRENT Clause

Exception Handling

- What are Exceptions?
- Handle Exceptions with PL/SQL
- Trap Predefined Oracle Server Errors
- Trap Non-Predefined Oracle Server Errors
- Trap User-Defined Exceptions
- Propagate Exceptions
- RAISE_APPLICATION_ERROR Procedure

Stored Procedures and Functions

- What are Stored Procedures and Functions?
- Differentiate between anonymous blocks and subprograms
- Create a Simple Procedure
- Create a Simple Procedure with IN parameter
- Create a Simple Function
- Execute a Simple Procedure
- Execute a Simple Function

Text Books:

1. DATABASE SYSTEM CONCEPTS by HENRY F. KORTH, ABRAHAM SILBERSCHATZ, S. SUDARSHAN, MCGRAW HILL EDUCATION

References:

1. THE PROGRAMMING LANGUAGE OF ORACLE by IVAN BYROSS, BPB PUBLICATIONS

2. DATABASE SYSTEMS: MODELS, LANGUAGES, DESIGN AND APPLICATION PROGRAMMING by RAMEZ ELMASRI, SHAMKANT B. NAVATHE, PEARSON

3. AN INTRODUCTION TO DATABASE SYSTEMS by C. J. DATE, S. SWAMYNATHAN, A. KANNAN, PEARSON

MEC135:BASICS OF MECHANICAL ENGINEERING

L:2 T:1 P:0 Credits:3

Course Outcomes: Through this course students should be able to

CO1 :: understand the fundamentals of engineering drawing including usages of drawing tools, line-types, dimensioning, letter-writing, scales and other conventions.

CO2 :: recognize and apply the conceptual framework of orthographic projections and acquire visualization and drawing skills on both grid-sheets and software.

CO3 :: understand the usages of sectioning and to draw sectioned views on both grid-sheets and software.

CO4 :: learn the procedures to draw the isometric views of few commonly used objects on both grid sheets and software.

CO5 :: explore the conceptual knowledge of digital fabrication using RPT and its fundamentals.

Unit I

Fundamentals of Engineering Drawing : Principles of engineering drawing and its importance, drawing instruments, line-types with applications, dimensioning, single stroke vertical Gothic letter writing, BIS norms

Unit II

Orthographic Projections : Introduction, principles, orthographic projections in first angle and third angle projections systems, practice, introduction to AutoCAD environment

Unit III

Sectional Views : Introduction, principle, importance, types- full section, offset section, half section, practice, 2D drawings on AutoCAD

Unit IV

Isometric Projections : Introduction, principles, terminology, isometric scale, isometric drawings and projections of stepped, inclined, oblique, and cylindrical blocks, isometric dimensioning, practice, 3D modelling on AutoCAD

Unit V

Introduction to Digital Fabrication : Need of digital manufacturing, prototype, types and roles of prototypes, rapid prototyping (RPT), phases of RPT, fundamentals of RPT, advantages, practice of 2D and 3D modelling on AutoCAD

Unit VI

Rapid Prototyping : Classification of RPT systems, process chain, 3D modelling, data conversion, checking-building- postprocessing, Stereolithography (STL)-process, principle, CAD for RPT, creation of STL file from 3D solid models

Text Books:

1. ENGINEERING DRAWING WITH AN INTRODUCTION TO AUTOCAD by DHANANJAY JOLHE, MC GRAW HILL

2. RAPID PROTOTYPING- PRINCIPLES AND APPLICATIONS by CHUA, C.K., LEONG, K.F., LIM, C.K., WORLD SCIENTIFIC

References:

1. ENGINEERING GRAPHICS FOR DEGREE by K.C. JOHN, PRENTICE HALL

2. ENGINEERING DRAWING by N. D. BHATT, CHAROTAR PUBLISHING HOUSE PVT. LTD.

3. MANUFACTURING ENGINEERING AND TECHNOLOGY by SEROPE KALPAKJIAN, ADDISON-WESLEY

MTH401:DISCRETE MATHEMATICS

L:3 T:0 P:0 Credits:3

Course Outcomes: Through this course students should be able to

CO1 :: understand several methods for proving or disproving particular logical propositions.

CO2 :: describe the recursive processes that can be used for solving counting problems.

CO3 :: apply the equivalence and partial order relation properties on graph.

CO4 :: interpret various graph theoretic concepts and familiarize with their applications.

CO5 :: learn about the chromatic number of a graph and the properties of tree graphs.

CO6 :: compute the solution of linear congruences using the Euclidean algorithm.

Unit I

Logic and Proofs : Propositional logic, propositional equivalences, quantifiers, Introduction to proof, direct proof,proof by contraposition, vacuous and trivial proof, proof strategy, proof by contradiction, proof of equivalence and counterexamples, mistakes in proof

Unit II

Recurrence relations : recurrence relation, modelling with recurrence relations, homogeneous linear recurrence relations with constant coefficients, Method of inverse operator to solve the non-homogeneous recurrence relation with constant coefficient, generating functions, solution of recurrence relation using generating functions

Unit III

Counting principles and relations : principle of Inclusion-Exclusion, Pigeonhole, generalized pigeonhole principle, relations and their properties, combining relation, composition, representing relation using matrices and graph, equivalence relations, partial and total ordering relations, lattice, sub lattice, Hasse diagram and its components

Unit IV

Graphs theory I : graph terminologies, special types of graphs(complete, cycle, regular, wheel, cube, bipartite and complete bipartite), representing graphs, adjacency and incidence matrix, graph-isomorphism, path and connectivity for undirected and digraphs, Dijkstra’s algorithm for shortest path problem

Unit V

Graphs theory II : planner graphs, Euler formula, colouring of a graph and chromatic number, tree graph and its properties, rooted tree, spanning and minimum spanning tree, decision tree, infix, prefix, and postfix notation

Unit VI

Number theory and its application in cryptography : divisibility and modular arithmetic, primes, greatest common divisors and least common multiples, Euclidean algorithm, Bezout's lemma, linear congruence, inverse of (a modulo m), Chinese remainder theorem, encryption and decryption by Ceasar cipher and affine transformation, Fermat’s little theorem

Text Books:

1. DISCRETE MATHEMATICS AND ITS APPLICATIONS by KENNETH H ROSEN, MCGRAW HILL EDUCATION

References:

1. HIGHER ENGINEERING MATHEMATICS by B. V. RAMANA, MC GRAW HILL

PEL130:ADVANCED COMMUNICATION SKILLS-I

L:1 T:0 P:3 Credits:3

Course Outcomes: Through this course students should be able to

CO1 :: recognize the grammatical elements for appropriate use

CO2 :: understand the usage of language for social and professional purposes.

CO3 :: use key grammatical concepts in written and oral discourse.

CO4 :: analyze and correct the place and order of different grammatical elements in verbal communication.

CO5 :: appraise and articulate with effective vocabulary and aesthetically pleasing language

CO6 :: express effectively by becoming more competent in English grammar, writing and speaking

Unit I

Parts of Speech : Different types of Nouns, Noun+Noun, Difference in Subjective and Objective Pronouns, Intensive Pronouns, Interrogative Pronouns, Adjectives ending in -ing,-ed, Difference in Adjectives and Adverbs, Word order, Adverbs with the Verb, Adverbial and Compound Conjunctions, Adjectives+Prepositions, Verb+ Prepositions.

Unit II

Articles, Determiners and Quantifiers : Rules of Using Articles and determiners, Names with and without Article The, Use of Quantifiers with countable and uncountable Nouns.

Unit III

Tenses : Compare and Contrast in use of Present and Past, Present Perfect and Past, Present Perfect continuous and Simple, Use of Have and Have got, will be doing and will have done, When I do and When I have done.

Unit IV

Sentences, clauses and Direct speech : Relative clauses with who, that, which, Relative clauses without who, that which. Relative clauses to add extra information,-ing and -ed clauses, Changes made in direct and Indirect speech in different types of Sentences like Imperative Sentences, Exclamatory sentences and Statement Sentences. Exceptions to Speech.

Unit V

Modals and Punctuation : Use of Modal Verbs to represent willingness, likelihood, certainty, habits, ability, Permission and Offers, Use of Period, Note of Interrogation, Note of Exclamation, Comma between Independent Clauses, Comma between Independent Clauses, Comma for Adding Nonessential Ideas and Nonrestrictive Clauses, Common mistakes made in Punctuation.

Unit VI

Vocabulary: phrasal verbs, confusing words : Phrasal Verbs with up, away and back, Difference between commonly confused words like:- Envy and Jealousy, Connotation and Denotation, Capital and Capitol, Complement and Compliment, Choose or Chose, Different Vocabulary words to replace very.

Unit VII **Practicals**

- **Practice worksheets on Grammar Topics**
  - Parts of Speech
  - Articles, determiners and Quantifiers
  - Tenses
  - Sentences, clauses and direct speech
  - Modal and Punctuation
  - Vocabulary

- **Listening skills:**
  - comprehension based on audio
  - Listening
  - making inferences and predictions about spoken discourse

- **Speaking Skills:**
  - Individual Presentation

- **Reading Skills:**
  - locating the main idea
  - understanding main points
  - finding supporting ideas, identifying purpose

- **Writing Skills:**
  - Fill-in the gaps on the basis of audio.

Text Books: ENGLISH GRAMMAR IN USE by RAYMOND MURPHY, CAMBRIDGE UNIVERSITY PRESS

References: ENGLISH GRAMMAR AND COMPOSITION by P. C. WREN and H. MARTIN, BLACKIE ELT BOOKS PUBLISHING.

PHY110:ENGINEERING PHYSICS

L:3 T:0 P:0 Credits:3

Course Outcomes: Through this course students should be able to

CO1 :: explore the basic principles of physics for the foundation for various engineering courses.

CO2 :: understand the principle and working of lasers and optical fibres for their wide applications.

CO3 :: illustrate the development of quantum mechanics and its applications.

CO4 :: articulate the physics of solids to understand their properties.

CO5 :: associate the knowledge of engineering materials with their applications.

Unit I

Electromagnetic theory : scalar and vectors fields, concept of gradient, divergence and curl, Gauss theorem and Stokes theorem (qualitative), Poisson and Laplace equations, continuity equation, Maxwell electromagnetic equations (differential and integral forms), physical significance of Maxwell equations, Ampere Circuital Law, Maxwell displacement current and correction in Ampere Circuital Law

Unit II

Lasers and applications : fundamentals of laser- energy levels in atoms, Radiation matter interaction, Absorption of light, spontaneous emission of light, stimulated emission of light, population of energy levels, Einstein A and B coefficients, metastable state, population inversion, resonant cavity, excitation mechanisms, Nd - YAG, He-Ne Laser, Semiconductor Laser, lasing action, properties of laser, applications of laser: holography

Unit III

Fiber optics : fiber optics introduction, optical fiber as a dielectric wave guide, total internal reflection, acceptance angle, numerical aperture, relative refractive index, V-number, step index and graded index fibers, losses associated with optical fibers

Unit IV

Quantum mechanics : need of quantum mechanics, photoelectric effect, concept of de Broglie matter waves, wavelength of matter waves in different forms, Heisenberg uncertainty principle, concept of phase velocity and group velocity (qualitative), wave function and its significance, Schrodinger time dependent and independent equation, particle in a box, tunneling effect (Qualitative idea)

Unit V

Solid state physics : free electron theory (Introduction), diffusion and drift current (qualitative), fermi energy, fermi-dirac distribution function, and theory of solids -formation of allowed and forbidden energy bands, concept of effective mass - electrons and holes, Hall effect (with derivation), semiconductors and insulators, fermi level for intrinsic and extrinsic semiconductors, direct and indirect band gap semiconductors, solar cell basics

Unit VI

Introduction to engineering materials : dielectric materials definition, dielectric constant, magnetic materials: dia, para, ferromagnetic materials, magnetic data storage, piezoelectric materials: direct and inverse piezoelectric methods, superconducting materials: properties, Meissner effect, Type I & Type II superconductors, applications

Text Books:

1. ENGINEERING PHYSICS by B K PANDEY, S. CHATURVEDI, CENGAGE LEARNING

References:

1. ENGINEERING PHYSICS by HITENDRA K MALIK, A K SINGH, Tata McGraw Hill, India

2. CONCEPT OF MODERN PHYSICS. by BESIER ARTHUR., MCGRAW HILL EDUCATION

3. FUNDAMENTAL OF PHYSICS by HALLIDAY D., RESNICK R., WALKER J., WILEY