# Scheme of Instruction

## Stream 1: EEE, ECE, CSE

### FIRST SEMESTER

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instruction Hours per Week</th>
<th>Course Type</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT01</td>
<td>Engineering Mathematics – I</td>
<td>3</td>
<td>Theory</td>
<td>4</td>
</tr>
<tr>
<td>CST01</td>
<td>Computer Programming</td>
<td>3</td>
<td>Theory</td>
<td>4</td>
</tr>
<tr>
<td>CET01</td>
<td>Environmental Studies</td>
<td>2</td>
<td>Theory</td>
<td>3</td>
</tr>
<tr>
<td>CET02</td>
<td>Basic Civil Engineering</td>
<td>3</td>
<td>Theory</td>
<td>3</td>
</tr>
<tr>
<td>MET02</td>
<td>Basic Mechanical Engineering</td>
<td>3</td>
<td>Theory</td>
<td>3</td>
</tr>
<tr>
<td>ENT01</td>
<td>English</td>
<td>3</td>
<td>Theory</td>
<td>3</td>
</tr>
<tr>
<td>CSP01</td>
<td>Computer Programming Lab</td>
<td>3</td>
<td>Theory</td>
<td>2</td>
</tr>
<tr>
<td>ENP01</td>
<td>English Communication Lab</td>
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<td>Theory</td>
<td>2</td>
</tr>
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</table>

Total: 17 Theory, 6 Tutorial, 6 Lab, 29 Total, 24 Credits

### SECOND SEMESTER

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instruction Hours per Week</th>
<th>Course Type</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT02</td>
<td>Engineering Mathematics – II</td>
<td>3</td>
<td>Theory</td>
<td>4</td>
</tr>
<tr>
<td>CST02</td>
<td>Data Structures</td>
<td>3</td>
<td>Theory</td>
<td>4</td>
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<tr>
<td>PHT01</td>
<td>Engineering Physics</td>
<td>3</td>
<td>Theory</td>
<td>3</td>
</tr>
<tr>
<td>CYT01</td>
<td>Engineering Chemistry</td>
<td>3</td>
<td>Theory</td>
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<tr>
<td>MET01</td>
<td>Engineering Graphics</td>
<td>2</td>
<td>Branch Subject</td>
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</tr>
<tr>
<td>CSP02</td>
<td>Data Structures Lab</td>
<td>3</td>
<td>Theory</td>
<td>2</td>
</tr>
<tr>
<td>MEP01</td>
<td>Workshop Practice</td>
<td>3</td>
<td>Theory</td>
<td>2</td>
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</tbody>
</table>

Total: 18 Theory, 4 Tutorial, 9 Lab, 31 Total, 26 Credits
### Scheme of Instruction

**Stream 2: CIVIL, MECHANICAL, CHEMICAL**

#### FIRST SEMESTER

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instruction Hours per Week</th>
<th>Course Type</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MAT01</td>
<td>Engineering Mathematics – I</td>
<td>3 2 5</td>
<td>Basic</td>
<td>4</td>
</tr>
<tr>
<td>CST01</td>
<td>Computer Programming</td>
<td>3 2 5</td>
<td>Basic</td>
<td>4</td>
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<tr>
<td>CET01</td>
<td>Environmental Studies</td>
<td>2 4</td>
<td>Basic</td>
<td>3</td>
</tr>
<tr>
<td>PHT01</td>
<td>Engineering Physics</td>
<td>3 3</td>
<td>Basic</td>
<td>3</td>
</tr>
<tr>
<td>CYT01</td>
<td>Engineering Chemistry</td>
<td>3 3</td>
<td>Basic</td>
<td>3</td>
</tr>
<tr>
<td>MET01</td>
<td>Engineering Graphics</td>
<td>2 5</td>
<td>Basic</td>
<td>4</td>
</tr>
<tr>
<td>CSP01</td>
<td>Computer Programming Lab</td>
<td>3 3</td>
<td>Basic</td>
<td>2</td>
</tr>
<tr>
<td>MEP01</td>
<td>Workshop Practice</td>
<td>3 3</td>
<td>Basic</td>
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</table>

| Total       | 16 6 9 31                              | 25                        |

#### SECOND SEMESTER

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<th>Course Type</th>
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<td>Engineering Mathematics – II</td>
<td>3 2 5</td>
<td>Basic</td>
<td>4</td>
</tr>
<tr>
<td>CST02</td>
<td>Data Structures</td>
<td>3 2 5</td>
<td>Basic</td>
<td>4</td>
</tr>
<tr>
<td>EET01</td>
<td>Basic Electrical Engineering</td>
<td>3 3</td>
<td>Basic</td>
<td>3</td>
</tr>
<tr>
<td>ECT01</td>
<td>Basic Electronics Engineering</td>
<td>3 3</td>
<td>Basic</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Branch Subject</td>
<td>4 4</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>ENT01</td>
<td>English</td>
<td>3 3</td>
<td>Basic</td>
<td>3</td>
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<td>Data Structures Lab</td>
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<td>Basic</td>
<td>2</td>
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<tr>
<td>ENP01</td>
<td>English Communication Lab</td>
<td>3 3</td>
<td>Basic</td>
<td>2</td>
</tr>
</tbody>
</table>

| Total       | 19 4 6 29                              | 25                        |
Course Objectives:

1. The emphasis is primarily on the development of analytical techniques.
2. To make students familiar with Differential Equations and its solutions.
3. To provide the basic knowledge in transformations and in particular Laplace transforms
4. Expansions of functions as a power series
5. Roll’s and Mean value theorems and maxima, minima
6. Curve tracing and Evaluation of Multiple Integrals

Syllabus

Unit – 1

Differential Equations: Linear differential equations of second and higher order with constant coefficients - particular integrals - homogeneous differential equations with variable coefficients - method of parameters - simulation equations.

Unit – 2


Unit – 3

Laplace Transforms II: Transforms of periodic functions - convolution theorem - applications to solution of ordinary differential equations.

Unit – 4

Calculus: Roll’s and Mean value theorems - Taylor’s and Maclaurins’s series - maxima and minima for functions of two variables - Infinite series - Convergence Tests series of positive terms - comparison, Ratio tests - Alternating series - Leibnitz’s rule - Absolute and conditional convergence.
Unit – 5

Multiple Integrals: Curve tracing (both Cartesian and polar coordinate) - Evaluations of double and Triple integrals - change of order of integrations - change of variables of integrations - simple applications to areas and volumes.

Text Books:


Course Outcomes:

1. Extends an ability to analyze differential equations and solve them
2. The students become familiar with the applications of differential equations to engineering problems.
3. In Mathematics, a transform is usually a device that converts one type into another type presumably easier to solve.
4. Use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients.
5. Solve an initial value problem for an n\textsuperscript{th} order ordinary differential equation using the Laplace transform.
6. Expand functions as power series using Maclaurin’s and Taylor’s series
7. The problems in OR, Computer science, Probability, statistics deals with functions of two or more variables. To optimize something means to maximize or minimize some aspects of it.
8. Curve tracing is an analytical method of drawing an approximate shape by the study of some of its important characteristics such as symmetry, tangents, regions etc it is useful in applications of finding length, area, volume.
9. Multiple integral is a natural extension of a definite integral to a function of two, three variables and are useful in evaluating area and volume of any region bounded by the given curves.
CST01 Computer Programming

Instruction Hours / Week : 5  
Credits: 4

Common to all branches and with effect from 2016-17

Prerequisites:

1. There are no prerequisites for this course, except that anyone who wants to learn C as well as should have analytical skills and logical reasoning.

Course Objectives:

1. This course starts from the basics of program development.
2. To understand the various steps in Program development
3. It covers various concepts of C and C++ programming languages
4. To learn how to write modular and readable C Programs
5. To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
6. To understand the notations used to analyze the Performance of algorithms.
7. It introduces searching and sorting algorithms
8. To understand and analyze various searching and sorting algorithms

Syllabus

UNIT – I


UNIT – II

Arrays and Strings – Concepts, arrays, one and two and multidimensional arrays. Strings Handling: String Input / Output functions, arrays of strings, string manipulation functions, data conversion, C and C++ Simple Programming examples

Designing Structured Programs- Functions- basics, functions, Scope, Storage classes- auto, register, static, extern, scope rules, type qualifiers, recursion, Preprocessor directives.
**Derived types** – Structures – Declaration, definition and initialization of Structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit fields, enumerated types. C and C++ Simple Programming examples

**UNIT – III**

**Pointers** – Introduction, Pointers for inter function communication, pointers to pointers, compatibility, memory allocation functions, array of pointers, pointers to void, pointers to functions, command –line arguments. C and C++ Simple Programming examples

**Data File Handling:** Input and Output – Concept of a file, streams, standard input / output Functions, formatted input / output functions, text files and binary files, file input / output operations, file status functions (Eq.error handling). C and C++ Simple Programming examples.

**Dynamic Memory Allocation:** Allocating a Block and Multiple Blocks, releasing the used space and altering memory size. C and C++ Simple Programming examples

**UNIT – IV**

**Basics of Object Oriented Programming (OOP) and C++:** Benefits of OOP, data types, declarations, expressions and operator precedence, scope of variables.

**Introduction to OOP and Concepts:** Abstraction, Data hiding, Encapsulation Classes and objects, Constructors & Destructors, Operator overloading & type conversions.

**Polymorphism:** Pointers, virtual functions and polymorphism- pointers to objects, this pointer, pointers to derived classes, virtual and pure virtual functions, C++ Simple Programming examples

**UNIT – V**

**Inheritance:** Derived classes, syntax of derived classes, making private members inheritable, single, multilevel, multiple, hierarchical, hybrid inheritance.

**Templates, Exception handling, console I/O and File I/O:** class templates, Function templates, member function templates, exception handling, managing console I/O operations, working with files. Programming guide lines and Simple C++ Programming examples

**TEXT BOOKS:**


**REFERENCES:**

5. C Programming & Data Structures, P. Dey, M Ghosh R Thereja,Oxford University Press
6. C & Data structures – E V Prasad and N B Venkateswarlu, S.Chand & Co

Course Outcomes:

1. Able to design the flowchart and algorithm for real world problems
2. Able to learn and understand new programming languages
3. Able to construct modular and readable programs
4. Able to write C and C++ programs for real world problems using simple and compound data types
5. Adapt programming experience and language knowledge to other programming language contexts
6. Good programming style, standards and practices during program development

At the end of the course, the student will be able to:

1. Develop C and C++ programs for computing and real life applications using basic elements like control statements, arrays, functions, pointers and strings; and data structures like stacks, queues and linked lists. Managing classes and Objects
2. Implement searching and sorting algorithms
Course Educational Objective (CEOs):

1. To Impart basic knowledge about the environment and its allied problems
2. To apply knowledge in Economic development without destroying the environment
3. To have knowledge on renewable energy and non renewable energy sources
4. To know about the bio diversity and its concepts

Syllabus

Unit I  Environmental Studies and Natural Resources
Definition, Scope and importance of Environment, Environmental studies, Need for public awareness
Components of Environment- Atmosphere, Hydrosphere, Lithosphere.
Renewable and Non Renewable Resources and associated problems
- Water resources: Use and over utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.
- Forest resources: Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- Land resources: Land as a resource, land degradation, Man induced landslides, soil erosion and desertification.
- Mineral resources: Use and over exploitation, Environmental effects of extracting and using mineral resources, case studies.
- Food resources: World food problems, changes caused agriculture and overgrazing, effects of modern agriculture, fertilizer – pesticide problems, water logging, salinity, Case studies.
- Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.
- Role of an individual in conservation of natural resources.
Unit II  Ecosystem and Biodiversity :

Ecosystem - Concept of an ecosystem.
1. Structure and functions of an ecosystem.
2. Producers, consumers and decomposers.
4. Ecological succession.
5. Food chains, food webs and ecological pyramids.
6. Introduction, types, characteristic features, structure and function of the following ecosystem.
   (a) Forest ecosystem. (b) Grassland ecosystem
   (c) Desert ecosystem. (d) Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and its conservation:
- Definition, genetic species and ecosystem diversity.
- Biogeographically 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-spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man – wildlife conflicts.
- Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

Unit III Environmental pollution and Global Effects.
- Definition, Causes, 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, earthquakes, cyclone, landslides, Tsunami.
- Climate change-Global warming, Acid rain, Ozone depletion.

Unit IV Environment Issues and Management

Unit V Social Issues and the Environment
- Urbanization, Industrialization, Development projects, Resettlement and
Rehabilitation of people – Problems concerned, Case studies.

- Role of information Technology in Environment and Human Health.

Text books:

Reference books:

Course Outcomes:

On successful completion of this course the students will be able to

1. Acquire knowledge in
   - Diverse components of environment and natural resources
   - Ecosystem and biodiversity & its conservation methods
   - Population growth and human health
   - Green technology
2. Identify and resolve the issues related to sources of different types of pollutions
3. Provide solutions to individuals, industries and government for sustainable development of natural resources
4. Apply environmental ethics in protection of diversified ecosystems.
Course Objectives:

1. To provide basic knowledge on different elements of civil engineering
2. To gain knowledge in various materials used for construction.
3. To become skilled at various aspects of surveying
4. To be familiar with the particulars of environmental concepts

Syllabus

UNIT I : CIVIL ENGINEERING MATERIALS

Introduction to materials – Timber, Cement, Steel, Bricks, Rocks & Stones, Tiles, Ceramics, glass, Paints, Varnishes and Distempers
Mixes: Mortars, Concrete

UNIT II: ELEMENTS OF BUILDING CONSTRUCTION

Types of buildings, Functional requirements of a building, principles of planning of a building, brick masonry, floors and floorings, Doors and windows, stairs, roofs, types of foundation, failure of foundations and remedial measures.

UNIT III: SURVEYING

Objective of Surveying, Types of surveying, classification of surveying, principles of surveying, measurement of distance, measurement of distance, measurement of angles, leveling, determination of Areas and volumes
Basic principles and applications of remote sensing, Global positioning systems (GPS), Geographical Information System (GIS)

UNIT IV: TRANSPORTATION ENGINEERING

Roads: Introduction, Road transport characteristics, Benefit of a good system of roads, classification of roads.
Bridges: Necessity of bridges, site investigation, components of a bridge, classification of bridges.

UNIT V: WATER RESOURCES & ENVIRONMENTAL ENGINEERING

Water resources- quality and quantity, water quality standards for drinking and construction-
Irrigation and types – crop seasons-Types of crops, reservoirs and types-rain water harvesting
TEXT BOOKS:


REFERENCE BOOK:

1. Gopi S, Basic Civil Engineering, Pearson Education, 2010

Course Outcomes:

On completion of the course, the students will be able to:

1. To find the suitability of various building materials at a particular location in the building construction.
2. Take accurate measurements, field booking, plotting and adjustment of errors can be understood
3. Analyze the status of water quality standards for drinking and construction
4. Classify the roads and bridges
Course Objectives:

1. To give overall picture of mechanical engineering from the point of view of basic concepts.
2. To learn about basic laws of thermodynamics.
3. To give insight into IC engines, steam engines, and steam turbines, gas turbines.
4. To make known the basic manufacturing processes and machine tools.
5. To learn about power transmission devices.

Syllabus

UNIT – I


UNIT – II


UNIT – III

UNIT – IV

Manufacturing Processes : Engineering Materials ; Classification , Properties of materials, Metal Casting, Moulding, Patterns, Hot working and Cold working , Extrusion, Forging, Rolling and Drawing.

Machine Tools and Machining Processes – Lathe Machines and Lathe operations, Milling machines, Types – Milling operations , Shaper, Planer, Drilling and Grinding machines. Welding – Gas welding, Arc Welding, Soldering and Brazing

UNIT – V


Basics of Automotive vehicle – Brakes – Types - Clutch and Differential.

Text Books:


Course Outcomes: At the end of the course, the student will be able to

1. Understand basics of thermodynamics and components of thermal plant
2. Identify engineering materials and their properties, manufacturing methods encountered in engineering practice.
3. Understand basics of heat transfer, refrigeration and internal combustion engines.
4. Understand mechanism of power transfer through belt, chain, rope and gear drives.
5. Understand functions and operations of machine tools including milling, grinding, and shaping machines.
Course Objectives:

1. To introduce students elements of grammar and composition of English language.
2. To familiarize students with literary texts such as short stories and prose passages.
3. To maintain linguistic competence through training in vocabulary, sentence structures and pronunciation.
4. To develop communication skills by cultivating the habit of reading comprehension passages.
5. To train the students to develop the language skills like listening, speaking, reading and writing.
6. To initiate them into use of self-instructed learner friendly modes of language learning through competence.

Syllabus

Unit-I  Effective Communication: Role and Importance of Communication, Features of Human Communication, Process of Communication, Interpersonal Communication, Barriers, Types- Verbal, Non-Verbal.

Unit-II  Grammar: Articles, prepositions, tenses, reported speech, idioms and phrases


Unit-IV  Soft Skills: Tem Work Skills, Interview Skills, Problem- Solving Skills Adoptability Skills, Presentation Skills and Group Discussions.

Unit- V  Stories from Delight and Wisdom (An Anthology of Short Stories)

1. The Gift of Magi By O. Henry
2. The Diamond Necklace by Guy De Maupassant
3. My Brother, My Brother by Norah Burke
4. The Open Window by Saki
5. The Child by Premchand

Text Books:

Reference Books:
1. David Green, Structure and Composition in English, Macmillan Publishers India Limited.

Course Outcomes:
1. Student will be able to get a thorough knowledge of various topics of grammar of English language.
2. Student will be trained in close reading of language and its relation to literary form.
3. Student will be able to read English correctly with focus on fluency and pronunciation.
4. Student will be able to understand the use of English through computer software.
5. Student will be in a position to face computer based competition exams like TOEFL.
6. They will get an ability to communicate effectively and to write accurately using English language.
4-Year B.Tech Degree Programme

CSP01 Computer Programming Lab

Instruction Hours / Week : 3  Credits: 2

Common to all branches and with effect from 2016-17

Course Objectives:

1. To work with the compound data types
2. To explore dynamic memory allocation concepts
3. Able to design the flowchart and algorithm for real world problems
4. Able to write C and C++ programs for real world problems using simple and compound data types
5. Employee good programming style, standards and practices during program development

Syllabus

1. C and C++ Programming Languages shall be used for Implementation of the following Programs.

2. The following List is not exhaustive, The instructor changes the problems and number of programs for continuous evaluation Teaching Learning Process

Week-1 1) Write a C program to make the following exchange between the variables a-> b -> c->d - > a
2) Write a C program to carry out the arithmetic operations addition, subtraction, multiplication, and division between two variables
3) Write a C program for printing prime numbers between 1 and n.

Week-2 1) Write a C program to construct a multiplication table for a given number.
2) Write a program to reverse the digit of a given integer.
3) Write a C program to find the sum of individual digits of a positive integer.
4) Write a C program to calculate the factorial of a given number

Week-3 1) Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
2) Write a program to calculate tax, given the following conditions:
   a) If income is less than 1, 50,000 then no tax.
   b) If taxable income is in the range 1,50,001 – 300,000 then charge 10% tax
   c) If taxable income is in the range 3,00,001 – 500,000 then charge 20% tax
   d) If taxable income is above 5,00,001 then charge 30% tax
Write a program to print the calendar for a month given the first Week-day of the month.

Input the first day of the month (Sun=0, Mon=1, Tue=2, Wed=3,.....) :: 3

Total number of days in the month : 31

Expected output

<table>
<thead>
<tr>
<th>Sun</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Sat</th>
</tr>
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<tbody>
<tr>
<td>-</td>
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<td>1</td>
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<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
</tr>
</tbody>
</table>

2) Write a C program to find the roots of a quadratic equation

Week-5

1) Write a program to print the Pascal triangle for a given number
2) Write a C program to find the GCD (greatest common divisor) of two given integers
3) Write a C program to construct a pyramid of numbers.
4) Write C code to define a function cash_dispense, which takes an amount as its input, and returns the number of 1000, 500, 100, 50, 20, 10, 5, 2, 1 rupee denomination that make up the given amount

Week-6

1) Write C code to reverse the contents of the array. For example, [1,2,3,4,5] should become [5,4,3,2,1]
2) Write a C program that uses functions to perform the following:
   i) Addition of Two Matrices
   ii) Multiplication of Two Matrices
3) Write a program that will search and find out the position where the given key element exist in a user chosen array and print it as output.

Week-7

1) Write C code to compute the frequency table of survey responses given by 20 users. The survey responses range from 1 to 5 and are stored in an array. For example, 10 responses are stored in the array [1,1,5,2,3,3,5,5,2,2]. The frequency table will be as shown below:
   a. 1 = 2
   b. 2 = 3
   c. 3 = 2
   d. 4 = 0
   e. 5 = 3
2) Write a program to define a function to sort an array of integers in ascending order by using exchange sort.

Week-8

1) Write a C program to check whether a given string is a palindrome or not, without using any built-in functions.
2) Write a C program to determine if the given string is a palindrome or not by using string functions.
3) Write a function that accepts a string and delete the first character.
4) Write a function that accepts a string and delete all the leading spaces.
Week-9
Write a program to accept a string from user and display number of vowels, consonants, digits and special characters present in each of the words of the given string.

Week-10
1) Write a C program to define a union and structure both having exactly the same numbers using the sizeof operators print the sizeof structure variables as well as union variable
2) Declare a structure time that has three fields hr, min, secs. Create two variables start_time and end_time. Input there values from the user. Then while start_time is not equal to end_time display GOOD DAY on screen.

Week-11
1) Write a program to read in an array of names and to sort them in alphabetical order. Use sort function that receives pointers to the functions strcmp, and swap, sort in turn should call these functions via the pointers.
2) Write a program to read and display values of an integer array. Allocate space dynamically for the array using the malloc().
3) Write a program to calculate area of a triangle using function that has the input parameters as pointers as sides of the triangle.

Week-12
1) Two text files are given with the names text1 and text2. These files have several lines of text. Write a program to merge (first line of text1 followed by first line of text2 and so on until both the files reach the end of the file) the lines of text1 and text2 and write the merged text to a new file text3.
2) Write a program to split a given text file into n parts. Name each part as the name of the original file followed by .part<n> where n is the sequence number of the part file.

Reference Books:
3. Programming with C RemaTheraja, Oxford
4. “C Test Your Skills”, Kamthane, Pearson Education
5. Programming in C: A Practical Approach, Ajay Mittal, Pearson
6. Problem solving with C, M.T.Somasekhara, PHI

Course Outcomes:
1. Able to have fundamental concept.
2. Able to write, compile and debug programs in C language.
3. Able to formulate problems and implement algorithms in C.
4. Able to effectively choose programming components that efficiently solve computing problems in real-world.
5. Able to use different data types in a computer program.
6. Able to design programs involving decision structures, loops and functions.
ENP01 English Communication Lab

Instruction Hours / Week : 3  Credits: 2

Common to all branches and with effect from 2016-17

Course Objectives:

1. To enable students to use language software.
2. To make them aware of western accents.

Syllabus

At least twenty exercises covering the topics: Stress, Introduction, Accent, Intonation, English vs Hinglish and Important Skills using Computer-Aided Packages.

Text Book:


Course Outcomes:

1. Students gain felicity in using language software.
2. They are exposed to different accents of the language.
Course Objectives:

1. Rank of a matrix, Eigen values, Eigen vectors- Cayley Hamilton theorem- Quadratic forms- diagonalization
2. Gradient of a scalar, Divergence, Curl of a vector and related properties- line, surface, volume integrals Green’s, Stokes’ and Gauss divergence theorems and its applications.
3. Fourier Series- Harmonic analysis
4. Gamma and Beta Functions
5. Bessel function and Legender Polynomials

Syllabus

Unit – 1


Unit – 2

Vector Calculus: Gradient, Divergence, Curl of a vector and related properties - line, surface, volume integrals - Green’s, Stokes’s and Gauss Divergence theorems and its applications.

Unit – 3

Fourier Series: Fourier series-even and odd functions, periodic functions-half range sine and cosine series-harmonic analysis.

Unit – 4

Special Functions I: Gamma and Beta functions-series solutions of differential equations-ordinary points.
Unit – 5

Special Functions II: Bessel function - recurrence formulae - generating function for $J_n(X)$-Lengender polynomials - recurrence formulae - generating function for $P_n(X)$ - Rodrigue’s formula - orthogonality of Lengender polynomials.

Text Books:


Course Outcomes:

1. Use ranks of matrices to decide whether the system of linear equations is consistent or not and hence solve.
2. Use Cayley-Hamilton theorem to find inverses or powers of matrices.
3. Use Eigen values and vectors to reduce Quadratic forms to normal form.
4. Ability to analyze motion problems from real lines to curves and surfaces in 3-D. Use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications.
5. To use Green’s theorem to evaluate line integrals along simple closed contours on the plane
6. To use Stokes’ theorem to give a physical interpretation of the curl of a vector field
7. To use the divergence theorem to give a physical interpretation of the divergence of a vector field.
8. Find the Fourier series representation of a function of one variable. It is representation of a function as a series of constants times sine and cosine functions of different frequencies in order to see periodic phenomenon have long fascinating mankind.
9. Evaluation of certain improper integrals is made simple with introduction of Gamma and Beta functions
10. Primary motivation for studying certain special functions is that they arise in solving certain ordinary differential equations that model many physical phenomenon. They constitute necessary items in the toolkit of anyone who wishes to understand the work with such models.
Course Objectives:

1. To develop skills to design and analyze linear and nonlinear data structures.
2. Develop algorithms for manipulating linked lists, stacks, queues, trees and graphs.
3. Develop recursive algorithms as they apply to trees and graphs.
4. To get acquaintance with frequently used data structures in Software Engineering and Programming practices.
5. To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
6. To develop a base for advanced computer science study.

Syllabus

UNIT I


UNIT II


Skip List and Hashing: Dictionaries, the ADT of Skip List, Linear List Representation, Hash Table Representation.

UNIT III

UNIT IV


UNIT V


Text Books:

REFERENCES:

1. Data Structures and Algorithms Using C++ by Ananda Rao Akepogu and Radhika Raju Palagiri
4. ADTs, Data Structures and Problem Solving with C++, Larry Nyhoff, Pearson
6. Data Structures through C++, Yashavant P.Kanetkar, BPB Publication
Course Outcomes:

After completion of the course the student will have:

1. A knowledge of various Methods and Notations for comparing the performance of various Data Structures.
2. A knowledge of development of linear data structures like stacks, Queues and their operations, Implementation using Arrays and Linked Lists.
3. A knowledge of properties of Binary Search Trees and balanced binary search trees.
4. A knowledge of properties of Splay Trees, Red Black Trees, AVL Trees and their implementation

A knowledge of efficient external searching techniques using Indexing, Hashing.
Course Objectives:

1. To make students aware of basic crystallographic geometry, defect studies and estimation of crystal structure by diffraction techniques.
2. To provide students with sound knowledge of basic principles of quantum Mechanics and its applications in problem solving.
3. To understand the concept of electrical conductivity by classical and quantum free electron theories and distinguishing materials based on band theory of solids.
4. Basic principles of laser optics and applications and ultrasonics.
5. Quantum confinement and size dependent properties of nanomaterials, their synthesis and applications.

Syllabus

UNIT-I


UNIT – II


UNIT – III

UNIT – IV


UNIT – V


Text Books:
2. S.P.Basava Raju “A Detailed Text Book of Engineering Physics” Sole Distributers, Subhash Stores Book Corner, Bangalore

Reference Books

Course Outcomes:
1. Students demonstrate appropriate competence and working knowledge of laws of modern physics in understanding advanced technical engineering courses.
2. Ability to understand the crystal geometries and estimation of crystal structure by X-ray diffraction techniques.
3. Students demonstrate the ability to identify and apply appropriate analytical and mathematical tools of physics in solving engineering problems.
4. Students demonstrate the ability to apply knowledge of band theory in the area of electronics and understanding the basic electron transportation phenomenon in micro devices.
5. Student’s ability to understand the principles in the production and applications of lasers and their effective utilization in optical communication and detection.
6. Students demonstrate the ability to understand size depended properties of nano dimensional materials and their effective utilization in making nano and micro devices for further microminiaturization of electronic devices.
Course Objectives:

1. To provide the information regarding hardness of water, effects of hard water in boilers and treatment methods to avoid bad effect on human health. And also to check the parameters of various water samples by experimental techniques.

2. To make students familiar with importance of electrochemical processes in nature and industry, like the coating of objects with metals or metal oxides through electro deposition, also to provide the information about new technological solar batteries.

3. To provide knowledge on the fuel properties to help in selecting good fuel for reducing the pollution based on its efficiency without much smoke and also to make aware of synthetic fuels.

4. To make aware of the design synthesis and analysis of polymers and their multi-faceted applications in Engineering, Airplane engineering and bio-medical engineering.

5. To make aware of compounding and processing of polymers and description of major polymers, structure property relations and application and to provide their relevance in the electric and electronic fields.

6. To provide the knowledge of manufacturing of cement and analysis of cement and also the classification and properties of refractories and ceramics.

Syllabus

UNIT-I:

UNIT –II:


UNIT –III:


UNIT –IV:


UNIT–V:

BUILDING MATERIALS: Manufacture-dry and wet processes-setting and hardening of cement-analysis of cement. Refractories-classification-properties and engineering applications. Ceramics-classification-properties and engineering applications

Books Recommended:
2. Engineering Chemistry : BK Sharma
3. Engineering Chemistry : SS Dhara
4. Physical Chemistry : Puri & Sharma-Vishal Pulishing Company(VPC), Jalandhar
5. Physical Chemistry : Bahl & Tuli-
6 Polymer Science- :Gowarikar-
7 Physical Chemistry by : Glasstone-

Course Outcomes:
1. To understand the importance of the water and its quality
2. To identify uses of electrochemical processes in nature and industry
3. To understand properties of good fuel for reducing auto exhaust gases to the environment
4. To understand synthesis, properties and engineering applications of polymers
5. To know the procedure and analysis of cementing materials
Course Objectives:

1. Students are to learn fundamentals of engineering graphics as it applied to basic engineering core course.
2. To provide the knowledge of construction of basic scales, conics, ellipse, parabola and hyperbola.
3. To impart knowledge about the construction of Cycloidal curves.
4. To understand the concepts of first angle and third angle projections of drawing.
5. To understand the concepts of projections of plane surfaces, solids, cylinders and cones.
6. To have thorough understanding of sections of solids and orthographic projections.

Syllabus

UNIT-I

Scales, plane scale, diagonal scale Practices
Conics- construction of Ellipse, parabola and Hyperbola by eccentricity method
Ellipse- Concentric circles and Oblong methods, Rectangular hyperbola

UNIT-II

Construction of cycloidal curves- epi cycloid and hypocycloid, Involutes- Circle, Polygon

UNIT-III

Projection of points-Principles of Projections, First and Third angle projections, projections of points
Projection of Lines- Projection of straight Lines, lines inclined to one plane and parallel to the other, Lines inclined to both planes, True length and true inclinations, Location of traces

UNIT-IV

Projection of Plane surfaces and solids-Projection of Polygonal surfaces and circular lamina inclined to both planes. Projection of right regular solids- Projection of simple solids such as Prisms, Pyramids, Cylinders and Cones with their axes perpendicular to anyone of the Principal planes and inclined to the other.
UNIT-V

Section of Solids- Sections of above solids in simple vertical position resting on their base, by cutting planes inclined to one reference plane and perpendicular to the other-True shape of the sections.
Orthographic Projections- Conversion of Pictorial views into orthographic views of simple objects.

Text Books:

2. Dhananjaya A Jolhe, Engineering Drawing with an introduction to Auto CAD, Tata McGrawhill - 2009

Course Outcomes: At the end of the course, the student will be able to

1. Make a distinction between first angle projection and third angle projection of drawing.
2. Draw hyperbola, parabola, Involutes and Cycloidal curves.
3. Draw sections of solids including cylinders, cones, prisms and pyramids.
4. Draw projections of lines, planes, solids and sections of solids.
5. Draw orthographic projections of lines, planes, and solids.
Course Objectives:

1. Arm the students with the basic programming concepts.
2. Arm the students with the necessary constructs of C++ programming.
3. Choose the appropriate data structure and algorithm design method for a specified application.
4. To Gain knowledge in practical applications of data structures.

Syllabus

1. Write a C++ Program to create a sequential file with at least 5 records, each record having the structure shown below:

<table>
<thead>
<tr>
<th>USN</th>
<th>Name</th>
<th>Marks1</th>
<th>Marks2</th>
<th>Marks3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-zero</td>
<td>25</td>
<td>Positive</td>
<td>Positive</td>
<td>Positive</td>
</tr>
<tr>
<td>positive</td>
<td>Characters</td>
<td>Integer</td>
<td>Integer</td>
<td>Integer</td>
</tr>
<tr>
<td>integer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Write necessary functions
a. To display all the records in the file.
b. To search for a specific record based on the USN. In case the record is not found, suitable message should be displayed. Both the options in this case must be demonstrated.

2. Write and demonstrate the following C++ functions:
   a. `newStrCpy` that does the same job as `strcpy`
   b. `newStrCat` that does the same job as `strcat` without using any library functions.

3. Write a C++ Program, which accepts the Internet Protocol (IP) address in decimal dot format (ex. 153.18.8.105) and converts it into 32-bit long integer (ex. 2568095849) using `strtok` library function and unions.

4. Write a C++ Program to construct a stack of integers and to perform the following operations on it:
   a. Push
   b. Pop
   c. Display
The program should print appropriate messages for stack overflow, stack underflow, and stack empty.

5. Write a C++ Program to convert and print a given valid parenthesized *infix* arithmetic expression to *postfix* expression. The expression consists of single character operands and the binary operators + (plus), - (minus), * (multiply) and / (divide).

6. Write a C++ Program to evaluate a valid *suffix/postfix* expression using stack. Assume that the suffix/postfix expression is read as a single line consisting of non-negative single digit operands and binary arithmetic operators. The arithmetic operators are + (add), - (subtract), * (multiply) and / (divide).

7. Write a C++ Program to simulate the working of a *queue of integers* using an array. Provide the following operations:
   a. Insert
   b. Delete
   c. Display

8. Write a C++ Program to simulate the working of a *circular queue of integers* using an array. Provide the following operations:
   a. Insert
   b. Delete
   c. Display

9. Write a C++ Program using dynamic variables and pointers, to construct a *singly linked list* consisting of the following information in each node: student id (integer), student name (character string) and semester (integer). The operations to be supported are:
   a. The insertion operation
      i. At the front of a list
      ii. At the back of the list
      iii. At any position in the list
   b. Deleting a node based on student id. If the specified node is not present in the list an error Message should be displayed. Both the options should be demonstrated.
   c. Searching a node based on student id and updates the information content. If the specified Node is not present in the list an error message should be displayed. Both situations should be displayed.
   d. Displaying all the nodes in the list.
      (Note: Only one set of operations among a, b and c with d may be asked in the examination)

10. Write a C++ Program using dynamic variables and pointers to construct a *stack of integers* using *singly linked list* and to perform the following operations:
    a. Push
    b. Pop
    c. Display
    The program should print appropriate messages for stack overflow and stack empty.

11. Write a C++ Program using dynamic variables and pointers to construct a *queue of integers* using *singly linked list* and to perform the following operations:
    a. Insert
    b. Delete
c. Display
The program should print appropriate messages for queue full and queue empty.

12. Write a C++ Program to support the following operations on a **doubly linked list** where each node consists of integers:
   a. Create a doubly linked list by adding each node at the front.
   b. Insert a new node to the left of the node whose key value is read as an input.
   c. Delete the node of a given data, if it is found, otherwise display appropriate message.
   d. Display the contents of the list.
   (Note: Only either (a, b and d) or (a, c and d) may be asked in the examination)

13. Write a C++ Program
   a. To construct a **binary search tree** of integers.
   b. To traverse the tree using all the methods i.e., **inorder, preorder and postorder**.
   c. To display the elements in the tree.

14. Write recursive C++ Programs for
   a. Searching an element on a given list of integers using the **Binary Search method**.
   b. Solving the **Towers of Hanoi problem**.

**Text Books:**

7. The Art, Philosophy, and Science of OOP with C++, RickMiller, SPD.
8. C++ for Programmers, P.J.Deitel and H.M.Deitel, PHI/Pearson

**Course Outcomes:**

1. Understand algorithmic thinking and apply it to programming.
2. Be able to design and analyze the time and space efficiency of the data structure.
3. Be capable to identity the appropriate data structure for given problem.
4. Have practical knowledge on the application of data structures.
Course Objectives:

1. To impart training to the students in different crafts of workshop.
2. To make known about the importance of Carpentry, Welding in our daily life.
3. To identify what are runners, risers in a foundry shop, and welding equipment used in Gas welding and Arc welding.
4. To identify different smithy tools used in tin smithy.

Syllabus

Carpentry
Wood sizing exercise in planning, marking, sawing, chiseling and grooving to prepare
   1. Half – lap joint
   2. Dove – tail joint
   3. Tenon joint

Fitting
Markings, cutting and filing to prepare
   1. Straight fitting
   2. V – fitting
   3. Square fitting

Tin smithy
Markings, bending and cutting to prepare
   1. Round tin
   2. Square tin

Foundry
Ramming and placing of riser and runner to prepare the moulds for the following
   1. Two – stepped pulley
   2. Three – stepped pulley
   3. Dumbell
Welding

Preparation of

1. Lap joint
2. Butt joint
3. T – joint

Course Outcomes: At the end of the course, the student will be able to

1. Prepare different types of joints by means of wood, i.e., wood working.
2. Prepare sand moulds by means of wooden patterns.
3. Identify different and prominent tools used in various sections of workshop.
5. Perform markings, cutting, and filing on steel specimens by fitting tools.
Instruction Hours / Week : 3  
Credits: 3

Common to Civil, Mechanical, Chemical branches and with effect from 2016-17

Course Objectives:

This course is design to

1. Apprise student about fundamentals of Electrical Circuits and Machines
2. Make the student learn operation of electrical machines and computation of performance

Syllabus

UNIT-I

**Basic Circuit Concepts:** Basic circuit elements R, L and C—Classification of circuit elements, voltage and current sources—Kirchoff’s laws—Star-delta and Delta to Star transformations, Network reduction techniques, Simple problems

UNIT-II

**DC Circuits:** DC Circuit analysis by mesh current method and Nodal voltage method, Superposition theorem, Thevenin’s theorem and maximum power transfer theorem—Application to simple DC circuits

UNIT-III

**AC Circuits:** Average value—RMS value—form factor, crest factor—j-notation, Phasor diagrams, reactance, impedance and admittance, active power, reactive power, apparent power, power triangle.—Expression for real power in ac circuit—Analysis of simple—series and parallel circuits

UNIT-IV

**DC Machines:** Principle of operation of dc generator, emf equation, types of generators, principle of operation of dc motor, Back EMF, torque equation of dc motor, Illustrative examples, applications dc motors
UNIT-V

Transformers: Single phase transformer – principle of operation—types of transformers—emf equation, transformer on load

Induction Motors: principle of operation of 3-phase induction motor, types of 3-phase induction motors Principle of single phase induction motor, types, applications of 3-phase and single phase induction motors

Illuminations: Introduction, Laws of Illumination, Lighting calculations, Design of lighting schemes

Text Books:

1. Network analysis by A Sudhakar, ShyamMohan (Tata McGrawHill)
2. Basic Electrical Engineering by DP Kothari, IH Nagrath (Tata McGrawHill)

References:

1. Electrical Technology – E. Hughes (University Press)
2. Electrical Circuits – Joseph Edminister (TMH Series)

Course Outcomes: Student will be able to

a. Understand and apply principles of basic electrical circuits
b. Analyse and apply theorems for different types of networks
c. Understand the principle of operation of DC machines, Transformers and Induction motors
d. Compute the performance of DC motor, Single phase Transformer
e. Carryout calculations related to design of illumination schemes
Course Objectives:

1. This course is to focus on the basics of Electronics and Communication to other non-circuit branch students.
2. To understand Electronic devices used in day-to-day instrument.
3. To have knowledge of amplifier working principles.
4. To understand the digital circuits principles.
5. To have knowledge of instruments in measurements.
6. To gain knowledge of communication principles.

Syllabus

UNIT-I

Electronics Devices: Introduction to electronics, review of p-n junction operation, diode applications, Zener diode as regulator, Transister – Biasing, characteristics, FET-Operation, Types of FETs, Photo Electronic Devices.

UNIT-II


UNIT-III

Digital Circuits: Number systems, Conversion of number systems, Logic gates, Boolean theorems, Demorgan theorems, combination logic circuits, Flip-Flops, Counters and Shift Registers, Data converters, ADC and DAC convertors

UNIT-IV

UNIT-V


Text Books:

2. A. Ananda Kumar, Switching theory and logic design, Prentice Hall of India Ltd.
3. Helfrick and cooper, Modern Electronic Instrumention and Measurement techniques, Pearson Education.
5. P. Ramakrishna, Analog Communication, Mcgraw Hill Co.

Course Outcomes:

1. Understands different types of Electronic Devices and working mechanism.
2. Have knowledge of amplifiers and oscillators used in day-to-day life.
3. Understands digital circuits used in computer systems and other systems.
4. Will have knowledge of measurements and measuring instruments.
5. Understands the principles of communication systems used in day-to-day life.