# COURSE STRUCTURE AND SYLLABUS
## I B.Tech CIVIL & MECH MLRS (R20) (w. e. f A.Y. 2020-21)

### I Year I Semester

| S. No. | Course Code | Course Name | Course Area | Periods per week | | | Credits | Scheme of Examination Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | Total |
| 1 | 2010001 | Engineering Mathematics-I | BS | 3 | 1 | 0 | 4 | 30 | 70 | 100 |
| 2 | 2010006 | Engineering Physics | BS | 3 | 1 | 0 | 4 | 30 | 70 | 100 |
| 3 | 2010501 | Programming for Problem Solving | ES | 3 | 1 | 0 | 4 | 30 | 70 | 100 |
| 4 | 2010071 | Engineering Physics Lab | BS | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 5 | 2010571 | Programming for Problem Solving Lab | ES | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 6 | 2010371 | Engineering Drawing Practice | ES | 1 | 0 | 4 | 3 | 30 | 70 | 100 |
| | | Induction Programme | - | - | - | - | - | - | - | - |
| **TOTAL** | | | | **10** | **3** | **10** | **18** | **180** | **420** | **600** |

**2010001 - ENGINEERING MATHEMATICS- I** **L T P C**
**3 1 0 4**

**B.Tech. I Year I Semester**

**Course Objectives: To learn**

- Types of matrices and their properties, Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form. Geometrical approach to the mean value theorems and their application to the mathematical problems.
- Partial differentiation, concept of total derivative, finding maxima and minima of function of two and three variables.
- The evaluation of Multiple integration and its applications

**Course Outcomes:**

After learning the contents of this paper the student must be able to

**CO.1**: Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations

**CO.2:** Find the Eigen values, Eigen vectors and reduce the quadratic form to canonical form using orthogonal transformations.

**CO.3:** Solve the applications on the mean value theorems.

**CO.4:** Find the extreme values of functions of two variables with/ without constraints.

**CO.5:** Evaluate the multiple integrals and apply the concept to find areas, volumes for cubes, sphere and rectangular parallelepiped

**UNIT-I: Matrices**

Matrices: Types of Matrices, Symmetric, Skew-symmetric, orthogonal matrices, rank of a matrix by Echelon form, Normal form, Inverse of Non-singular matrices by Gauss-Jordan method,System of linear equations, solving system of Homogeneous and Non-Homogeneous equations. Gauss elimination method, Gauss seidel iteration method.

**Learning outcomes:**

- Understand the matrix representation of a set of linear equations
- Explain the Normal form and Echelon form.
- Apply elementary operations to find the rank
- Analyse the solution of the system of Linear equations
- Evaluate the rank of the matrix.

**UNIT-II: Eigen values and Eigen vectors**

Eigen values and Eigenvectors and their properties: Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms up to three variables. Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

**Learning outcomes:**

- Understand how to find the eigen values and eigen vectors of a matrix.
- Explain the quadratic form to canonical form using orthogonal transformations.
- Apply Cayley Hamilton theorem to find inverse and powers of the matrix
- Analyse the nature of the quadratic form.
- Evaluate the powers of matrix.

**UNIT-III: Calculus of single variable.**

Mean value theorems: Rolle's Theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's and Maclaurin theorems with remainders (without proof). Beta and Gamma functions and their applications.

Learning outcomes:

- Understand the concept of mean value theorem.
- Explain the nature of functions by using mean value theorems.
- Apply Taylor's or Maclaurin's series to find the series expansion for the functions.
- Analyse the geometrical interpretation of mean value theorem.
- Evaluation of the slopes at any point on the curve

**UNIT-IV: Multivariable Calculus.**

Partial Differentiation, Euler's Theorem, Total derivative, Jacobian, Functional dependence, independence, Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

**Learning outcomes:**

- Understand the concept of partial differentiation.
- Explain the functional dependence using Jacobian.
- Apply Lagrange's method to find Maxima and minima.
- Analyse concept of Lagrange multipliers.
- Evaluate the maximum and minimum value of functions of two variables.

**UNIT-V: Multiple integrals& applications**:

Evaluation of Double integrals (Cartesian and polar coordinates), Change of order of integration (Cartesian form),Evaluation of Triple integrals, Change of variables (Cartesian to polar) for double and (cartesian to spherical and cylindrical polar coordinates) for triple integrals.

Applications: finding the area of a region using double integration and volume of a region using double and triple integration.

**Learning outcomes:**

- Understand the concept of double integrals.
- Explain the polar form of double integral and triple integral.
- Apply double integration techniques in evaluating areas bounded by region.
- Analyse the centre of mass of a Lamina.
- Evaluation of double integrals interns of volumes.

**TEXTBOOKS:**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.

**REFERENCES**:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.

## 2010007: ENGINEERING PHYSICS

**B.Tech. I Year I Semester.**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

**Course Objectives:**

1. The course aims at making students to understand the basic concepts of Principles of Physics in a broader sense with a view to lay foundation for the various engineering courses.
2. Students will be able to demonstrate competency and understanding of the concepts found in Mechanics, Harmonic Oscillations, Waves in one dimension, wave Optics, Lasers, Fiber Optics and a broad base of knowledge in physics.
3. The main purpose of this course is to equip engineering undergraduates with an understanding of the scientific method, so that they may use the training beneficially in their higher pursuits.
4. Today the need is to stress principles rather than specific procedures, to select areas of contemporary interest rather than of past interest, and to condition the student to the atmosphere of change he will encounter during his carrier.

**Course outcomes:** Upon graduation, the graduates will have:

1. The knowledge of Physics relevant to engineering is critical for converting ideas into technology.
2. An understanding of Physics also helps engineers understand the working and limitations of existing devices and techniques, which eventually leads to new innovations and improvements.
3. In the present course, the students can gain knowledge on the mechanism of physical bodies upon the action of forces on them, the generation and transmission of the waves.
4. Optical Phenomena like Interference, diffraction, the principles of lasers and Fibre Optics.
5. Various chapters establish a strong foundation on the different kinds of characters of several materials and pave a way for them to use in at various technical and engineering applications.

### UNIT-I: Introduction to Mechanics

Transformation of scalars and vectors under Rotation transformation, Forces in Nature, Newton’s laws and its completeness in describing particle motion, Form invariance of Newton’s second law, Solving Newton’s equations of motion in polar coordinates.

**Learning Outcomes:**

**Understand** the rotation transformation of vectors and scalars.

**Explain** the form invariance of Newton’s second law.

**Apply** Polar coordinates on Newton’s laws of motion.

**Analyze** the various forces in nature.

**Evaluate** the Newton's equations of motion in polar coordinates.

**UNIT-II: Harmonic Oscillations**

Mechanical and electrical simple harmonic oscillators, Complex number notation and phasor representation of simple harmonic motion, Damped harmonic oscillator: heavy, critical and light damping, Energy decay in a damped harmonic oscillator, Quality factor, Steady state motion of forced damped harmonic oscillator, Power observed by oscillator.

**Learning Outcomes:**

**Understand** the fundamental notation of Simple Harmonic Oscillations.

**Explain** about the Damped and Forced oscillators.

**Apply** knowledge of various damping conditions.

**Analyze** the difference between damped and forced oscillators.

**UNIT-III: Acoustics**

Introduction, basic requirements for the acoustically good halls, reverberation and time of reverberation, transmission of sound and transmission loss, factors affecting the architectural acoustics and their remedy, sound absorbing materials, sabine formulae, absorption coefficients, stadium seating, movie theater, acoustic quieting.

**Learning Outcomes:**

After the completion of this chapter, the student will be able to

**Identify** the requirements for acoustically good hall.

**Analyze** the various remedial methods to overcome factors affecting acoustically good hall.

**Gain** knowledge about sound absorbing materials.

**UNIT-IV: Interference and Diffraction**

Huygen's principle, Superposition of waves and interference of light by wave front splitting and amplitude splitting, Young's double slit experiment, Newton's rings, Michelson's interferometer, Frunhofer diffraction at a single slit, Diffraction grating- resolving power.

**Learning Outcomes:**

After the completion of this chapter, the student will be able to

C**lassify** the types of Interference.

**Outline** the working of Interferometer.

**Identify** the diffraction and conditions for maxima and minima.

**Gain** knowledge Grating and its Resolving power.

**UNIT-V: Lasers and Fibre Optics**

**Lasers:** Introduction to Lasers, Coherence, Population inversion, Pumping, Lasing action, Types of Lasers: Ruby laser, Carbon dioxide ($CO_2$) laser, He-Ne laser, Semiconductor laser; Applications of laser.

**Fibre Optics:** Introduction, Block diagram of fiber optic communication system, Total internal reflection, Acceptance angle and Numerical aperture, Step and Graded index fibres, Losses associated with optical fibres, Applications of optical fibres.

**Learning Outcomes:**

The students will be able to

**Study** about Laser and fiber optics for understanding an advanced communication systems.

**Explain** the working principle of laser and optical fibers.

**Classify** optical fibers based on refractive index profile and mode of propagation .

**Identify** the applications of optical fibers in medical, communication and other fields.

**Apply** the laser and fiber optic concepts in various fields.

**Text Books:**


1. Engineering Mechanics, 2nd ed.- MK Harbola, Cengage Learning
2. I. G. Main, "Vibrations and waves in physics', 3rd Edn, Cambridge University Press, 2018.
3. Ajoy Ghatak, " Optics", McGraw Hill Education, 2012


**References:**


1. H. J. Pain, "The physics of vibrations and waves", Wiley, 2006
2. O. Svelto, "Principles of Lasers"
3. "Introduction to Mechanics", M.K.Verma, Universities Press

## 2010501-PROGRAMMING FOR PROBLEM SOLVING

**B.Tech. I Year I Sem.** **L T P C**
**3 1 0 4**

**Course Objectives:**

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

**Course Outcomes:** The student will learn

- To write algorithms and to draw flowcharts for solving problems.
- To convert the algorithms/flowcharts to C programs.
- To code and test a given logic in C programming language.
- To decompose a problem into functions and to develop modular reusable code.
- To use arrays, pointers, strings and structures to write C programs.
- Searching and sorting problems.

**Unit - 1: Introduction to Programming**

Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, compilers, creating, compiling and executing a program etc., Number systems

Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured programming

Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code , Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command linearguments

Bitwise operations: Bitwise AND, OR, XOR and NOT operators

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do- while loops

I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout andstderr. Command line arguments

**Unit - II: Arrays, Strings, Structures and Pointers:**

Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays

Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings

Structures: Defining structures, initializing structures, unions, Array of structures

Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self referential structures in linked list (no implementation) Enumeration data type

**Unit - III: Preprocessor and File handling in C:**

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef

Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions.

**Unit - IV: Function and Dynamic Memory Allocation:**

Functions: Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions

Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types

**Unit - V: Introduction to Algorithms:**

Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number, etc.

Basic searching in an array of elements (linear and binary search techniques),

Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs

**Text Books:**


1. Byron Gottfried, Schaum's Outline of Programming with C,McGraw-Hill
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rdEdition)


**Reference Books:**


1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language,Prentice
2. Hall ofIndia
3. R.G. Dromey, How to solve it by Computer, Pearson (16thImpression)
4. Programming in C, Stephen G. Kochan, Fourth Edition, PearsonEducation.
5. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4thEdition

## 2010072 - ENGINEERING PHYSICS LAB

**B.Tech. I Year I Sem** **L T P C**

**0 0 3 1.5**

**List of Experiments:**

1. Melde's experiment:
   To determine the frequency of a vibrating bar or turning fork using Melde's arrangement.

2. Torsional pendulum:
   To determine the rigidity modulus of the material of the given wire using torsional pendulum.

3. Coupled Oscillator:
   To determine the spring constant by coupled oscillator.

4. Newton's rings:
   To determine the radius of curvature of the lens by forming Newton's rings.

5. Diffraction grating:
   To determine the number of lines per inch of the grating.

6. Dispersive power:
   To determine the dispersive power of a prism by using spectrometer.

7. LCR Circuit:
   To determine quality factor and resonant frequency of LCR circuit.

8. LASER:
   To study the V-I characteristics of LASER sources.

9. Optical fibre:
   To determine the bending losses of Optical fibres.

10. Optical fibre:
    To determine the Acceptance angle and Numerical aperture of a given fibre

**Note: Any 8 experiments are to be performed.**

## 2010571 - PROGRAMMING FOR PROBLEM SOLVING LAB

**B.Tech. I Year I Sem**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 1.5 |

*[Note: The programs may be executed using any available Open Source/ Freely available IDE Some of the Tools available are:*
*Code Lite: https://codelite.org/ Code::Blocks: http://www.codeblocks.org/*
*DevCpp :http://www.bloodshed.net/devcpp.html Eclipse: http://www.eclipse.org*
*This list is not exhaustive and is NOT in any order of preference]*

**Course Objectives:** The students will learn the following:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- To create, read from and write to text and binary files

**Course Outcomes:** The candidate is expected to be able to:

- Formulate the algorithms for simple problems
- Able to develop programs based on condition checking
- Implement pyramid programs
- Able to perform matrix applications
- Modularize the code with functions so that they can be reused
- Create, read and write to and from simple text and binary files

***Simple numeric problems:***

a. Write a program for the simple, compound interest.
b. Write a program for calculating area, perimeter of a rectangle, triangle and square.
c. Write a program for calculating area and perimeter of a circle.
d. Write a program to implement bit-wise operators.
e. Write a program for converting Fahrenheit to Celsius.
f. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input.
g. Write a simple program to find largest of two and three numbers using conditional operator.

h. Write a program for swapping two numbers with and without using third variable and using bitwise operators.

***Condition branching and statements:***

a. Write a program for finding largest of three numbers.
b. Write a program that declares Class awarded for a given percentage of marks, where marks<40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.
c. Write a C program to find the roots of a Quadratic equation.
d. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

***Condition branching and loops:***

a. Write a program to find whether the given number is a prime or not.
b. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
c. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, number=5 and no. of rows = 3, the output should be:

5 x 1 = 5
5 x 2 =10
5 x 3 =15

d. Write a program that shows the binary equivalent of a given positive number between 0 to255.
e. A 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.
f. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
g. Write a C program to calculate the following, where x is a fractional value.
$1-x/2+x^2/4-x^3/6$
h. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:$1+x+x^2+x^3+\ldots+x^n$. For example: if n=3 and x=5, then the program compute 1+5+25+125.
i. Write a C program to construct a pyramid of numbers as follows:

```
1          *          1          1          *
1 2        * *        2 3        2 2        * *
1 2 3      * * *      4 5 6      3 3 3      * * *
                                 4 4 4 4    * *
                                            *
```

j. Write a C program to find given number is Armstrong number or not.
k. Write a C program to find given number is Perfect number or not.

***Arrays, Strings, Pointers and Structures:***

a. Write a C program to find the minimum, maximum and average in an array of integers.

b. Write a program to compute Mean, Variance, Standard Deviation, Sorting of n elements in single dimension array.
c. Write a C program that perform the following:
    i. Addition of Two Matrices
    ii. Multiplication of Two Matrices
    iii. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be same.
d. Write a C program that sorts a given array of names.
e. Write a C program that perform the following operations:
    i. To insert a sub-string in to a given main string from a given position.
    ii. To delete n Characters from a given position in a given string.
f. Write a program for reading elements using pointer into array and display the values using array.
g. Write a program for display values reverse order from array using pointer.
h. Write a program through pointer variable to sum of n elements from array.
i. Write a program to implement student information by using structure to function.
j. Write a program to sort student id or name using structures.

***Functions:***

a. Write a C program to find factorial of a given number using functions.
b. Write a C program to perform swapping using functions.
c. Write a C program to find LCM, GCD of two numbers using functions.
d. Write a C program to implement sorting using functions.
e. Write a C program to create and print two dimensional array using functions.
f. Write a C program to find factorial of a given number using recursion.
g. Write a C program to find Fibonacci series using recursion
h. Write a C program to implement Towers of Hanoi problem using recursion.

***Files:***

a. Write a C program to display the contents of a file to standard output device.
b. Write a C program which copies one file to another, replacing all lowercase characters with their upper case equivalents.
c. Write a C program to count the occurrence of a character in a text file. The file name and the character are supplied as command line arguments.
d. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

***Reference Books***


1. Byron Gottfried, Schaum's Outline of Programming with C,McGraw-Hill
2. Let us C byYashavantKanetkar BPB publications (16th Edition)
3. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rdEdition)
4. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
5. R.G. Dromey, How to solve it by Computer, Pearson (16thImpression)
6. Programming in C, Stephen G. Kochan, Fourth Edition, and Pearson Education.
7. Herbert Schildt, C: The Complete Reference, McGrawHill, 4thEdition.

## 2010371 - ENGINEERING DRAWING PRACTICE

| **B.Tech. I Year I Sem** | **L** | **T** | **P** | **C** |
|---|---|---|---|---|
| | **1** | **0** | **4** | **3** |

**Pre Requisites:** Knowledge in dimensions and units, Usage of geometrical instruments and analytical ability

**Course Objective:**

1. The course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation.
2. To prepare the student to use the techniques, skills, and modern engineering tools necessary for engineering practice.
3. To get exposure to a CAD package.

**Course Outcomes:**

1. Familiarize with BIS standards and conventions used in engineering graphics.
2. Draw various engineering curves e.g., ellipse, parabola, cycloids and involutes etc and construct various reduced scales e.g., plain and diagonal scale.
3. Develop the lateral surfaces of simple solids
4. Ability to draw orthographic projections and isometric projections of given engineering components.
5. Visualize different views like elevation and plan for a given line, plane figures or solid objects.
6. Apply drafting techniques and use 2D software e.g., AutoCAD to sketch 2D plane figures.

**UNIT – 1 INTRODUCTION TO ENGINEERING DRAWING**

Principles of Engineering Graphics and their Significance-Drawing Instruments and their Uses-Conventions in Drawing-BIS -Lettering and Dimensioning.

**Geometrical Constructions**: Bisecting a Line, Arc. Dividing A Line into 'N' Equal Parts, Construction of Polygons, Division of Circle into Equal Parts (8 And 12)

**Construction of Scales:** Plain, Diagonal and Vernier Scale.

**Conic Sections:** Ellipse, Parabola, Hyperbola and Rectangular Hyperbola- General Methods only.

**Engineering Curves:** Cycloid, Epicycloid, Hypocycloid

**Involutes:** For Circle, Triangle, Square, Pentagon and Hexagon.

**Learning Outcome:**

1. To understand the basic standards, conventions of engineering drawing and how to use the instruments in drawing.
2. Learn and draw the various types of curves used in engineering application.

**UNIT – 2 ORTHOGRAPHIC PROJECTIONS**

Principles- Assumptions- Different Angles of Projection.

**Projections of Points-** orientation in all the quadrants

**Projections of Lines-** Parallel, Perpendicular, Inclined to one plane and Inclined to both planes.

**Projections of Planes:** Surface Parallel, Perpendicular, Inclined to one plane and Inclined to both planes.

**Learning Outcome:**

1. Knowledge in various planes of projections
2. To draw the front view, top view and side views of the given geometrical elements

**UNIT – 3 PROJECTIONS OF SOLIDS**

Classification of solids- Axis- Parallel, Perpendicular, Inclined to one plane and Inclined to both planes- Prisms, Pyramids, Cylinder and Cone

**Learning Outcome:**

1. To understand the various solid types
2. To draw all the views of the given solid in all possible orientations.

**UNIT – 4 SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES**

Types of Section Planes, Sectioning Prisms, Pyramids, Cylinders and Cones using various planes. Development of surfaces of right Regular Solids- Parallel Line Method, Radial Line Method.

**Learning Outcome:**

1. To identify the cut surfaces and represent the sectional views graphically when the solid is sectioned.
2. To develop the surfaces of solid using various methods.

**UNIT – 5 ISOMETRIC PROJECTIONS AND PERSPECTIVE PROJECTIONS**

Principles, Isometric Views of Planes, Solids- Box Method, Offset Method, Compound solids, Sectioned Solids. Conversion of Isometric to Multi view projection and vice versa.

**Learning Outcome:**

1. Knowledge in principles of isometric projection
2. Conversion of isometric to orthographic and vice-versa.

**Text Books:**

1. N.D.Bhatt, Elementary Engineering Drawing, Charotar Publishers,2012.
2. Basanth Agrawal and C M Agrawal –Engineering Drawing 2e –,McGraw-Hill Education(India) Pvt.Ltd.

**References:**

1. Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishers
2. Engineering Drawing- Johle/Tata Macgraw Hill.
3. K.Veenugopal, –Engineering Drawing and Graphics + Autocad New Age International Pvt.Ltd, 2011.