MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

MLRS
EMPOWERING THROUGH INNOVATIONS

COURSE STRUCTURE AND SYLLABUS
B.Tech Civil & Mechanical 1st Year (R20) (w. e. f A.Y. 2020-21)

I Year I Semester

Code	Course	Category	Periods per Week			Credits
			L	T	P	
2010001	ENGINEERING MATHEMATICS - I	BS	3	1	0	4
2010007	ENGINEERING PHYSICS	BS	3	1	0	4
2010501	PROGRAMMING FOR PROBLEM SOLVING	ES	3	1	0	4
2010072	ENGINEERING PHYSICS LAB	BS	0	0	3	1.5
2010571	PROGRAMMING FOR PROBLEM SOLVING LAB	ES	0	0	3	1.5
2010371	ENGINEERING DRAWING PRACTICE	ES	1	0	4	3
TOTAL			10	3	10	18

I Year II Semester

Code	Course	Category	Periods per Week			Credits
			L	T	P	
2020002	ENGINEERING MATHEMATICS - II	BS	3	1	0	4
2020008	ENGINEERING CHEMISTRY	BS	3	1	0	4
2020302	ENGINEERING MECHANICS	ES	3	1	0	4
2020009	COMMUNICATIVE ENGLISH	HS	2	0	0	2
2020073	ENGINEERING CHEMISTRY LAB	BS	0	0	3	1.5
2020074	COMMUNICATIVE ENGLISH LAB	HS	0	0	2	1
2020372	ENGINEERING WORKSHOP	ES	1	0	3	2.5
2020021	ENVIRONMENTAL SCIENCE	MC	3	0	0	0
TOTAL			15	3	8	19

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

Classify 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:

$$5 \times 1 = 5$$
$$5 \times 2 = 10$$
$$5 \times 3 = 15$$

  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.

2020002 – ENGINEERING MATHEMATICS - II

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

Course Objectives: To learn
- Methods of solving the differential equations of first and higher order.
- Evaluation of multiple integrals and their applications
- The physical quantities involved in engineering field related to vector valued functions
- The basic properties of vector valued functions and their applications to line, surface and volume integrals

Course Outcomes: After learning the contents of this paper the student must be able to
- Identify whether the given differential equation of first order is exact or not
- Solve higher differential equation and apply the concept of differential equation to real world problems
- Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelopiped
- Evaluate the line, surface and volume integrals and converting them from one to another

UNIT-I: First Order ODE
Exact, linear and Bernoulli's equations; Applications : Newton's law of cooling, Law of natural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT-II: Ordinary Differential Equations of Higher Order
Second order linear differential equations with constant coefficients: Non-Homogeneous termsof the type e^{aa},$\sin aaaa$,$\cos aaaa$, polynomialsin aa, $e^{aaaa}VV(aa)$ and $aaVV(aa)$; method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Eulerequation.

UNIT-III: Multivariable Calculus (Integration)
Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only 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: Areas (by double integrals) and volumes (by double integrals and triple integrals), Centre of mass and Gravity (constant and variable densities) by double and triple integrals (applications involving cubes, sphere and rectangular parallelopiped).

UNIT-IV: Vector Differentiation
Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotationalvectors.

UNIT-V: Vector Integration

Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition,2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint,2002.

References:

1. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India,1984.

2020008 - ENGINEERING CHEMISTRY

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

Course Objectives:
- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
- To acquire the knowledge of electrochemistry, corrosion and water treatment which are essential for the Engineers and in industry.
- To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.
- To impart the knowledge of stereochemistry and synthetic aspects useful for understanding reaction pathways

Course Outcomes: The basic concepts included in this course will help the student to gain:
- The knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
- The required principles and concepts of electrochemistry, corrosion and in understanding the problem of water and its treatments.
- The required skills to get clear concepts on basic spectroscopy and application to medical and other fields.
- The knowledge of configurational and conformational analysis of molecules and reaction mechanisms.

Unit - I:
Molecular structure and Theories of Bonding: Atomic and Molecular orbitals. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2, O_2 and F_2 molecules. π molecular orbitals of butadiene and benzene. Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbitals in Tetrahedral, Octahedral and square planar geometries. Band structure of solids and effect of doping on conductance.

Unit - II:
Water and its treatment: Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization. Boiler feed water and its treatment – Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange process. Desalination of water – Reverse osmosis. Numericalproblems.

Unit - III:

Electrochemistry and corrosion: Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation Determination of pH of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Numerical problems. Potentiometric titrations. Batteries – Primary (Lithium cell) and secondary batteries (Lead – acid storage battery and Lithium ion battery).

Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection
– Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application. Electroless plating of Nickel.

Unit - IV:

Stereochemistry, Reaction Mechanism and synthesis of drug molecules: Introduction to representation of 3-dimensional structures, Structural and stereoisomers, configurations, symmetry and chirality. Enantiomers, diastereomers, optical activity and Absolute configuration. Conformation alanalysis of n- butane.

Substitution reactions: Nucleophilic substitution reactions: Mechanism of S_N1, S_N2 reactions. Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownikoff and anti Markownikoff's additions. Grignard additions on carbonyl compounds. Elimination reactions: Dehydro halogenation of alkylhalides. Saytzeff rule. Oxidation reactions: Oxidation of alcohols using $KMnO_4$ and chromicacid.

Reduction reactions: reduction of carbonyl compounds using $LiAlH_4$ & $NaBH_4$. Hydroboration of olefins. Structure, synthesis and pharmaceutical applications of Paracetamol andAspirin.

Unit - V:

Spectroscopic techniques and applications: Principles of spectroscopy, selection rules and applications of electronic spectroscopy. vibrational and rotational spectroscopy. Basic concepts of Nuclear magnetic resonance Spectroscopy, chemical shift. Introduction to Magnetic resonance imaging.

Suggested Text Books:
1. Physical Chemistry, by P.W.Atkins
2. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., NewDelhi.
3. Fundamentals of Molecular Spectroscopy, by C.N.Banwell
4. Organic Chemistry: Structure and Function by K.P.C. Volhardt and N.E.Schore, 5th Edition.
5. University Chemistry, by B.M. Mahan, Pearson IVEdition.
6. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan

2020302 - ENGINEERING MECHANICS

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

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Prerequisites: Intermediate Mathematics and Physics.

Course Objectives:

1. To solve the resultant of any force system.

2. To analyze the types of frication for moving bodies and problems related to friction.

3. To determine the centroid of an area and center of gravity of body.

4. To understand the concept of area moment and mass moment about any axes.

5. Understand the work-energy principle

Course Outcomes: After completion of the course the student is able to

1. Determine the resultant of coplanar concurrent and special force systems and analyse the bodies for equilibrium to find the unknown forces.(L_1)

2. Analyze the bodies on rough horizontal and inclined planes and connected Bodies (L_4)

3. Determine the centroid of composite areas, centre of gravity of composite bodies (L_3)

4. Determine the moment of inertia of simple areas and mass moment of inertia of simple bodies.(L_3).

5. Apply work-energy principle to solve the rigid body problems.(L_3).

6. Appraise the influences of a human factor considerations on engineering design (L_6)

UNIT - I

Introduction to Mechanics: Basic Concepts, system of Forces Coplanar Concurrent Forces - Components in Space -Resultant -Moment of Forces and its Application - Couples and Resultant of Force Systems. Equilibrium of system of Forces: Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems.

Learning Outcomes:

1. Determine the resultant of coplanar concurrent and special force systems and analyse the bodies for equilibrium to find the unknown forces.(L_1)

UNIT - II

Friction: Types of friction -Limiting friction -Laws of Friction -static and Dynamic Frictions – Types of friction – Dry friction – Ladder friction – Wedge friction – Screw friction – Simple Screw Jack

Learning Outcomes:

1. Analyze the bodies on rough horizontal and inclined planes and connected Bodies (L_4)

UNIT - III

Centroid and Center of Gravity: Introduction – Centroids of lines – Centroids of area - Centroids of Composite figures - Theorem of Pappus -Centre of Gravity - Center of gravity of composite bodies.

Learning Outcomes:

1. Determine the centroid of composite areas, centre of gravity of composite bodies (L_3)

UNIT - IV

Area moments of Inertia: Introduction – Definition of Moment of Inertia -Polar Moment of Inertia – Radius of gyration - Transfer Theorem for moment of inertia – Moments of inertia by integration - Moments of Inertia of Composite Figures.

Mass Moment of Inertia: Introduction - Moment of Inertia of Masses – Radius of gyration - Transfer Formula for Mass Moments of Inertia – Mass moments of inertia by integration - Mass moment of inertia of composite bodies – Product of Inertia.

Learning Outcomes:

1. Determine the moment of inertia of simple areas and mass moment of inertia of simple bodies.(L_3)

UNIT - V

Kinetics of Rigid Bodies: Types of motion, D'Alemberts principle and its applications in plane motion and connected bodies; Work energy principle and its application in plane motion of connected bodies; kinetic of rigid body rotation.

Learning Outcomes:

1. Understanding basic laws and principles of kinetics of particle and rigid body. (L_2)

2. Apply work-energy principle to solve the rigid body problems.(L_3)

Text Books:
1. Singer's Engineering Mechanics Statics and Dynamics/ K. Vijaya Kumar Reddy and J.Suresh Kumar/ BSP

2. Engineering Mechanics/ Irving Shames, G.Krishna Mohan Rao / Prentice Hall.

References:
1. Engineering Mechanics/ Bhattaharyya/ Oxford.

2. Tayal A.K.(2010), Engineering Mechanics. Umesh Publications.

3. Engg. Mechanics by S.S. Bhavikati & K.G. Rajasekharappa

2020372 - ENGINEERING WORKSHOP

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

Prerequisites: **1   0   3 2.5**

Course Objectives:

1. To Study of different hand operated power tools, uses and their demonstration.

2. To gain a good basic working knowledge required for the production of various engineering products.

3. To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.

4. To develop a right attitude, team working, precision and safety at work place.

5. It explains the construction, function, use and application of different working tools, Equipment and machines

Course Outcomes:

1. Explain the design and model different prototypes in the carpentry trade such as Cross lap joint, Dove tail joint. (L4)

2. Demonstrate the design and model various basic prototypes in the trade of fitting such as Straight fit, V- fit. (L4)

3. Understand to make various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder. (L4)

4. Demonstrate the design and model various basic prototypes in the trade of Welding. (L4)

5. Explain to make various basic prototypes in the trade of Black smithy such as J shape, and S shape. (L4)

6. Understand to perform various basic House Wiring techniques such as connecting one lamp with one switch, connecting two lamps with one switch, connecting a fluorescent tube, Series wiring, Go down wiring. (L4)

UNIT I - CARPENTRY & FITTING

Carpentry – Introduction, Carpentry tools, sequence of operations and applications (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)

Fitting – Introduction, fitting tools, sequence of operations and applications (V-Fit, Dovetail Fit & Semi-circular fit)

Learning Outcomes:

Students should be able to,

1. Understand the trade of carpentry and fitting. (L2)

2. Explain the tools involved in manufacturing operations. (L3)

3. Evaluate the applications of carpentry and fitting. (L4)

UNIT II - TIN SMITHY AND BLACKSMITHY

Tin-Smithy – Introduction, Tin smithy tools, sequence of operations and applications (Square Tin, Rectangular Tray & Conical Funnel).

Blacksmithy- Introduction, Blacksmithy tools, sequence of operations and applications (Round to Square, Fan Hook and S-Hook)

Learning Outcomes:

Students should be able to,

1. Understand the oldest manufacturing methods. (L2)

2. Describe the sequence of operations involved. (L3)

3. Explain the safety precautions and tools usage. (L4)

UNIT III - HOUSE WIRING AND WELDING

House-wiring – Introduction, Electrical wiring tools, sequence of operations and applications (Parallel & Series, Two-way Switch and Tube Light)

Welding Practice – Introduction, electrode, welding tools, and sequence of operations. Advantages and applications (Arc Welding & Gas Welding)

Learning Outcomes:

Students should be able to,

1. Discuss the topic of Heat engines.(L3)

2. Identify types of Heat engines cycles.(L5)

3. Evaluate the Factors affecting routing procedure, Route Sheet.(L4)

Text Books:

1. Workshop Practice /B. L. Juneja / Cengage

2. Workshop Manual / K. Venugopal / Anuradha.

References:

1. Work shop Manual – P. Kannaiah/ K. L. Narayana/ SciTech

2. Workshop Manual / Venkat Reddy/ BSP

2020009 – COMMUNICATIVE ENGLISH

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

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.*

Learning Objectives: The course will help to
a. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
b. Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
c. Develop study skills and communication skills in formal and informal situations.

Course Outcomes: Students should be able to

1. Use English Language effectively in spoken and written forms.

2. Comprehend the given texts and respond appropriately.

3. Communicate confidently in various contexts and different cultures.

4. Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

SYLLABUS UNIT –I
'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes.
Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.
Reading: Reading and Its Importance- Techniques for Effective Reading.

Basic Writing Skills: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for writing precisely – **Paragraph writing** – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT –II
'Ancient Architecture in India' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary: Synonyms and Antonyms.
Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.
Reading: Improving Comprehension Skills – Techniques for Good Comprehension
Writing: Format of a Formal Letter-**Writing Formal Letters** E.g.., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT –III
'Blue Jeans' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English.
Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.
Reading: Sub-skills of Reading- Skimming and Scanning
Writing: Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places and Events – **Classifying**- Providing Examples or Evidence

UNIT –IV
'What Should You Be Eating' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary: Standard Abbreviations in English
Grammar: Redundancies and Clichés in Oral and Written Communication.
Reading: Comprehension- Intensive Reading and Extensive Reading
Writing: Writing Practices--Writing Introduction and Conclusion - Essay Writing-Précis Writing.

UNIT –V
'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary: Technical Vocabulary and their usage
Grammar: Common Errors in English
Reading: Reading Comprehension-Exercises for Practice
Writing: **Technical Reports**- Introduction – Characteristics of a Report – Categories of Reports

Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing aReport.

Text Books:

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.

References:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007).Remedial English Grammar.Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006).Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

2020073 - ENGINEERING CHEMISTRY LAB

B.Tech. I Year II Semester   **L T P C**
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Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will earn:
- Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
- To determine the rate constant of reactions from concentrations as an function of time.
- The measurement of physical properties like adsorption and viscosity.
- To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC)technique.

Course Outcomes: The experiments will make the student gain skills on:
- Determination of parameters like hardness and chloride content in water.
- Estimation of rate constant of a reaction from concentration – time relationships.
- Determination of physical properties like adsorption and viscosity.
- Calculation of R_f values of some organic molecules by TLC technique.

List of Experiments:
1. Determination of total hardness of water by complexometric method using EDTA
2. Determination of chloride content of water by Argentometry
3. Estimation of an HCl by Conductometrictitrations
4. Estimation of Acetic acid by Conductometrictitrations
5. Estimation of HCl by Potentiometrictitrations
6. Estimation of Fe^{2+} by Potentiometry using$KMnO_4$
7. Determination of rate constant of acid catalysed hydrolysis of methylacetate
8. Synthesis of Aspirin and Paracetamol
9. Thin layer chromatography calculation of R_f values. eg ortho and para nitrophenols
10. Determination of acid value of coconut oil
11. Verification of freundlich adsorption isotherm-adsorption of acetic acid oncharcoal
12. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
13. Determination of partition coefficient of acetic acid between n-butanol and water.
14. Determination of surface tension of a give liquid using stalagmometer.

References
1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co.,Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N.Delhi)
3. Vogel's text book of practical organic chemistry 5[th]edition

4. Text book on Experiments and calculations in Engineering chemistry – S.S.Dara

2020074 – COMMUNICATIVE ENGLISH LAB

B.Tech. I Year II Semester   **L T P C**
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The **Language Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:
1. To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
2. To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency of students in spoken English and neutralize their mother tongue influence
5. To train students to use language appropriately for public speaking and interviews

Learning Outcomes: Students will be able to attain
1. Better understanding of nuances of English language through audio- visual experience and group activities
2. Neutralization of accent for intelligibility
3. Speaking skills with clarity and confidence which in turn enhances their employability skills

Syllabus
English Language and Communication Skills Lab (ELCS) shall have two parts:
a. Computer Assisted Language Learning (CALL)Lab
b. Interactive Communication Skills (ICS)Lab

Listening Skills
Objectives
1. To enable students develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation insentences.

- Listening for general content
- Listening to fill upin formation
- Intensive listening
- Listening for specific information

Speaking Skills
Objectives
1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts
- Oral practice: Just A Minute (JAM)Sessions
- Describing objects/situations/people
- Role play – Individual/Group activities

➢ **The following course content is prescribed for the English Language and Communication Skills Lab based on Unit-6 of AICTE Model Curriculum 2018 for B.Tech First English. As the syllabus is very limited, it is required to prepare teaching/learning materials by the teachers collectively in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning and timesaving in the lab)**

Exercise – I CALL Lab:
Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening.
Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.
ICS Lab:
Understand: Communication at Work Place- Spoken vs. Written language.
Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II CALL Lab:
Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context.
Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.
ICS Lab:
Understand: Features of Good Conversation – Non-verbal Communication.
Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III CALL Lab:
Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.
ICS Lab:
Understand: How to make Formal Presentations.
Practice: Formal Presentations.

Exercise – IV CALL Lab:
Understand: Listening for General Details. *Practice:* Listening Comprehension Tests. **ICS Lab**:
Understand: Public Speaking – Exposure to Structured Talks.
Practice: Making a Short Speech – Extempore.

Exercise – V CALL Lab:
Understand: Listening for Specific Details. *Practice:* Listening Comprehension Tests. **ICS Lab**:
Understand: Interview Skills. *Practice:* Mock Interviews.
****

Minimum Requirement of infrastructural facilities for ELCS Lab:
1. Computer Assisted Language Learning (CALL)Lab:
The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self-study by students.

System Requirement (Hardware component):
Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:
i) Computers with Suitable Configuration
ii) High Fidelity Headphones
2. Interactive Communication Skills (ICS)Lab:
The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projector etc.

2020021 - ENVIRONMENTAL SCIENCE

B.Tech. I Year II Sem   **L T P C**
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Course Objectives:
- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

Course Outcomes:
- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

UNIT-I
Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT-II
Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III
Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV
Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon lifestyle.

TEXT BOOKS:
1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:
1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt.Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.