

**COURSE STRUCTURE
AND
DETAILED SYLLABUS**

CIVIL ENGINEERING

**For
B.TECHFOUR YEAR DEGREE PROGRAMME
(Applicable for the batches admitted from 2020-2021)**



**VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)
Bollikunta, Warangal-506 005
Telangana State, India.**

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

CIVIL ENGINEERING**COURSE STRUCTURE**

(R20 Regulations applicable for the batches admitted from Academic Year 2020-2021)

I-SEMESTER

S.No	Course Code	Title of the Course	L	T	P	Credits
1	B20MA04	Linear Algebra and Vector Calculus	3	1	0	4
2	B20PH04	Applied Physics	3	1	0	4
3	B20ME05	Basic Mechanical Engineering	3	0	0	3
4	B20CS01	Programming for Problem Solving	4	0	0	4
5	B20PH05	Physics Lab	0	0	3	1.5
6	B20CS02	Programming for Problem Solving Lab	0	0	3	1.5
7	B20ME04	Engineering Workshop	0	0	2	1
8	B20MC01	Induction Program	0	0	0	0
		Total Credits	13	2	8	19

II SEMESTER

S. No	Category	Title of the Course	L	T	P	Credits
1.	B20MA06	Differential Calculus and Transforms	3	1	0	4
2.	B20CH03	Applied Chemistry	4	0	0	4
3.	B20CE01	Engineering Mechanics	3	1	0	4
4.	B20EE01	Basic Electrical and Electronics Engineering	3	0	0	3
5.	B20EN01	English for Effective communication	2	0	0	2
6.	B20CS07	Python Programming Lab	0	1	2	2
7.	B20ME01	Engineering Drawing Lab	0	0	4	2
8.	B20MC03	NSS/ NCC/Sports	0	0	0	0
		Total Credits	15	3	6	21

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

CIVIL ENGINEERING

COURSE STRUCTURE

(R20 Regulations applicable for the batches admitted from Academic Year 2020-2021)

III SEMESTER

S. No	Course Code	Title of the Course	L	T	P	Credits
1.	B20MA08	Probability Distribution and Numerical Methods	3	1	0	4
2.	B20CE02	Strength of Materials - 1	3	0	0	3
3.	B20CE03	Fluid Mechanics	3	0	0	3
4.	B20CE04	Surveying	3	0	0	3
5.	B20CE05	Construction Materials	3	0	0	3
6.	B20CE06	Strength of Materials Lab	0	0	2	1
7.	B20CE07	Surveying Lab	0	0	3	1.5
8.	B20EN02	English Language and Interactive Communication Skills Lab	0	0	3	1.5
9.	B20CE08	Project Based Learning - 1	0	0	2	1
10.	B20MC04	Human Values and Professional Ethics	2	0	0	0
Total Credits			17	1	10	21

IV SEMESTER

S. No	Course Code	Title of the Course	L	T	P	Credits
1.	B20CE09	Strength Materials - 2	3	0	0	3
2.	B20CE10	Hydraulics and Hydraulic Machinery	3	0	0	3
3.	B20CE11	Structural Analysis - 1	3	0	0	3
4.	B20CE12	Engineering Geology	2	0	0	2
5.	B20CE13	Construction Techniques And Practices	3	0	0	3
6.	B20CE14	Fluid Mechanics & Hydraulic Machinery Lab	0	0	2	1
7.	B20CE15	Engineering Geology Lab	0	0	2	1
8.	B20CE16	Building Drawing Lab - CAD	0	1	2	2
9.	B20CE17	Project Based Learning - 2	0	0	2	1
Total Credits			14	1	8	19

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

CIVIL ENGINEERING

COURSE STRUCTURE

(R20 Regulations applicable for the batches admitted from Academic Year 2020-2021)

V SEMESTER

S. No	Category	Title of the Course	L	T	P	Credits
1.	B20CE18	Design of Steel Structures	3	0	0	3
2.	B20CE19	Geotechnical Engineering	3	0	0	3
3.	B20CE20	Concrete Technology	3	0	0	3
4.	B20CE21	Hydrology and Water Resource Engineering	3	0	0	3
5.	B20CE22	Highway Engineering	3	0	0	3
6.	B20CE37	Professional Elective – 1 Structural Analysis – 2	3	0	0	3
	B20CE38	Environmental and Social Impact Assessment				
	B20CE39	Advanced Surveying				
7.	B20CE23	Concrete Technology Lab	0	0	3	1.5
8.	B20CE24	Geotechnical Engineering Lab	0	0	3	1.5
9.	B20CE25	Highway Engineering Lab	0	0	3	1.5
10.	B20CE26	Project Based Learning - 3	0	0	2	1
Total Credits			18	0	11	23.5

VI SEMESTER

S. No	Category	Title of the Course	L	T	P	Credits
1.	B20CE27	Design of RC Structures	3	0	0	3
2.	B20CE28	Estimation and Valuation Practice	3	0	0	3
3.	B20CE29	Environmental Engineering	3	0	0	3
4.	B20CE40	Professional Elective – 2 Foundation Engineering	3	0	0	3
	B20CE41	Remote Sensing				
	B20CE42	System Analysis in Civil Engineering				
5.	B20CE43	Professional Elective – 3 Irrigation and Hydraulic Structures	3	0	0	3
	B20CE44	Railway, Airport and Harbour Engineering				
	B20CE45	Geographical Information System				
6.	OPEC	Open Elective – 1	3	0	0	3
7.	B20CE30	Structural Design and Detailing Lab	0	0	3	1.5
8.	B20CE31	Environmental Engineering Lab	0	0	3	1.5
9.	B20EN03	Advanced English Communications Skills Lab	0	0	3	1.5
10.	B20CE32	Project Based Learning - 4	0	0	2	1
Total Credits			18	0	10	23.5

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

CIVIL ENGINEERING

COURSE STRUCTURE

(R20 Regulations applicable for the batches admitted from Academic Year 2020-2021)

VII SEMESTER

S. No	Category	Title of the Course	L	T	P	Credits
1.	B20MB01	Managerial Economics and Financial Analysis	3	0	0	3
2.	B20CE46	Professional Elective – 4 Repair & Rehabilitation of Structures	3	0	0	3
	B20CE47	Construction Planning and Management				
	B20CE48	Pavement Management System				
3.	B20CE49	Professional Elective – 5 Structural Dynamics and Design of Earthquake Resistant Structures	3	0	0	3
	B20CE50	Building Information Modelling				
	B20CE51	Sustainable Materials and Green Buildings				
4.	OPEC	Open Elective – 2	3	0	0	3
5.	B20CE33	Mini Project & Internship#	0	0	0	2
6.	B20CE34	Major Project Phase I	0	0	8	4
Total Credits			12	0	8	18

The student should undergo Mini Project & Internship for a minimum period of two months during the summer vacation of 3rd year. Mini Project & Internship will be evaluated at the beginning of the VII semester by assessing the report and seminar presentations.

VIII SEMESTER

S. No	Category	Title of the Course	L	T	P	Credits
1.	B20CE52	Professional Elective – 6 Design of Prestressed Concrete	3	0	0	3
	B20CE53	Smart Cities Planning and Development				
	B20CE54	Air Pollution and Control				
2.	OPEC	Open Elective – 3	3	0	0	3
3.	B20CE35	Technical Seminar	0	0	2	1
4.	B20CE36	Major Project Phase II	3	0	16	8
Total Credits			09	0	18	15

LIST OF OPEN ELECTIVE COURSES OFFERED TO OTHER DEPARTMENT

S. No	Category	Title of the Course	L	T	P	Credits
1.	B20CE55	Disaster Preparedness & Planning Management	3	0	0	3
2.	B20CE56	Environmental Management	3	0	0	3
3.	B20CE57	Urban Planning	3	0	0	3

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

CIVIL ENGINEERING

COURSE STRUCTURE

(R20 Regulations applicable for the batches admitted from Academic Year 2020-2021)

R20 B.Tech list of open electives. (Applicable form 2020-2021 admitted batch)

S.No.	Subject code	Subject	L	T	P	Credits	Offered Dept
1	B20CE55	Disaster Preparedness & Planning Management	3	0	0	3	CIVIL
2	B20CE56	Environmental Management	3	0	0	3	CIVIL
3	B20CE57	Urban Planning	3	0	0	3	CIVIL
4	B20EE54	Electrical Power Utilisation and Safety	3	0	0	3	EEE
5	B20EE55	Concepts of Control systems	3	0	0	3	EEE
6	B20EE56	Renewable Energy Sources	3	0	0	3	EEE
7	B20ME59	Non-Conventional Energy Sources	3	0	0	3	MECH
8	B20ME45	Robotics	3	0	0	3	MECH
9	B20ME33	Mechatronics	3	0	0	3	MECH
10	B20EC37	Digital Image Processing	3	0	0	3	ECE
11	B20EC46	Wireless and Mobile Communication	3	0	0	3	ECE
12	B20EC49	Sensor Networks	3	0	0	3	ECE
13	B20EC61	Biomedical Instrumentation	3	0	0	3	ECE
14	B20CS19	Data base Management Systems	3	0	0	3	CSE
15	B20CS12	Java Programming	3	0	0	3	CSE
16	B20CS55	Introduction to Network Security	3	0	0	3	CSE
17	B20CS56	Introduction to Cloud Computing	3	0	0	3	CSE
18	B20CS37	Internet of Things	3	0	0	3	CSE
19	B20CS04	Data Structures and Algorithms	3	0	0	3	CSE
20	B20AI03	Artificial Intelligence	3	0	0	3	CSM
21	B20AI29	Introduction to Machine Learning	3	0	0	3	CSM
22	B20AI30	Neural Networks	3	0	0	3	CSM
23	B20AI31	Introduction to Cyber Security	3	0	0	3	CSM
24	B20DS24	Introduction to Data science	3	0	0	3	CSD
25	B20DS25	Data Handling and Visualization	3	0	0	3	CSD
26	B20DS26	Introduction Big Data	3	0	0	3	CSD
27	B20DS27	Introduction to Computer Forensics	3	0	0	3	CSD
28	B20MB02	Management Science	3	0	0	3	MBA
29	B20MB03	Entrepreneurship Development	3	0	0	3	MBA
30	B20MB06	Intellectual Property Rights	3	0	0	3	MBA

Note: Students should take open electives from the list of open electives offered by the other departments/branches only.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
LINEAR ALGEBRA AND VECTOR CALCULUS**

B. TECH- I Semester

L/T/P/C
3/1 /0 /4**Pre-requisites:** Mathematical Knowledge at pre-university level**Course Objectives:**

To learn

- Concept of rank of matrix and apply to know the consistency of system of linear equations.
- To determine Eigen values, Eigen vectors of matrices.
- Geometrical approach to the mean value theorems and their applications.
- To find extreme value of function of two and three variables.
- The physical quantity involved in Engineering field related to vector field.
- To apply fundamental theorems of vectors integrations in their applications.

UNIT-I**Matrices**

Types of Matrices: Symmetric, Skew-symmetric, Hermitian, Skew-Hermitian, orthogonal, Unitary matrices, Rank of a matrix by Echelon form and Normal form, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations.

UNIT-II**Eigen Values and Eigen vectors**

Eigen values and Eigen vectors and their properties, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem.

UNIT-III**Calculus**

Definitions of Limit, continuity and differentiability. Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value theorem. Taylor's series. Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates).

UNIT-IV**Multivariable calculus (Partial Differentiation and applications)**

Functions of several variables: Partial derivatives, Total derivative; Jacobian; Functional dependence and independence, Maxima and Minima of functions of two and three variables using method of Lagrange's method of undetermined multipliers.

UNIT-V**Vector Differentiation and Integration**

Gradient, Divergence and Curl. Directional derivatives, Scalar potential functions. Solenoidal and Irrotational vector field. Line, surface and volume integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1: Understand the principles of matrix to calculate the characteristics of system of linear equations using multiple methods.

CO2: Determine Eigen values, Eigenvectors of matrices.

CO3: Evaluate limits of single-variable functions graphically and computationally.

Analyze improper integrals using Beta and Gamma functions.

CO4: Calculate Partial derivatives, extreme of functions of multiple variables. CO5: Analyse line, surface and volume integrals using fundamental theorems.

TEXT BOOKS

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 42nd Edition, 2012.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John wiley& Sons, 2006.

REFERENCES

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

APPLIED PHYSICS

B. TECH- I Semester

**L/T/P/C
3/1 /0 /4**

Pre Requisites - None

Course Objectives:

The course will develop students' knowledge in/on

- To understand the basic concept of mechanics their applications.
- To enhance the concepts of properties of matter and their applications.
- To study the concepts of Non destructive techniques and their applications.
- To enrich the concepts waves and Acoustics.
- To provide sufficient depth in the concept of Rigid body dynamics.

Unit I: 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.

Unit II: Properties of Matter

Elasticity – stress strain diagrams and its uses – elastic constants – factors affecting elastic modulus and tensile strength – Bending of beams – bending moment – stresses due to bending in beams – twisting couple – torsion and deformations – torsion pendulum: theory and applications.

Unit III : Non Destructive Testing (NDT) of materials

Introduction – Nondestructive testing – methods – ultrasonic test – pulse echo system – piezo electric method – magnetostriction method – Liner Variable differential transducer – Strain gauge – Applications.

Unit IV Waves and Acoustics

Introduction to waves – longitudinal and transverse waves – speed of wave motion- Seismic wave: P wave, S waves, Surface waves, Love waves, Rayleigh waves – isolation of structure against seismic waves. Classification of sound – decibel – factors affecting acoustics of buildings. Sabine formula for reverberation, Methods of sound absorptions – absorbing materials- sound insulation and its measurement.

Unit V: Rigid body dynamics

Definition and motion of a rigid body in the plane; Rotation in the plane; Kinematics in a coordinate system rotating and translating in the plane; Angular momentum about a point of a rigid body in planar motion.

Course outcomes:

At the end of this course students will be able to:

- CO1** : Use the laws of mechanics to determine the equilibrium condition of particles and rigid bodies.
- CO2** : Explain the elastic properties of materials.
- CO3** : Understands the basic concepts in Nondestructive techniques and their applications.
- CO4** : Explain the knowledge of waves and the factors affecting acoustics of buildings and their remedies.
- CO5** : Calculate geometric properties like Centre of gravity moment of inertia and mass moment of inertia for various sections.

Text Books:

1. “Engineering Physics “, V. Rajendran, Tata Mc Gram Hill Book Publishers.
2. M N Avadhaulu, P G Kshirsagar, “ A Text book of Engineering Physics”, S Chand & Co., New Delhi 2011
3. R K Gaur, S L Gupta, “Engineering Physics”, Dhanpat Rai 2013

References:

1. D. S Mathur, “Properties of Matter”, S Chand & Co., New Delhi 2012
2. V Rajendran, “Engineering Physics,” Tata McGraw Hill Publishing Co Ltd, New Delhi 2012
3. R C Hibbeler. “Engineering Mechanics: Combined static and dynamics”, Prentice Hall,2010
4. Vela Murali, “Engineering Mechanics”, Oxford University Press 2010
5. A Nelson, “Engineering Mechanics: Statics and Dynamics”, Tata McGraw Hill Publishing. Ltd New Delhi 2017

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

BASIC MECHANICAL ENGINEERING

B. TECH- I Semester

**L/T/P/C
3/0 /0 /3**

Pre-requisites: Nil

Course Objectives:

UNIT – I

Engineering materials and joining processes:

Engineering Materials: Types and applications of Ferrous & Nonferrous metals and alloys.

Composites: Introduction: Definition, Classification and applications (Automobiles) Soldering, Brazing and welding. Definitions, classification and method of soldering, Brazing and welding. Differences between soldering, brazing and Welding. Description of Electric Arc Welding and Oxy- Acetylene Welding.

UNIT – II

Machine Tools Operations :

Turning, facing, knurling, Thread cutting, Taper Turning by swiveling the compound rest, Drilling, Boring, Reaming, Tapping, Counter Sinking, Counter Boring, -Plane milling, End milling, Slot milling.

UNIT – III

Internal Combustion Engines :

Classification, I.C. Engines parts, 2 Stroke and 4 stroke Petrol engines, 4 stroke diesel engines. P-V diagrams of Otto and Diesel cycles. Problems on indicated power, brake power, indicated thermal efficiency, brake thermal efficiency, mechanical efficiency, and specific fuel consumption, [numericals on IC Engines].

UNIT – IV

Turbines :

Classification, Principle of operation of Impulse and reaction turbines, Delavan's turbine, Parson's turbine. (No compounding of turbines).

Gas turbines: Classification, Working principles and Operations of Open cycle and closed cycle gas turbines.

Water turbines: Classification, Principles and operations of Pelton wheel, Francis turbine and Kaplan turbine.

UNIT – V

Energy Resources: Non-renewable and renewable energy resources, Petroleum based solid, liquid and gaseous fuels, Calorific values of fuels.

Solar Power: Solar Radiation, Solar constant (definition only), Solar Thermal energy harvesting Wind Power: principle of operation of a typical windmill.

Hydro Power: Principles of electric power generation from hydropower plants.

Nuclear Power: Principles of Nuclear power plants.

COURSE OUTCOMES:

After the completion of this course, the students should be able to

CO1: Identify the Various Energy sources and IC engines systems.

CO2: Apply the Metal removal process using Lathe, drilling and Milling operations.

CO3: Compare the application and usage of various engineering Materials.

CO4: Analyze the Principle of operation of Impulse and reaction turbine.

CO5: Discuss the importance of engineering materials.

TEXT BOOKS

1. V.K.Manglik, “Elements of Mechanical Engineering”, PHI Publications, 2013. (Module-1,2,4,5)
2. K.R.Gopalkrishna, “A text Book of Elements of Mechanical Engineering”- Subhash Publishers, Bangalore. (Module -1,2,3,4,5).

REFERENCE BOOKS

1. S.TrymbakaMurthy, “A Text Book of Elements of Mechanical Engineering”, 4th Edition 2006, Universities Press (India) Pvt Ltd, Hyderabad.
2. K.P.Roy, S.K.HajraChoudhury, Nirjhar Roy, “Elements of Mechanical Engineering”, Media Promoters & Publishers Pvt Ltd,Mumbai,7th Edition,2012
3. Pravin Kumar, “Basic Mechanical Engineering”, 2013 Edition, Pea

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

PROGRAMMING FOR PROBLEM SOLVING

B. TECH- I Semester

**L/T/P/C
4/0 /0 /4**

Pre-requisites: Nil

Course Objectives:

- To provide the necessary knowledge on general engineering problem solving methodologies.
- To provide necessary foundations for step by step computer program development and to present the basic concepts in C programming language.
- To prepare the students to write modular and readable C Programs.
- The Course introduces the essential concepts like abstract data types, user defined data types.
- To analyze the performance of algorithms and how to use such knowledge for later processing with the help of files.
- Aims to train the students to write working programs to solve problems.

UNIT -I

Introduction: Steps in Problem Solving, Algorithms, Flowcharts, Pseudo code, Types of Programming Languages, Introduction to C, History of C, Structure of a C Program.

Introduction to C Programming: The C Character Set, Identifiers and - Keywords, Data Types, Constants and Variables, Declarations, Expressions & Statements, Input / Output Statements (Formatted and Unformatted), Creating and Running a C program.

Operators and Expressions : Unary Operators, Arithmetic Operators, Relational and Logical Operators, Assignment Operators, Conditional operator, Bitwise Operators, special operators, Precedence & Associativity, Type Casting and Type Conversion.

UNIT – II

Control Statements: Branching Statements – if, if-else, else- if, nested-if. Switch statement. Un - conditional Branching Statement- goto. Looping Statements- while, do-while, for, nested loops. Break & Continue.

Functions : Introduction, Defining a Function, Types of Functions, Accessing a Function, Function Prototypes, Passing Arguments to a Function – call by value, Recursion.

Storage Classes: Automatic Variables, External (Global) Variables, Static Variables, Register.

UNIT – III

Arrays: Definition - Single Dimensional Arrays, Multi Dimensional Arrays, Declaration, Initialization, Reading & Writing elements in to an Array, Passing Arrays to Functions. Linear Search, Binary search, Bubble sort.

Strings: Declaration and Initialization of Strings, Reading and Writing a String, String Manipulation Functions, String as Array of Characters, Array of strings, Sorting of Strings.

Structures and Unions: User-Defined Data Types , Defining a Structure, Processing

Structure, Array of Structures, Nested Structures, Passing Structures To Functions. Unions. Typedef, Enumerated types - enum.

UNIT – IV

Pointers: Introduction, Pointer Declarations, Pointer to Pointer, Operations on Pointers -Pointer Arithmetic, Dynamic Memory Allocation – Malloc(), Calloc(), Realloc(), Free(). Pointers and Functions - call by Reference, Pointers and Arrays (one dimensional, two dimensional), Array of Pointers. Structures and Pointers, Self-Referential Structures.

UNIT- V

File Handling: Introduction, Text Files and Binary Files, File Handling Functions-Opening and Closing a File, File Opening Modes, Reading and Writing a File. Random Access File Functions – fseek() , rewind(), ftell(). Command Line Arguments, C Preprocessor Directives.

Course Outcomes:

CO-1: Understanding how problems are posed and how they can be analyzed for obtaining solutions.

CO-2: Learning of sequencing, branching, looping and decision making statements to solve scientific and engineering problems.

CO-3: Implementing different operations on arrays and creating and using of functions to solve problems.

CO-4: Understanding and exploring the various methods of memory allocations.

CO-5: Ability to design and implement different types of file structures using standard methodology.

TEXT BOOK:

1. Byron Gottfried, “Programming with C” . Third Edition(Schaum’s Outlines)
McGraw Hill.

REFERENCE BOOKS:

1. B.A. Forouzan and R.F. Gilberg ,“C Programming and Data Structures” , Cengage Learning (3rd Edition)
2. Pradip Dey & Manas Ghosh, “Programming in C”, 2nd Edition , Oxford University Press,2013.
3. E. Balaguruswamy , “Programming in ANSI C “ ,McGraw-Hill Education, 2008.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

PHYSICS LAB

B. TECH- I Semester

**L/T/P/C
0/0 /3 /1.5**

Pre-requisites: None

Course Objectives:

The laboratory course will develop student's knowledge in/on...

- Determination of frequency of AC supply by Sonometer
- Determination of the wavelengths, slit widths with high degree of accuracy from diffraction phenomena using conventional light and laser light
- Determination of time constant of RC circuit and optical fibre characteristics.
- Determination of Solar cell, LED and LASER diode etc. characteristics
- Determination of the wavelength and radius of curvature of Plano convex lens using Newton's rings

Name of the Experiment

1. Torsional Pendulum- Determination of rigidity modulus of materials of a wire
2. Determination of energy gap of material of a p-n junction
3. Study of LED diode V-I & P-I characteristics
4. Determination of dispersive power of a material of a prism-spectrometer.
5. Bending losses of optical fibres and evaluation of numerical aperture of a given optical fibre
6. Study of decay charge & determination of time constant of RC circuit
7. Study of characteristics of Solar cell
8. Determination of wavelength of laser source- Diffraction grating
9. Determination of frequency of AC supply - Sonometer
10. Study of LASER diode V-I & L-I characteristics
11. Determination of wavelength and radius of curvature of Plano convex lens using Newton Rings Experiment.
12. Study of P-N diode Characteristics.

Course Outcomes:

CO1: Estimate the frequency of tuning fork and AC supply with the help of stretched strings

CO2: Analyze as well as compare the intensity distribution of interference and diffraction patterns

CO3: Draw the characteristics of electrical and electronic circuits and evaluate the dependent parameters

CO4: Explore and understand the applications of semiconducting devices

CO5: Evaluates the wavelength and radius of curvature of Plano convex lens by Newton's rings

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

PROGRAMMING FOR PROBLEM SOLVING LAB

B. TECH- I Semester

**L/T/P/C
0/0 /3 /1.5**

Pre Requisites - None

Course Objectives:

- To provide the necessary knowledge on general engineering problem solving methodologies.
- To provide necessary foundations for step by step computer program development and to present the basic concepts in C programming language.
- To prepare the students to write modular and readable C Programs.
- The Course introduces the essential concepts like abstract data types, user defined data types.
- To analyze the performance of algorithms and how to use such knowledge for later processing with the help of files.
- Aims to train the students to write working programs to solve problems.

WEEK-1

- 1.a) Write a C program to find the areas of shapes like circle, square, rectangle and triangle
- 1.b) Write a C program to demonstrate Type Casting and Type Conversion.

WEEK-2

- 2.a) Write a C program to find the roots of a quadratic equation.
- 2.b) Write a C program to find greatest of any 3 numbers.
- 2.c) 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)

WEEK-3

- 3.a) Fibonacci sequence is defined as follows: the first and second terms in 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.
- 3.b) A positive integer d is said to be a factor of another positive integer N if when N is divided by d, the remainder obtained is zero. For example, for number 12, there are 6 factors 1, 2, 3, 4, 6, 12. Every positive integer k has at least two factors, 1 and the number k itself. Given two positive integers N and k, write a program to print the kth largest factor of N.

Input Format: The input is a comma-separated list of positive integer pairs (N, k).

Output Format: The kth highest factor of N. If N does not have k factors, the output should be 1.

Constraints:

- $1 < N < 10000000000$
- $1 < k < 600$.

You can assume that N will have no prime factors which are larger than 13.

Example

- **Input:** 12,3
- **Output:** 4

- 3.c) Write a C program to find the second largest number in a set of n numbers.

WEEK-4

- 4.a) Write a C program to generate Pascal's triangle.
- 4.b) Write a C program to find the LCM (Least Common Multiple) and GCD (greatest common divisor) of two given integers.

- 4.c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

WEEK-5

- 5.a) Write a C program to find sum of series $1+x^1+x^2+x^3+\dots+x^n$ using functions.
5.b) Write a C program to find factorial of a given number using Recursion.
5.c) Write a C program to demonstrate the use of Storage Classes

WEEK-6

- 6.a) Write a C program to find both the largest and smallest number in a list of integers.
6.b) N monkeys are invited to a party where they start dancing. They dance in a circular formation, very similar to a Gujarati Garba or a Drum Circle. The dance requires the monkeys to constantly change positions after every 1 second.
The change of position is not random & you, in the audience, observe a pattern. Monkeys are very disciplined & follow a specific pattern while dancing.
Consider $N = 6$, and an array monkeys = {3,6,5,4,1,2}.
This array (1-indexed) is the dancing pattern. The value at monkeys[i], indicates the new of position of the monkey who is standing at the ith position.
Given N & the array monkeys[], find the time after which all monkeys are in the initial positions for the 1st time.

Constraints

$1 \leq t \leq 10$ (test cases)

$1 \leq N \leq 10000$ (Number of monkeys)

Input Format

First line contains single integer t, denoting the number of test cases.

Each test case is as follows -

Integer N denoting the number of monkeys.

Next line contains N integer denoting the dancing pattern array, monkeys[].

Output

t lines,

Each line must contain a single integer T, where T is the minimum number of seconds after which all the monkeys are in their initial position

- 6.c) Write a C program to insert an element at a given position in an Array using functions.

WEEK-7

7. Write a C program to perform all of the following:
a) Matrix Addition and subtraction
b) Matrix Multiplication
c) Find Transpose and test if a matrix is symmetric or not
d) A traditional chess board consists of 8 rows and 8 columns. Write a program to count the number of safest places that a King can be positioned when 3 queens (ministers) are placed at different positions on the chess board.

WEEK-8

- 8.a) Write a C program to perform linear search
8.b) Write a C program to perform binary search
8.c) Write a C program to sort the elements using bubble sort

WEEK-9

- 9.a) Write a C program to insert a sub-string in to a given main string at a given position.
9.b) Write a C program to count number of characters, words and sentences in a given text.
9.c) Write a C program to determine if the given string is a palindrome or not.
9.d) Write a C program to sort the given names in alphabetical order.

WEEK-10

- 10.a) Write a C program to implement array of structures.(use student structure) and write functions to
- i. to search student data using hall ticket number.
 - ii. to sort the student records based on the total marks.
- 10.b) Write a menu driven C program that uses functions to perform the following operations on complex numbers stored in a structure:
- i. Reading a complex number
 - ii. Writing a complex number
 - iii. Addition of two complex numbers
 - iv. Multiplication of two complex numbers
- 10.c) Write a C program to demonstrate Unions and enum.

WEEK-11

- 11.a) Write a C program for Pointer Arithmetic.
- 11.b) Write a C program to swap two numbers using Call by value and Call by reference.
- 11.c) Write a C program to demonstrate calling of a function (like add, subtract, multiply) using a function pointer.

WEEK-12

- 12.a) Write a C program using pointer to create a two dimensional matrix, to input values in to the matrix and to display the matrix and its transpose. Free the memory properly.
- 12.b) Write a C program to demonstrate on structures and pointers.
- 12.c) Write a C program for dynamic creation of structures using pointers

WEEK-13

- 13.a) Write a C program to count no of alphabets, no of digits, no of special symbols, no of white spaces and no of tabs in a given text file.
- 13.b) Write a C program which copies one text file to another text file and verify the correctness.
- 13.c) Write a C program which copies one binary file to another binary file and verify the correctness.

WEEK-14

- 14.a) Write a C program to produce reverse of the content of a text file into another text file and verify the result.
- 14.b) Write a C program to merge two text files into a third text file (i.e., the contents of the first file followed by those of the second are put in the third file) and verify the correctness.

WEEK-15

- 15.a) Write a command-line C program to reverse the first n characters in a file.
(Note: The file name and n are specified on the command line.)
- 15.b) Write a C Program that removes all comment lines from a C source file.

Course Outcomes:

- CO1:** Understand basic structure of the C Programming, data types, declaration and usage of variables, control structures and all related concepts.
- CO2:** Ability to understand any algorithm and Write the C programming code in executable form.
- CO3:** Implement Programs using functions, pointers and arrays, and use the pre-processors to solve real time problems.
- CO4:** Ability to use file structures and implement programs on files.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

ENGINEERING WORKSHOP

B. TECH- I Semester(Civil, Mechanical, EEE)

**L/T/P/C
0/0 /2 /1**

Pre-requisites: Nil

Course Objectives:

- Know the usage of various tools and their application in carpentry, tin smithy.
- Know the usage of various tools and their application in black smithy, foundry, welding and house wiring.
- Make lap joint and dove tail joint in carpentry.
- Make scoop, funnel and tray like items in tin smithy.
- Use one – way, two-way switches, parallel and series connections in house wiring.
- Know the basics of welding.

UNIT – I

TRADES FOR EXERCISES: (Any six trades from the following for Mechanical Engineering Branch & Any four trades for all other Branches with minimum of two exercises in each trade)

1. Carpentry
2. Fitting
3. Tin – Smithy
4. Black Smithy
5. House – wiring
6. Foundry
7. Plumbing
8. Soldering

UNIT – II

TRADES FOR DEMONSTRATION & EXPOSURE

1. Demonstration of Power tools & wiring
2. Welding.
3. Machine Shop

UNIT – III

IT WORKSHOP I: Computer hardware, identification of parts, Disassembly, Assembly of computer to working condition, simple diagnostic exercises.

IT WORKSHOP II: Installation of operating system windows and Linux simple diagnostic exercises.

TEXTBOOKS:

1. Workshop Manual – P.Kannaiah / K.L.Narayana/Scitech Publishers.
2. Workshop Manual – Venkat Reddy/BS Publication / 6th Edition.

COURSE OUTCOMES:

The students will be able to

CO1: Know the fundamental knowledge of various trades and their usage in real time Applications.

CO2: Compare Foundry, Welding, Black smithy, Fitting, Machine shop and house wiring.

CO3: Understand the basis for analyzing power tools in construction and wood working, electrical engineering and mechanical engineering.

CO4: Apply basic concepts of computer hardware for assembly and disassembly.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

Induction Program

B. TECH- I Semester

**L/T/P/C
0/0 /0 /0**

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

DIFFERENTIAL CALCULUS AND TRANSFORMS

B. TECH- II Semester

**L/T/P/C
3/1 /0 /4**

Pre Requisites - None

Course Objectives:

To learn

- Methods of solving the applications of differential equations.
- To apply fundamental theorems of particular integral in their applications.
- To solve initial value problems using Laplace Transforms.
- The expansion of any function by Fourier series.
- The physical quantity involved in engineering field related to Partial differential equations.

UNIT-I: First Order ODE: Exact, Non-Exact differential equations, linear differential equations and Bernoulli's differential equations, Applications: Newton's law of cooling, Law of Natural growth and decay.

UNIT-II: Ordinary Differential Equations of Higher Order: Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax} V(x)$; method of variation of parameters.

UNIT-III: Laplace Transform: Laplace transform of standard functions – Inverse transform – first shifting Theorem, Transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function– Periodic function – Convolution theorem Differentiation and integration of transforms- Application of Laplace transforms to ordinary differential equations.

UNIT-IV: Fourier Series: Calculation of coefficients of Fourier Series, Even and Odd functions, Half range Fourier series, Change of interval.

UNIT-V: Partial Differential Equations: Formation of Partial Differential Equations and its solutions, Lagrange's linear equations, Non-linear equations of first order, Charpit's method, Method of separation of variables.

Course Outcomes:

On successful completion of this course, students will be able to:

- CO1:** Apply the fundamental concepts of ordinary differential equations to real time problems.
- CO2:** Find the complete solution of a non homogeneous differential equations and applying its concepts in solving physical problems of Engineering.
- CO3:** Evaluate initial value problems and boundary value problems using Laplace transforms technique.
- CO4:** Expand the algebraic and transcendental functions by applying Fourier Series
- CO5:** Apply the concepts of Partial Differential Equations to Engineering problems.

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 42nd Editions, 2012.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

References:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishers
3. S.L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

APPLIED CHEMISTRY

B. TECH- II Semester

**L/T/P/C
4/0 /0 /4**

Pre Requisites - None

Course Objectives:

- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To acquire the knowledge of electrochemical cell, different batteries and corrosion, its control methods.
- To acquire the knowledge of water treatment which are essential for the Engineers in industry.
- To acquire the knowledge of materials and their composition.
- To acquire the knowledge of phase rule and surface chemistry.
- To acquire the skills and knowledge to organic reactions and importance of polymers in engineering and everyday life.

UNIT-I: Batteries & Corrosion

Introduction to Electrochemical and Electrolytic cells, Galvanic cell, e.m.f, and Electro chemical series– applications. Batteries: primary cells-lithium cells. Secondary cells – Pd-acid storage cell, lithium-ion cells, Fuel cells-hydrogen-oxygen fuel cell. Methanol-oxygen fuel cell-advantages and applications.

Corrosion: Introduction, causes of corrosion, types of corrosion-dry and wet corrosion-mechanism of electrochemical corrosion. Factors affecting on corrosion and corrosion control methods- cathodic protection(sacrificial anodic protection and impressed current cathodic protection) and surface coatings (anodic and cathodic), Methods of application of metal coatings-Hot dipping (galvanization and tinning) and electroplating of copper.

UNIT-II: Water Technology

Introduction, types of hardness, units and Numerical problems. Estimation of hardness of water-EDTA method. Boiler troubles-scales and sludges, Caustic embrittlement and boiler corrosion. Treatment of Boiler feed water-Ion-exchange process. De-salination of brackish water-Reverse Osmosis. Domestic water treatment-specifications and steps involved in the treatment of potable water.

UNIT-III: Material chemistry

Material chemistry: Chemistry of lime and gypsum, Cement-chemical composition, classification, manufacture by wet and dry process, setting and hardening of cement, chemical reactions during the hydration of cement, water proof and white cement-properties and uses.

UNIT-IV: Polymers

Polymers: Introduction to polymers, classification of polymers, types of polymerization, mechanism of free radical addition, ionic polymerization. Plastics: Properties of thermosetting (Bakelite, Nylon)) and thermoplastics (PE, PVC) resins. Conducting polymers-classification, mechanism of conduction in conducting polymers-poly acetylene and ploy aniline, applications.

UNIT-V: Phase rule and Surface chemistry

Phase rule: Definition of terms, phase rule equation, phase diagrams: one component system – water system, two component system- Ag-Pb system, Iron-carbon phase diagram-cooling curves, annealing and case hardening.

Surface Chemistry: Adsorption-types of adsorption, adsorption isotherms- Freundlich adsorption isotherm and Langmuir adsorption isotherm, applications of adsorption.

Course Outcomes:

The basic concepts included in this course will help the student to gain:

CO1: The knowledge of molecular batteries and corrosion

CO2: The knowledge of water treatment.

CO3: The knowledge of polymers and their uses.

CO4: The required knowledge of principles and concepts of phase rule and surface chemistry.

CO5: The knowledge of materials and their uses.

Suggested reading:

1. Text book of Engineering Chemistry by Jain & Jain.
2. Text book of Engineering Chemistry by M. Thirumala, E.Laxminarayana, K.Shashikala – Pearson publications.
3. University chemistry, by B. H. Mahan
4. Engineering Chemistry by Shashi Ch

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

ENGINEERING MECHANICS

B. TECH- II Semester

**L/T/P/C
3/1 /0 /4**

Pre – Requisites: None

Course Objectives:

- To understand the system of forces and equilibrium condition of particles and rigid bodies.
- To understand determination of Centroid and Moment of Inertia of various sections for useful in design of engineering problems.
- To gain knowledge by applying concepts and principles for engineering problems and also this course will be act as basics for core engineering study.

UNIT – I

Introduction to Engineering Mechanics – Basic Concepts - Resultants of Force System: Parallelogram law – Forces and components- Resultant of Coplanar Concurrent Forces – Components of Forces in Space – Moment of Force - Principle of moments – Coplanar Applications – Couples - Resultant of any Force System.

Equilibrium of Force Systems: Free Body Diagrams, Equations of Equilibrium-Equilibrium of Planar Systems- Equilibrium of Spatial Systems.

UNIT – II

Friction: Introduction – Theory of Friction – Angle of friction - Laws of Friction – Static and Dynamic Frictions – Motion of Bodies: Wedge, Screw, Screw-jack, and Differential Screw-jack.

UNIT – III

Centroids and Centers of Gravity: Introduction – Centroids and Centre of gravity of simple figures (from basic principles) – Centroids of Composite Figures - Theorem of Pappus – Center of gravity of bodies and centroids of volumes.

Moments of Inertia: Definition – Polar Moment of Inertia –Radius of gyration- Transfer formula for moment of inertia - Moments of Inertia for Composite areas - Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia: Moment of Inertia of Masses- Transfer Formula for Mass Moments of Inertia - Mass Moment of Inertia of composite bodies.

UNIT – IV

Kinematics: Motion of a particle – Rectilinear motion – motion curves – Rectangular components of curvilinear motion– Kinematics of Rigid Body - Types of rigid body motion - Angular motion - Fixed Axis Rotation

Kinetics: Translation - Analysis as a Particle and Analysis as a Rigid Body in Translation – Equations of plane motion - Angular motion - Fixed Axis Rotation – Rolling Bodies.

UNIT – V

Work - Energy Method: Work Energy Equations for Translation – Work Energy Applications to Particle Motion – Work Energy applied to Connected Systems - Work Energy applied to Fixed Axis Rotation and Plane Motion. Impulse and Momentum.

Course Outcomes:

The students will be able to

CO1: Understand concepts of resultant force and moment Systems.

CO2: Analyze problems related to friction developed in motion of bodies.

CO3: Calculate centroid and moment of inertia for simple and composite sections.

CO4: Apply concepts of mechanics to solve problems of rigid body motion

CO5: Understand the application of Work Energy method for plane motion problems.

Text Books:

1. Timoshenko S , Young D.H , Rao J. V , Sukumar Pati Engineering Mechanics, 5th Edition, McGraw Hill Education , 2017
2. Ferdinand. L. Singer, Engineering Mechanics - Statics and Dynamics, 3rd Edition, Harper International Edition, 1994.
3. James L. Meriam, L. G. Kraige, Engineering Mechanics, John Wiley & Sons, 7th Edition, 2012.

References:

1. Irving H. Shames, Engineering Mechanics, 1st Edition, Pearson, 2011
2. YVD Rao, K. Govinda Rajulu, M. Manzoor Hussain , A Textbook of Engineering Mechanics, 1st Edition, Academic Publishing Company, 2016
3. M.V. Seshagiri Rao & D Rama Durgaiah, Engineering Mechanics, Universities Press, India, 2005
4. Tayal, A.K , Engineering Mechanics Statics and dynamics, 14th edition, Umesh Publication, Delhi, 2012.
5. K. L. Kumar, Venu kumar, Engineering Mechanics,4th Edition,Tata McGraw-Hill Education (India) Pvt Limited, 2011
6. S. S. Bhavikatti, Fundamentals of Engineering Mechanics, 3rd Edition, New Academic Science, 2011.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

B. TECH- II Semester

**L/T/P/C
3/1 /0 /4**

Pre Requisites - None

Course objectives:

In this course it is aimed to introduce

- The basic concepts of electrical circuits which is the foundation for network theory
- To understand about single phase AC circuits.
- To understand functioning of different types of DC machines and transformers.
- To understand the various operations of transistors and special purpose diodes
- To learn basic concepts of diodes, Rectifiers and filters.

UNIT-I:

Electrical Circuits: Circuits concept, R-L-C Parameters, Voltage and Current sources, Source Transformation, V-I relationship for Passive elements, Kirchoff's Laws, Network reduction techniques – series, parallel, series parallel, star-delta & star-delta transformations, Nodal Analysis, Mesh analysis with DC excitations. Network Theorems - Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity Theorems with DC excitation Calculaion of Power (VI)

UNIT-II:

Single Phase AC Circuits - R.M.S. and Average values, Form Factor, steady state analysis of series, Parallel and Series parallel Combinations of R, L and C with Sinusoidal excitation concept of reactance, Impedance, Susceptance and Admittance –Concept of Power Factor.

UNIT-III:

Transformers and DC Machines:: D.C.Machines: Constructional features, Methods of Excitation, E.M.F. Equation and Applications, Torque development in D.C motor Characteristics of DC motors, losses, Efficiency, Speed control of DC Shunt motors Role of Transformers in the fields of engineering, Transformer principle, Ideal and Practical Transformers Equivalent circuit, Regulation and Efficiency.

UNIT-IV:

P-N Junction Diode - Diode equation, V-I characteristic, Temperature dependence, Bipolar Junction Transistor (BJT) - Construction, Principle of Operation, CB,CE and CC configurations, Zener Diode, Zener diode characteristics, Use of Zener diode as simple regulator.

UNIT-V:

Operational amplifier basics, op amp inverting and Non Inverting amplifier, Rectifiers and Filters - The P-N junction as a rectifier - A Half Wave Rectifier, Bridge Rectifier, Filters –Inductor Filters, Capacitor Filters.

COURSE OUTCOMES:

After Completion of the course, the students will be able to

CO1: Analyze circuit theorems, mesh and nodal analysis, series and parallel networks, Electrical power.

CO2: Gain knowledge on AC circuits, reactance, Impedance, Susceptance and Admittance and Power Factor

CO3: Learn the working principle of DC motors, Transformers

CO4: Study the characteristics of PN Junction diode and zener diode

CO5: Learn the basic of Amplifiers and Rectifiers.

Text Books:

1. Circuit Theory Analysis and Synthesis by A Chakrabarti, Dhanpat rai & co.
2. Basic Electrical Engineering, P Ramana, M. Suryakalavathi, G. T. Chandra Sekhar,1st Edition, S. Chand Technical Publications, 2018
3. Electronic Devices and Circuits, S. Salivahanan and N Suresh Kumar, 3rd Edition TMH, Revised 2019

References:

1. Network Analysis by M.E Van Valkenburg, Pearson Publications 3rd Edition
2. Principles of electrical machines by V K Mehta, S Chand Publications
3. Electronics devices and circuits by I J Nagrath PHI Publications

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)****ENGLISH FOR EFFECTIVE COMMUNICATION****B. TECH- II Semester****L/T/P/C
2/0 /0 /2****Pre Requisites - None****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. The course follows an integrated approach to language teaching. Instructors and students are encouraged to use online, print media and electronic media resources in compliance with the course topics of the prescribed book and make the best use of worksheets, quizzes, presentations, discussions, role plays and assignments.

Course Objectives

The course will enable the students to -

- Understand types of reading for different purposes and practice a variety of texts in print and electronic format.
- Improve the language proficiency of students in English with an emphasis on vocabulary, grammar, reading and writing skills.
- Motivate students to study academic subjects more effectively and critically using the theoretical and practical components of English.
- Develop study skills and communication skills in formal and informal situations.

Syllabus Content:**Unit 1: Note Making Skills**

- Listen to the audio texts on current issues by English speakers and make notes based on the audio text.
- Read the texts in printed format and make notes based on the text.
- Make notes for texts on scientific concepts.
- Read the excerpt, 'Inventors' and do the activities on skimming, scanning and information transfer.
- Vocabulary: Word formation – prefixes and suffixes.
- Grammar: Contracted forms of verbs, tense and aspects.

Unit 2: Summarizing Skills

- Watch the given videos on current issues and summarize the information.
- Read the given texts in electronic format to summarize the information.
- Summarize the given texts / videos on scientific concepts by English speakers.
- Read the excerpt, 'War' and do the activities on summarizing, and vocabulary building.
- Vocabulary: Homonyms, homophones and homographs.
- Grammar: Subject-verb agreement.

Unit 3: Mind Mapping Skills

- Use mind map techniques to read the text and infer the information using digital tools / through graphical representation.
- Read the excerpt, 'Aliens' and complete the activities on the reading passage.
- Vocabulary: One-word substitutes.
- Grammar: Articles.

Unit 4: Making Oral Presentations

- Train the students to prepare the drafts for the technical events and present to the class.
- Produce visuals using various digital tools for making effective oral presentation.
- Prepare the visuals, audio and text materials based on the four major components.
- Read the excerpt, 'Genetics' and make an oral presentation.
- Vocabulary: Abbreviations and acronyms.
- Grammar: Common errors in tenses.

Unit 5: Drafting Skills

- Letter writing – types – parts - styles – format – appropriate language – model letters.
- Prepare the script for compering for various college events.
- Read the excerpt, 'Sports' and write an essay on the most favourite sport.
- Vocabulary: Technical vocabulary.
- Grammar: Common errors in English.

Course Outcomes

After completing this course, students will be able to -

CO1: Skim and scan the digital text to summarize it for future reference.

CO2: Read the text to make notes according to their needs.

CO3: Use English language effectively in spoken and written forms.

CO4: Communicate confidently in various contexts and different cultures.

CO5: Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

Prescribed Textbook:

English for Technical Communication by Sudarshana, N.P. and C. Savitha, Published by 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.

Digital tools for mind mapping activities

1. <https://www.mindomo.com/>
2. <https://www.mindmeister.com/>

3. <https://www.ayoa.com/>
4. <https://coggle.it/>
5. <https://www.popplet.com/>

Digital tools for the activities on oral presentation

1. <https://prezi.com/>
2. <https://www.clearslide.com/product/presentations/>
3. <https://wideo.co/>
4. <https://slidebean.com/>
5. <https://www.canva.com/>
6. <https://docs.google.com/presentation/u/0/>
7. <https://www.powtoon.com/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

PYTHON PROGRAMMING LAB

B. TECH- II Semester

**L/T/P/C
0/1 /2 /2**

Pre Requisites - None

Course Objectives:

The purpose of the course is to make students

- To develop Python programs with conditionals and loops.
- To develop Python functions and call them.
- To develop and use Python data structures – lists, tuples, dictionaries.
- To do input/output with files in Python.
- To get exposure to various problems solving approaches of computer science

Week 1:

- a. Write a program to perform the arithmetic operators. Find out the student total marks and average
- b. Write a program to apply type conversion techniques in python. Convert from string to int, int to float, float to string

Week 2:

- a. Write a program to display whether a student passed in a single subject or not using if statement
- b. Write a program to display the grade of a student based on the average of 3 subject marks using if-elif statement

Week 3:

- a. Write a program to display the reverse of a given number using while loop and for loop
- b. Write a program to display the factorial of a given number using while loop and for loop

Week 4:

- a. Write a program to display the prime numbers between 2 and n using while loop and for loop
- b. Write a program to print the average marks of 10 students using loops(input 3 subjects for each student)

Week 5:

- a. Write a program to define a function to display the grade of a student by using positional arguments(rno, sub1,sub2,sub3)
- b. Write a program to define a function to display total bill for a shopping by taking customer name and number of items as keyword arguments.

Week 6:

- a. Write a program to define a function to calculate the area of a circle using default arguments
- b. Write a program to display the reverse of a given number using recursive function.

Week 7:

- a. Write a program to convert a decimal number to binary number using recursive function.
- b. Write a program to perform the arithmetic operations using the functions to each operation.(add(),sub(),mul(),div())

Week 8:

- a. Write a program to perform bubble sort on a list without using the sort().
- b. Write a program to display the elements of a list in reverse order without using the reverse()

Week 9:

- a. Write a program to find a student name from the list of students
- b. Write a program to perform addition of 2 matrices using nested lists

Week 10:

- a. Write a program to perform multiplication of 2 matrices using nested lists
- b. Write a program to demonstrate the tuple operations

Week 11:

- a. Write a program to create a list and eliminate the duplicate values from the list
- b. Write a program to create 2 sets and perform union, intersection, set difference and symmetric difference operations on sets.

Week 12:

- a. Write a program to create a student dictionary with the rno as key and a list as the values of a key (name,sub1,sub2,sub3) and display a memo with total, avg, result and grade
- b. Write a program to create a package Shapes and perform the area calculation for different shapes(use one function for each shape)

Week 13:

- a. Write a program to create a package Calculator and perform various arithmetic operations (use one function for each operation like add(),mul(),sub(),div())
- b. Write a program to create module with packages like Shapes and Calculator and import the module into program, access the functions defined the in the module.

Week 14:

- a. Write a program to create a file and save the details of a students (rno,name,sub1,sub2,sub3)
- b. Write a program to open a file of students and display the students details in tabular format like rno,name,sub1,sub2,sub3,total,avg,result,grade

Week 15:

- a. Write a program to perform demonstrate filename not exist exception
- b. Write a program to demonstrate the variable not available exception

Week 16:

- a. Write a program to demonstrate arithmetic exception
- b. Write a program to create a lambda function to display whether a person is eligible for voting or not

Course Outcomes:

- CO1:** Expressing the Core Python scripting elements such as variables and flow control structures.
- CO2:** Apply Python functions to facilitate code reuse
- CO3:** Extending how to work with lists and sequence data.
- CO4:** Implement file operations such as read and write and Adapting the code robust by handling errors and exceptions properly.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

ENGINEERING DRAWING

B. TECH- II Semester

**L/T/P/C
0/0 /4 /2**

Pre Requisites - None

Course objectives:

- Use of various command, object properties in AUTOCAD
- Learn the basic convention of drawings, dimensioning, scales and conic sections like ellipse, parabola and hyperbola.
- Learn projection of points, lines viewed in different positions.
- Learn projections of plane surfaces and solids viewed in different positions.
- Gain knowledge of sections of solids and their usage in real time applications and conversion of orthographic projection to isometric projection vice-versa.

Unit – I

Chapter-I Introduction to Computer Graphics : Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software -The Menu System, Toolbars Standard, Object Properties, Draw, Modify and Dimension.

Chapter-II Introduction to Engineering Drawing:

Principles of Engineering Graphics and their significance, ISO and ANSI standards for coordinate dimensioning- usage of Drawing instruments, lettering

- a. Conic sections including the Rectangular Hyperbola (General method only);
- b. Roulettes-Cycloid, Epicycloid, Hypocycloid
- c. Involute
- d. Scales – Plain, Diagonal and Vernier Scales.

Unit –II Principles of Orthographic Projections in First Angle Projection- Conventions

Projections of Points

Projection of lines: Parallel, Perpendicular, inclined to one plane and inclined to both the planes.

Unit-III

Projection of planes: Plane parallel, perpendicular and inclined to one reference plane. Planes inclined to both the reference planes.

Projection of Regular Solids-Projection of regular solids, Cube, prisms, pyramids, tetrahedron, Cylinder and cone, axis inclined to one plane and both planes, Projections of Regular Solids.

Unit-IV

Projections of Sections and sectional views of right angular solid-Prism, Cylinder, Pyramid, Cone.

Development of surfaces of Right Regular Solids – Prism, Pyramid, Cylinder and Cone.

Unit-V Isometric Projections:

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric views to Orthographic views and Vice-versa, Conventions.

Course Outcomes:

The students will be able to

CO1: Understand various commands, object properties in AUTOCAD

CO2: Analyse the Projections of Points and solids.

CO3: Estimate the use of drawings, dimensioning, scales and conic sections

CO4: Compare the Conversion of Isometric views to Orthographic views

Text Books

1. Agrawal B & Agrawal C.M. (2012), Engineering Graphics, TMH Publications.
2. Bhatt N.D., Panchal V.M. & Ingke P.R., (2014), Engineering Drawing, Charotar Publishing House.

References

1. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers.
2. (Corresponding set of) CAD Software Theory and User Manuals.
3. Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd.
4. Engineering Drawing – P.J.Shan S.Chand Publishers.
5. Engineering Drawing – Johle/Tata McGraw Hill Book Publishers.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

NSS/ NCC/Sports

B. TECH- II Semester

**L/T/P/C
0/0 /0 /0**

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

PROBABILITY DISTRIBUTION AND NUMERICAL METHODS

B. TECH- III Semester

**L/T/P/C
3/1 /0 /4**

Pre-Requisites - Nil

Course Objectives:

To learn

- The ideas of probability and random variables and various discrete and continuous probability distributions.
- The basic ideas of statistics including measures of central tendency, correlation and regression.
- To apply the tests in deriving the conclusions of the data.
- The importance of numerical methods and finding its approximate value by different techniques.
- Solving initial value problems using numerical methods.

UNIT-I: Basic Probability: Basic definitions of probability, addition and multiplication theorems of probability, Conditional probability, independent events and Bayes' theorem.

UNIT-II: Discrete and Continuous Probability distributions: Random variables: Expectation of Random Variables, Binomial, Poisson, Normal and exponential distributions, evaluation of statistical parameters for these distributions.

UNIT-III: Testing of Hypothesis: Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, Test for single mean, difference of means for small samples, test for ratio of variances for small samples.

UNIT-IV: Solutions of algebraic Equations: Introduction, Numerical solution of algebraic and transcendental equations by Bisection Method, Regular-Falsi method, Newton-Raphson's method.

UNIT-V: Numerical Integration and Solution of Ordinary Differentiation: Numerical Integration with Trapezoidal rule, Simpson's 1/3rd rule, Simpson's (3/8) rule, Solutions of first order ordinary differential equations by Taylor's series, Euler's Method, Euler's -Modified Method, Runge-Kutta methods.

Course Outcomes:

On successful completion of this course, students will be able to:

- CO1:** Use probability theory for modelling uncertainty in engineering problems
- CO2:** Develop discrete and continuous probability distribution and its applications.
- CO3:** Construct confidence interval estimates for population parameters to test the hypothesis.
- CO4:** Find a better approximate root of a given equation.
- CO5:** Compute the differential equation using Numerical techniques.

TEXT BOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L., "Myers, keying Ye. Probability and statistics for engineers and scientists", Pearson Publications, 9th Edition, 2007.
2. S C Guptha and V.K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand & Sons Publications, 10th Edition, 2002.
3. S.S. Sastr, "Introductory Methods of Numerical Analysis", PHI, 4th Edition, 2005.

REFERENCES:

1. Miller and Freund's, "Probability and Statistics for Engineers", Pearson Educations, 8th Edition, 2015.
2. M.K. Jain, S.R.K. Iyengar, R.K. Jain, "Numerical Methods for Scientific and Engineering Computations", New Age International Publications, 6th Edition, 2007.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

STRENGTH OF MATERIALS - 1

B. TECH- III Semester

**L/T/P/C
3/0 /0 /3**

Pre Requisites – Engineering Mechanics

Course Objectives:

- To impart knowledge of different stresses, strain and deformation of bars.
- To introduce the concept of shear force and bending moment diagram for beams.
- To determine the stresses of various structural sections.
- To know the calculation of slope and deflection of determinate beams.
- To understand the theory of torsion, stresses and deflection of shaft and springs.

UNIT - I STRESS, STRAIN AND DEFORMATION OF SOLIDS

Simple Stresses and strains – Elastic constants - Relationship between elastic constants – Stress Strain Diagram – Deformation of axially loaded member - Composite Bars - Thermal Stresses – Principal Stresses and Principal Planes.

UNIT- II SHEAR FORCE AND BENDING MOMENT

Types of supports - Classification of beams - Shear force and Bending Moment Diagram for Determinate Beams: Cantilever Beam, Simply Supported Beam and Overhanging Beam subjected to Point Loads, Uniformly Distributed Load, Uniformly Varying Loads and combination of these loads. Point of contra flexure.

UNIT- III FLEXURAL AND SHEAR STRESSES

Theory of simple bending - Assumptions - Derivation of bending equation – Section Modulus, Determination of flexural/bending stresses of rectangular, circular, I and Channel sections. Derivation of formula for shear stress distribution - Shear stress distribution across various beam sections like rectangular, circular, I and channel sections.

UNIT- IV DEFLECTION OF BEAMS

Elastic curve – Governing differential equation - Double integration method - Macaulay's method - Moment Area method - Conjugate beam method for computation of the slope and deflection of determinate beams.

UNIT - V TORSION AND SPRINGS

Theory of Torsion – Stresses and Deformations in Solid and Hollow Circular Shafts – Combined bending moment and torsion of shafts - Power transmitted to shaft – Shaft in series and parallel – Closed and Open Coiled helical springs – Springs in series and parallel – Design of buffer springs.

Course Outcomes:

After the completion of this course, the students should be able to

- CO1:** Determine the stresses and strains in the members.
- CO2:** Draw shear force and Bending moment diagram for determinate beams.
- CO3:** Identify the flexural and shear stresses for various sections.
- CO4:** Evaluate the slope and deflection of determinate beams.
- CO5:** Identify the concept of torsion and spring subjected to loading.

TEXT BOOKS:

1. Timoshenko and Gere, “Mechanics of Materials”, PWS Publishing Company, Boston, 4th Edition., 1997.
2. H.J.Shah and S.B. Junnarkar, “Mechanics of Structures Vol.- I. ”, Charotar publishing House Pvt. Ltd., Anand, 31st Edition., 2017.
3. Punmia.B.C., Ashok Kumar Jain and Arun Kumar Jain, SMTS – I Strength of materials, Laxmi Publications. New Delhi, 10th Edition, 2018.
4. Bansal. R.K. “Strength of Materials”, Laxmi Publications Pvt. Ltd., New Delhi, 6th Edition, 2018.

REFERENCE BOOKS:

1. Andrew Pytel and Ferdinand L. Singer, “Strength of Materials”, Harper and Row publishers, New York, 4th Edition., 2011.
2. Ferdinand P Beer, E. Russell Johnston and John T. Dewolf, David F. Mazurek & Sanjeev Sanghi, “Mechanics of Materials”, Tata McGraw Hill Education Pvt. Ltd, 8th Edition 2020.
3. Rajput.R.K. “Strength of Materials”, S.Chand and Co, New Delhi, 4th Edition, 2018.

Online Resources:

1. <https://nptel.ac.in/courses/105/105/105105108/>
2. <https://nptel.ac.in/courses/112/107/112107147/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

FLUID MECHANICS

B. TECH- III Semester

**L/T/P/C
3/0 /0 /3**

Pre-Requisites – Nil

Course Objectives:

- To outline the basic properties of the fluid statics and hydrostatic forces.
- To impart knowledge on fluid kinematics, Buoyancy and floatation.
- To understand about the fluid dynamics and flow measurement.
- To develop knowledge in the major and minor losses in pipes.
- To learn about boundary layer and its equation.

UNIT-I

FLUID STATICS: Dimensions and units – Physical properties of fluids, Vapor pressure and cavitations. Pressure at a point, Pascal’s law, Hydrostatic law. Types of fluid pressure and its measurement by manometers.

HYDROSTATIC FORCES ON SUBMERGED PLANES: Different cases of submerged planes.

UNIT – II

FLUID KINEMATICS: Description of fluid flows, Classification of flows and flow visualization. Equation of continuity for 1-D, 2-D and 3-D. Stream and velocity potential functions, Velocity and Acceleration calculation.

BUOYANCY AND FLOATATION: Calculation of Buoyancy and centre of Buoyancy. Stability of submerged and floating bodies.

UNIT – III

FLUID DYNAMICS: Surface and body forces, Navier –Stokes equation and Bernoulli’s equations for a flow along a streamline. Momentum equation and its applications.

MEASUREMENT OF FLOW: Venturi- Meter, Orifice-Meter and Pitot-Tube. Orifices, and Mouth-pieces, Notches and Weirs.

UNIT – IV

FLOW THROUGH PIPES: Reynolds’s experiment – Characteristics of Laminar & Turbulent flows. Laws of Fluid friction. Major and Minor Energy Losses. Series and parallel combination of pipes. Energy grade line, Hydraulic grade line. Water-Hammer effect in pipes, Pipe-Networks.

UNIT – V

BOUNDARY LAYER THEORY: Boundary layer – concept. Displacement, Momentum and Energy Thickness. Von Karman Momentum Integral equation Drag-Lift forces. Separation of Boundary layer, Magnus-Effect.

COURSE OUTCOMES:

After the completion of this course, the students should be able to

CO1: Learn the fundamentals of fluids and the principles of manometer.

CO2: Compute dimensional flow in a pipe applying continuity equation.

CO3: Calculate the flow parameters by Euler’s and Bernoulli’s equation.

CO4: Differentiate laminar and turbulent flow and various losses in pipe flow.

CO5: Determine Boundary layer thickness, Drag-Lift forces.

TEXT BOOKS:

1. F M White. "Fluid Mechanics", Tata McGraw Hill Publication, 7th Edition, 2011.
2. Subramanya.K" Fluid Mechanics and Hydraulic Machines", Tata McGraw Hill Education Private Limited, New Delhi, 2nd Edition, 2018.
3. Rajput.R.K. "Fluid Mechanics and Hydraulic Machines", S.Chand and Co, New Delhi, 6th Edition, 2016.

REFERENCES:

1. S.K.Som & G.Biswas, "Introduction to Fluid Mechanics", Tata Mc.Grawhill publishers Pvt. Ltd., 3rd Edition, 2017.
2. A.K. Mohanty, "Fluid Mehanics", Prentice Hall of India Pvt. Ltd., New Delhi, 2nd Ediiton, 1994.
3. P.N. Modi and S.M. Seth, "Fluid Mechanics", Standard book house, 22nd Edition,2019

Online Resources:

1. <https://nptel.ac.in/courses/112/104/112104118/>
2. <https://nptel.ac.in/courses/112/105/112105171/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

SURVEYING

B. TECH- III Semester

**L/T/P/C
3/0 /0 /3**

Pre Requisites – Nil

Course Objectives:

- To introduce the rudiments of Surveying, chain surveying and compass surveying.
- To introduce the concepts of leveling and theodolite.
- To learn the various method of contouring and contour map.
- To introduce the basics Trilateration and calculation of areas and volumes.
- To understand the concept of total station and GPS Surveying.

UNIT - I

Classifications and basic principles of surveying, instruments for surveying, – Chain surveying: Measurement of distance, chain surveying principles, Methods of ranging
Compass surveying: Measurement of directions and angles, types of compass, Basic Principles, meridians and bearings, traversing with a chain and compass,

UNIT - II

Levelling- Principles and theory of Levelling – Datum- Bench Marks – Temporary and Permanent Adjustments- Methods of Levelling- Sources of errors in Levelling
Theodolite and its parts, Horizontal and vertical angle measurements - Temporary and permanent adjustments

UNIT - III

Contours– Characteristics of contours – Methods of contouring, Contour gradient – Uses of contour plan and map
Heights and distances - Tacheometer - Stadia Constants - Analytic Lens -Tangential and Stadia Tacheometry

UNIT - IV

Trigonometrical leveling, precautions and corrections – classification of errors
Triangulation: Principle of triangulation, purpose and classification of triangulation surveys, layout of triangulation, field work, triangulation stations
Area & Volumes: calculation of areas of a closed traverse, calculation of volumes, earth work calculations, practical problems.

UNIT - V

Hydrographic Surveying – Tides – MSL – Sounding methods, – satellite stations – reduction to centre
Total Station: Advantages - Parts and accessories – working principle - Errors and Good practices in using Total Station area calculation using Total Station
GPS Surveying: Different segments - space, control and user segments, Traversing and triangulation.

COURSE OUTCOMES:

After the completion of this course, the students should be able to

- CO1 :** Identify the classification of surveying and instruments used.
- CO2:** Calculate the horizontal and vertical angle using Tacheometric surveying.
- CO3:** Understand the process of control surveying and adjustments.
- CO4:** Know the concept of Hydrographic and Astronomical surveying.
- CO5:** Understand the principles of Total station and GPS surveying.

TEXT BOOKS:

1. B.C. Punmia & Ashok kumar Jain, “Surveying Volume I and II”, Laxmi Publications, 16th Edition., 2011.
2. S.K. Duggal, “Surveying Volume1 and II”, McGraw Hill Education (India) Pvt.Ltd, 5th Edition, 2019.
3. T.P. Kanetker and S.V. Kulkarni, “Surveying and Leveling Volume I and II”, 24th Edition., 2014.

REFERENCE BOOKS:

1. Dr. K.R. Arora, “Surveying Volume I and II”, Standard Book House, 15th Edition, 2015.
2. R. Subramanian, “Surveying and Leveling”, Oxford University Press, New Delhi, 2nd Edition, 2007.
3. Alfred Leick, “GPS satellite surveying”, John Wiley & Sons Inc., 3rd Edition, 2004.

Online Resources:

1. <https://nptel.ac.in/courses/105/107/105107122/>
2. <https://nptel.ac.in/courses/105/104/105104101/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

CONSTRUCTION MATERIALS

B. TECH- III Semester

**L/T/P/C
3/0 /0 /3**

Pre Requisites – Nil

Course Objectives:

- To develop knowledge on building materials and their properties.
- To impart knowledge on Mortar and its materials.
- To understand the process steps in manufacturing concrete.
- To be familiar with the Timber and functional materials.
- To impart knowledge on modern materials and their properties.

UNIT I STONES – BRICKS – CONCRETE BLOCKS

Stone as building material – Criteria for selection – Tests on stones – Deterioration and Preservation of stone work – Bricks – Classification – Manufacturing of clay bricks – Tests on bricks – Compressive Strength – Water Absorption – Efflorescence – Bricks for special use – Refractory bricks – Concrete blocks – Lightweight concrete blocks.

UNIT II LIME – CEMENT – AGGREGATES – MORTAR

Lime – Preparation of lime mortar – Cement – Ingredients – Manufacturing process – Types and Grades – Properties of cement and Cement mortar – Hydration – Compressive strength – Tensile strength – Fineness– Soundness and consistency – Setting time – fine aggregates – river sand – crushed stone sand – properties – coarse Aggregates – Crushing strength – Impact strength – Flakiness Index – Elongation Index – Abrasion Resistance – Grading

UNIT III CONCRETE

Concrete – Ingredients – Manufacturing Process – Batching plants –mixing – transporting – placing – compaction of concrete –curing and finishing – Ready mix Concrete – Mix specification.

UNIT IV TIMBER AND OTHER MATERIALS

Timber – Market forms – Industrial timber– Plywood – Veneer – Thermocol – Panels of laminates – Steel – Aluminum and Other Metallic Materials – Composition – Aluminium composite panel – Market forms – Mechanical treatment – Paints – Varnishes – Distempers – Bitumens.

UNIT V MODERN MATERIALS

Glass – Ceramics – Sealants for joints – Fibre glass reinforced plastic – Clay products – Refractories – Composite materials – Types – Applications of laminar composites – Fibre textiles– Geomembranes and Geotextiles for earth reinforcement.

COURSE OUTCOMES:

On completion of this course the students will be able to

CO 1: Compare the properties of most common and advanced building materials.

CO 2: Understand the typical and potential applications of lime, cement and aggregates

CO 3: Know the Rudiments of production of concrete.

CO 4: Understand application of timbers and other materials.

CO 5: Understand the importance of modern material for construction.

TEXT BOOKS:

1. Varghese.P.C, "Building Materials", PHI Learning Pvt. Ltd, New Delhi, 2nd Edition, 2015.
2. Rajput. R.K., "Engineering Materials", S. Chand and Company Ltd., Revised Edition,2000.

3. Gambhir.M.L., "Concrete Technology", Tata McGraw Hill Education, 3rd Edition, 2004
- 4.

REFERENCES:

1. Jagadish.K.S, "Alternative Building Materials and Technologies", New Age International, 1st Edition, 2017.
2. Gambhir. M.L., & Neha Jamwal., "Building Materials, products, properties and systems", Tata McGraw Hill Educations Pvt. Ltd, New Delhi, 1st Edition, 2011.
3. Duggal.S.K., "building materials", New Age International,4th Edition, 2008.

Code Books:

1. IS 456 - 2000: Indian Standard specification for plain and reinforced concrete
2. IS 383 - 1970: Indian Standard specification for coarse and fine aggregate
3. IS 10262-2009: Indian Standard Concrete Mix Proportioning –Guidelines
4. IS 4926 - 2003: Indian Standard specification for ready–mixed concrete

Online Resources:

1. <https://nptel.ac.in/courses/105/106/105106206/>
2. <https://nptel.ac.in/courses/105/102/105102088/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

STRENGTH OF MATERIALS LAB

B. TECH- III Semester

**L/T/P/C
0/0 /2 /1**

Pre-Requisites: Strength of Materials Theory

Course Objectives:

- To conduct test on different materials under the action of various forces
- To understand the procedure of doing different tests like hardness torsion, tension and impact etc. in various materials.
- To impart knowledge about the deflection calculation of various beams.
- To understand conduct of compression test on Concrete material.

LIST OF EXPERIMENTS:

1. Tension test on mild steel & Tor steel
2. Bending test on cantilever beam
3. Bending test on simply supported beam
4. Torsion test
5. Rockwell Hardness Test
6. Brinells Hardness Test
7. Spring Test
8. Compression test on wood/Concrete
9. Impact test
10. Shear Test

Course Outcomes:

After the completion of this course, the students should be able to

CO1: Identify the bending behavior of beams using bending test.

CO2: Determine the behavior of material under torsion.

CO3: Determine the hardness of materials using different tests.

CO4: Find out the characteristic of material under compression, impact and shear test.

Reference Books:

1. Rajput.R.K. “Strength of Materials”, S.Chand and Co, New Delhi, 4th Edition, 2018
2. Punmia.B.C., Ashok Kumar Jain and Arun Kumar Jain, SMTS – I Strength of materials, Laxmi Publications, New Delhi, 10th Edition, 2018
3. Bansal. R.K. “Strength of Materials”, Laxmi Publications Pvt. Ltd., New Delhi, 6th Edition, 2018

Online Resources:

1. <http://sm-nitk.vlabs.ac.in/List%20of%20experiments.html>
2. <https://eerc01-iiith.vlabs.ac.in/List%20of%20experiments.html>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

SURVEYING LAB

B. TECH- III Semester

**L/T/P/C
0/0 /3 /1.5**

Pre-Requisites: Surveying theory

Course Objectives:

- To introduce the principles of surveying, instruments and its accessories.
- To measure the land area, to prepare map and to find out the elevation of a point for constructional purpose.
- To possess knowledge about modern Survey field techniques

LIST OF EXPERIMENTS:

Chain Survey

1. Study of chains and its accessories, Aligning, Ranging, Chaining and Marking Perpendicular offset
2. Setting out works – Foundation marking using tapes single Room and Double Room

Compass Survey

3. Compass Traversing – Measuring Bearings & arriving included angles

Levelling - Study of levels and levelling staff

4. Fly levelling using a Dumpy level & Tilting level
5. Check levelling

Theodolite - Study of Theodolite

6. Measurements of horizontal angles by reiteration and repetition and vertical angles
7. Determination of elevation of an object using the single plane method when base is accessible/inaccessible.

Tacheometry – Tangential system – Stadia system

8. Determination of Tacheometric Constants
9. Heights and distances by stadia Tacheometry
10. Heights and distances by Tangential Tacheometry

Total Station - Study of Total Station, Measuring Horizontal and vertical angles

11. Traverse using the total station and Area of Traverse
12. Determination of distance and difference in elevation between two inaccessible points using the total station

Course Outcomes:

After the completion of this course, the students should be able to

CO 1: Calculate area of given plot/points using chain survey.

CO 2: Determine the angle/distance of given points using compass survey.

CO 3: Find out the angle, distance and height of the given points using theodolite surveying

CO 4: Determine the distance of the given points using Total station

Reference Books:

1. Dr. K.R. Arora, “Surveying Volume I and II”, Standard Book House, 15th Edition, 2015.
2. R. Subramanian, “Surveying and Leveling”, Oxford University Press, New Delhi, 2nd Edition, 2007.
3. B.C. Punmia & Ashok kumar Jain, “Surveying Volume I and II”, Laxmi Publications, 16th Edition., 2011.

Online Resources:

1. <http://sl-iitr.vlabs.ac.in/List%20of%20experiments.html>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

ENGLISH LANGUAGE AND INTERACTIVE COMMUNICATION SKILLS LAB

B. TECH- III Semester

L/T/P/C

0/0 /3 /1.5

The ELICS Lab focuses on the production and practice of sounds of language to familiarize the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

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

English Language and Interactive Communication Skills Lab (ELICS) shall have two parts:

- a. Computer Assisted Language Learning (CALL) Lab
- b. Interactive Communication Skills (ICS) Lab

Module - I

CALL Lab: Understand the essentials of English pronunciation through dialogues and conversations: Listening skill- its importance – purpose- process- types- barriers. Practice: introduction to phonetics – speech sounds – vowels and consonantal phonemes.

ICS Lab: Understand the practicalities in using English in formal contexts: Communication at workplace– spoken vs. written language. Practice: Ice-breaking activity and JAM session– situational dialogues – greetings – taking leave – introducing oneself and others.

Module - II

CALL Lab: Understand the fundamentals of English pronunciation through expressions used in day to day situations: 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 and practice non-verbal cues in various situations: Features of good conversation – non-verbal communication. Practice: Situational dialogues – roleplay– expressions in various situations – making requests and seeking permissions – telephone etiquette.

Module - III

CALL Lab: Understand the importance of e-correspondence: The basics– general format –drafting –features of good e-mails– do's and don'ts of e-mail etiquette. Practice: Assignments through e-mails observing e-mail etiquette.

ICS Lab: Apply the strategies of browsing to make effective oral presentations: Understanding text features, print features – collecting data needed for the presentation – how to make formal presentations. Practice: Formal presentations.

Module – IV

CALL Lab: Identify and differentiate audio text from the given source while listening to authentic material: Listening for general details about an event / object/ person or a piece of art. Practice: Listening descriptions / discussions / interpretations / comments/ analysis/ evaluations / summaries.

ICS Lab: Understand: Public speaking – exposure to structured talks. Practice: To make an academic talk – extempore.

Module – V

CALL Lab: Understand: Listening for specific details of a survey to fill up the survey sheet.

Practice: Listening to comprehension texts to understand the gist.

ICS Lab: Understand: Debate/group discussion based on contemporary topic/survey report, interview skills.

Practice: Mock group discussion/mock interviews.

Minimum Requirement of infrastructural facilities for ELICS 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, an LCD and a projector etc.

COURSE OUTCOMES:

After the completion of this course, students will be able to –

CO 1: Understand the nuances of English language through audio-visual experience and group activities.

CO 2: Speak with clarity and confidence which in turn enhances their employability skills.

CO 3: Develop their listening skills so that they may appreciate its role in developing LSRW skills language and improve their pronunciation.

CO 4: Involve the students in speaking activities in various contexts.

REFERENCES:

1. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad, Oxford University Press.
2. Spoken English: A self-learning guide to conversation practice by V Sasikumar and P V Dhamija, Tata McGraw-Hill, 2nd Edition, 2008.
3. Fundamentals of English Grammar, Betty Schramper Azar, Barbara F. Matthies and Shelley Hartle, Longman, 3rd Edition. 2003
4. Handbook for Technical Writing by David A Mc Murrey & Joanne Buckely CENGAGE Learning 2008.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

PROJECT BASED LEARNING - 1

B. TECH- III Semester

**L/T/P/C
0/0 /2 /1**

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

HUMAN VALUES AND PROFESSIONAL ETHICS

B. TECH- III Semester

**L/T/P/C
2/0 /0 /0**

Pre-Requisites: Nil

Course Objectives:

- To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Value based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

Unit-1 Human Values: Morals, values, ethics – integrity – work ethics – service learning – civic virtue – respect for others – living peacefully – Caring – sharing – honesty – courage – valuing time – cooperation – commitment – empathy – self-confidence – spirituality – character.

Unit II Professional Ethics: Profession and professionalism – Two models of professionalism – Professional etiquette – Three types of Ethics or morality Responsibility in Engineering standards – Engineering Ethics – Positive and Negative faces.

Unit III Professional Responsibilities: Ethical standards Vs Professional Conduct – Zero Tolerance for Culpable Mistakes – Hazards and Risks- Risk benefit analysis-congeniality, collegiality and loyalty. Respect for authority – conflicts of interest – occupational crime.

Unit IV Professional Rights: Professional rights and employee rights communicating risk and public policy – Whistle blowing – Collective bargaining. Professionals /engineers as managers, advisors, experts, witnesses and consultants – moral leadership-

Unit V Ethics in global context: Global issues in MNCs-Problems of bribery, extortion, and grease payments – Problem of nepotism, excessive gifts.

Course Outcomes

- CO 1:** It ensures students sustained happiness through identifying the essentials of human values and skills.
CO 2: It facilitates a correct understanding between profession and happiness.
CO 3: It helps students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.
CO 4: Ability to develop appropriate technologies and management patterns to create harmony in professional and personal life.

PRESCRIBED BOOK:

1. Aryasri, Human Values and Professional Ethics, Maruthi Publications.

SUGGESTED BOOKS:

1. S B George, Human Values and Professional Ethics, Vikas Publishing.
2. S K Chakraborty & D Chakraborty: Human Values and Ethics, Himalaya.
3. M. Govindarajan, S. Natarajan, & V.S. Senthilkumar: Engineering Ethics (Includes Human Values), HI Learning Pvt. Ltd., New Delhi -110001.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

STRENGTH OF MATERIALS – 2

B. TECH- IV Semester

**L/T/P/C
3/0 /0 /3**

Pre-Requisites: Strength of Materials-I

Course Objectives:

- To calculate Shear force and Bending moment for indeterminate beams.
- To understand the concept of direct and bending stresses.
- To impart the knowledge of columns and cylinders.
- To build theoretical background for study of stresses in three dimension.
- To apply the knowledge of unsymmetrical bending and shear centre.

UNIT - I INDETERMINATE BEAMS

Analysis of Fixed beams - Fixed end moments and reactions – Sinking and Rotation of supports - Theorem of three moments – Analysis of continuous beams – Shear Force and Bending Moment Diagram.

UNIT - II DIRECT AND BENDING STRESSES

Stresses under the combined action of direct loading and bending moment, core of a section-determination of stresses in the case of chimneys, retaining walls and dams-condition for stability-stresses due to direct loading and bending moment about both axis.

UNIT - III COLUMNS AND CYLINDERS

Euler's column theory – Critical load for prismatic columns with different end conditions – Effective length – Limitations - Rankine-Gordon formula - Eccentrically loaded columns – Middle third rule - Core of a section – Thin cylindrical and spherical shells – stresses and change in dimensions Thick cylinders – Compound cylinders – shrinking on stresses.

UNIT - IV STATE OF STRESS IN THREE DIMENSIONS

Stress tensor at a point – Stress invariants - Determination of principal stresses and principal planes - Volumetric strain. Theories of failure: Maximum Principal stress theory – Maximum Principal strain theory – Maximum shear stress theory – Strain Energy: Resilience-Gradual, Sudden, and impact loading- Total Strain energy theory – Maximum distortion energy theory – Application problems.

UNIT - V UNSYMMETRICAL BENDING AND SHEAR CENTRE

Unsymmetrical bending of beams of symmetrical and unsymmetrical sections – Shear Centre -curved beams – Winkler Bach formula – Stresses in hooks.

Course Outcomes:

After the completion of this course, the students should be able to

CO1: Analyse the fixed and continuous beams

CO2: Evaluate the direct and bending stresses of different structures

CO3: Determine the critical load of columns and stresses developed in thick and thin cylinders

CO4: Understand the concept of principal stresses and strain energy

CO5: Analyze the unsymmetrical bending of beams and shear centre for different section

TEXT BOOKS:

1. Timoshenko and Gere, "Mechanics of Materials", PWS Publishing Company, Boston, 4th Edition., 1997.
2. Rattan.S.S., "Strength of Materials", Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2nd Edition, 2011.

3. Punmia B.C., Ashok Kumar Jain and Arun Kumar Jain, "Theory of Structures (SMTS) – II", Laxmi Publishing Pvt Ltd, New Delhi, 12th Edition, 2017.

REFERENCE BOOKS:

1. Andrew Pytel and Ferdinand L. Singer, "Strength of Materials", Harper and Row Publishers, New York, 4th Edition., 2011.
2. Ferdinand P Beer et al., "Mechanics of Materials", Tata McGraw Hill Education Pvt. Ltd, 6th Edition, 2012.
3. Rajput R.K. "Strength of Materials (Mechanics of Solids)", S.Chand & company Ltd., New Delhi, 5th Edition, 2015.

Online Resources:

1. <https://nptel.ac.in/courses/112/101/112101095/>
2. <https://nptel.ac.in/courses/105/105/105105108/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

HYDRAULICS AND HYDRAULIC MACHINERY

B. TECH- IV Semester

**L/T/P/C
3/0 /0 /3**

Pre-Requisites: Fluid Mechanics

Course Objectives:

- To learn the fundamentals on flow in open channels
- To understand the basic concepts of dimensional analysis.
- To know the rudiments or turbo machinery
- To develop knowlwdge about types and working principle of turbines.
- To impart the knowledge on pumps and its classification.

UNIT-I

OPEN CHANNEL FLOW: Types of flow - Type of channels, Velocity distribution – Energy and momentum correction factors – Chezy’s, Manning’s; and Bazin formulae for uniform flow. Most Economical sections. Specific Energy-Specific Energy curves. Non uniform flow-Dynamic equation for G.V.F. Different slope profiles and Hydraulic Jump.

UNIT- II

DIMENSIONAL ANALYSIS AND HYDRAULIC SIMILITUDE: Dimensional analysis-Rayleigh’s method and Buckingham’s – π theorem- study of Hydraulic models – Geometric, kinematic and dynamic similarities-dimensionless numbers – model and prototype relations. Distorted and non-distorted models.

UNIT-III

BASICS OF TURBO MACHINERY: Impact of jet on vanes-Different cases for stationary and moving plates. Work done and efficiency-Velocity Triangles- Applications to radial flow turbines.

UNIT-IV

HYDRAULIC TURBINES: Layout of Hydropower plant. Different Heads, Efficiencies. Different Types of Turbines and their working principle. Governing of turbines. Unit Quantities-Characteristic curves. Geometric similarity- Cavitation phenomenon.

UNIT-V

PUMPS: Installation details-classification-types, work done. Different Heads and Efficiencies. Single stage and Multi-stage centrifugal Pumps, Series-parallel combination of pumps. Characteristic curves. NPSH-Cavitation. Reciprocating pumps.

Course Outcomes:

After the completion of this course, the students should be able to

CO1: Apply fundamental knowledge in open-channel hydraulics in Civil Engineering.

CO2: Describe dimensional analysis and similarity to develop hydraulic model.

CO3: Understand about the turbo-machines and its efficiency

CO4: Gain knowledge of hydraulic turbines and their operational design.

CO5: Evaluate the performance of centrifugal pumps.

TEXT BOOKS:

1. K. Subramanya, “Open Channel flow”, Tata McGraw-Hill Publishers, 3rd Editrion,2009.
2. P.M. Modi & S.M. Seth, “Hydraulics & Fluid Mechanics”, Standard Book house, New Delhi, 22nd Edition, 2018.
3. D.S. Kumar, “Fluid Mechanics & Fluid Power Engineering”, Kataria & Sons, 9th Edition, 2018.

REFERENCES:

1. K,Subramanya, “Fluid Mechanics and Hydraulic Machines”, Tata McGraw Hill Education Pvt. Ltd, 2nd Edition, 2019.
2. V.T.Chow, “Open Channel flow”, Mc.Graw Hill book company, 2007.
3. Rajesh Srivastava, “Flow through Open Channels”, Oxford University Press, 2007.

Online Resources:

1. <https://nptel.ac.in/courses/105/103/105103096/>
2. <https://nptel.ac.in/courses/112/104/112104117/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

STRUCTURAL ANALYSIS – 1

B. TECH- IV Semester

**L/T/P/C
3/0 /0 /3**

Pre-Requisites: Strength of Materials-I

Course Objectives:

- To know about the concept of strain energy method.
- To study the concept of analysis of beams and frames by slope deflection method.
- To analysis the beams and frames by Moment Distribution method.
- To understand the concept of analysis of beams and frames by Flexibility method.
- To understand the concept of analysis of beams and frames by Stiffness method.

UNIT - I STRAIN ENERGY METHOD

Determination of Static and Kinematic Indeterminacies – Analysis of continuous beams, plane frames and indeterminate plane trusses by strain energy method (up to two degree of redundancy).

UNIT - II SLOPE DEFLECTION METHOD

Slope deflection equations – Equilibrium conditions - Analysis of continuous beams and rigid frames – Rigid frames with inclined members - Support settlements- symmetric frames with symmetric and skew-symmetric loadings.

UNIT - III MOMENT DISTRIBUTION METHOD

Stiffness and carry over factors – Distribution and carryover of moments - Analysis of continuous Beams- Plane rigid frames with and without sway – Support settlement - symmetric frames with symmetric and skew-symmetric loadings.

UNIT - IV FLEXIBILITY METHOD

Primary structures - Compatibility conditions – Formation of flexibility matrices - Analysis of indeterminate pin- jointed plane frames, continuous beams and rigid jointed plane frames by direct flexibility approach.

UNIT - V STIFFNESS METHOD

Restrained structure – Formation of stiffness matrices - equilibrium condition - Analysis of Continuous Beams, Pin-jointed plane frames and rigid frames by direct stiffness method.

COURSE OUTCOMES:

After the completion of this course, the students should be able to

- CO 1:** Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method
- CO 2:** Analyse continuous beams and rigid frames by slope deflection method.
- CO 3:** Understand the concept of moment distribution and analyse continuous beams and rigid frames with and without sway.
- CO 4:** Analyse the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.
- CO 5:** Understand the concept of matrix stiffness method and analyse of continuous beams, pin jointed trusses and rigid plane frames.

TEXT BOOKS:

1. Bhavikatti, S.S, “Structural Analysis, Vol.1, & 2”, Vikas Publishing House Pvt.Ltd., NewDelhi, 4th Edition, 2010.
2. Vazrani.V.N And Ratwani, M.M, “Analysis of Structures”, Vol.II, Khanna Publishers, 16th Edition, 2015.
3. Hibbeler, R.C., Structural Analysis Prentice Hall, 7th Edition, 2012.

REFERENCES:

1. Punmia B.C., Ashok Kumar Jain and Arun Kumar Jain, "Theory of Structures (SMTS) – II” , Laxmi Publishing Pvt Ltd, New Delhi, 12th Edition, 2017.
2. William Weaver, Jrand James M.Gere, Matrix analysis of framed structures, CBS Publishers & Distributors, Delhi, 1995
3. Negi L.S.and Jangid R.S.,Structural Analysis, Tata McGraw Hill Publishing Co.Ltd.2004.

Online Resources:

1. <https://nptel.ac.in/courses/105/105/105105166/>
2. <https://nptel.ac.in/courses/105/101/105101085/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

ENGINEERING GEOLOGY

B. TECH- IV Semester

**L/T/P/C
2/0 /0 /2**

Pre Requisites: Nil

Course Objectives:

- To familiarize students to study about interior of the earth and seismic zones in India.
- To provide an insight on types of minerals and its properties.
- To impart knowledge on classification of rocks and its geological characteristics
- To understand various defects with geological formations and also geophysical exploration techniques.
- To make students to understand the role of geology in selection of site and construction of dams, tunnels etc.

UNIT I PHYSICAL GEOLOGY

Geology in civil engineering – branches of geology – structure of earth and its composition weathering of rocks – scale of weathering – soils - landforms and processes associated with river, wind, groundwater and sea – relevance to civil engineering. Plate tectonics – Earth quakes – Seismic zones in India.

UNIT II MINEROLOGY

Physical properties of minerals – Quartz group, Feldspar group, Pyroxene - hypersthene and augite, Amphibole – hornblende, Mica – muscovite and biotite, Calcite, Gypsum and Clay minerals.

UNIT III PETROLOGY

Classification of rocks, distinction between Igneous, Sedimentary and Metamorphic rocks. Engineering properties of rocks. Description, occurrence, engineering properties, distribution and uses of Granite, Dolerite, Basalt, Sandstone, Limestone, Laterite, Shale, Quartzite, Marble, Slate, Gneiss and Schist.

UNIT IV STRUCTURAL GEOLOGY AND GEOPHYSICAL METHODS

Geological maps – attitude of beds, study of structures – folds, faults and joints – relevance to civil engineering. Geophysical methods – Seismic and electrical methods for subsurface investigations

UNIT V APPLICATION OF GEOLOGICAL INVESTIGATIONS

Remote sensing for civil engineering applications; Geological conditions necessary for design and construction of Dams, Reservoirs, Tunnels, and Road cuttings - Hydrogeological investigations and mining - Coastal protection structures. Investigation of Landslides, causes and mitigation.

COURSE OUTCOMES:

After the completion of this course, the students should be able to

CO1: Understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.

CO2: Gain basics knowledge on properties of minerals.

CO3: Gain knowledge about types of rocks, their distribution and uses.

CO4: Understand the methods of study on geological structure.

CO5: Understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbor

TEXT BOOKS:

- 1) N. Chenna kesavulu, “Engineering Geology”, Mc-Millan, India Ltd., 2nd Edition, 2018.
- 2) Subinoy Gangopadhyay, “Engineering Geology”, Oxford university press, 2012.
- 3) Parbin Singh, “Engineering Geology”, S.K.Kataria & Sons,2013.

REFERENCES:

1. F.G. Bell, “Fundamental of Engineering Geology” Butterworths, Publications, New Delhi, 2005.
2. Krynine & Judd, “Principles of Engineering Geology & Geotechnics”, CBS Publishers & Distribution,2005.
- 3) P.C. Varghese, “Engineering Geology for Civil Engineers”, PHI,2011.

Online Resources:

1. <https://nptel.ac.in/courses/105/105/105105106/>
2. <https://nptel.ac.in/courses/105/104/105104191/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)****CONSTRUCTION TECHNIQUES AND PRACTICES****B. TECH- IV Semester****L/T/P/C
3/0 /0 /3****Pre Requisites: Nil****Course Objectives:**

- To understand about various construction techniques.
- To impart knowledge in various Construction practices.
- To gain knowledge about the construction procedures in Sub structure .
- To enrich the information in Super Structure construction.
- To know about equipment needed for construction activities.

UNIT - I CONSTRUCTION TECHNIQUES

Structural systems - Load Bearing Structure - Framed Structure - Load transfer mechanism – floor system - High rise Building Technology - Seismic effect - Environmental impact of materials – responsible sourcing - Eco Building (Green Building) - Materials used - Construction methods - Natural Buildings - Passive buildings - Intelligent(Smart) buildings – Concepts of Building automation - Energy efficient buildings for various zones-Case studies of residential, office buildings and other buildings in each zones.

UNIT - II CONSTRUCTION PRACTICES

Specifications, details and sequence of activities and construction co-ordination – Site Clearance – Marking – Earthwork - masonry – stone masonry – Bond in masonry - concrete hollow block masonry – flooring – damp proof courses – construction joints – movement and expansion joints – pre cast pavements – Building foundations – basements – temporary shed – centering and shuttering – slip forms – scaffoldings – de-shuttering forms – Fabrication and erection of steel trusses – frames – braced domes – laying brick – weather and water proof – roof finishes – acoustic and fire protection.

UNIT - III SUB STRUCTURE CONSTRUCTION

Techniques of Box jacking – Pipe Jacking -under water construction of diaphragm walls and basement-Tunneling techniques – Piling techniques - well and caisson - sinking cofferdam - cable anchoring and grouting - driving diaphragm walls, sheet piles - shoring for deep cutting - well points -Dewatering and stand by Plant equipment for underground open excavation.

UNIT - IV SUPER STRUCTURE CONSTRUCTION

Launching girders, bridge decks, off shore platforms – special forms for shells - techniques for heavy decks – in-situ pre-stressing in high rise structures, Material handling - erecting light weight components on tall structures - Support structure for heavy Equipment and conveyors - Erection of articulated structures, braced domes and space decks.

UNIT - V CONSTRUCTION EQUIPMENT

Selection of equipment for earth work - earth moving operations - types of earthwork equipment - tractors, motor graders, scrapers, front end waders, earth movers – Equipment for foundation and pile driving. Equipment for compaction, batching, mixing and concreting - Equipment for material handling and erection of structures – types of cranes - Equipment for dredging, trenching, tunneling,

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1: Know the different construction techniques and structural systems

CO2: Understand various techniques and practices in masonry construction, flooring, and roofing.

CO3: Plan the requirements for substructure construction.

CO4: Know the methods and techniques involved in construction of various types of super structures

CO5: Select, maintain and operate hand and power tools and equipment used in the building construction sites.

TEXT BOOKS :

1. Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C., "Construction Planning, Equipment and Methods", McGraw Hill, Singapore 5th Edition, 1995.
2. Arora S.P. and Bindra S.P., "Building Construction, Planning Techniques and Method of Construction", Dhanpat Rai and Sons, 1997.
3. Varghese, P.C. "Building construction", Prentice Hall of India Pvt. Ltd, New Delhi, 2nd Edition, 2007.

REFERENCES:

1. Jha J and Sinha S.K., "Construction and Foundation Engineering", Khanna Publishers, 8th Edition, 2017.
2. Sharma S.C. "Construction Equipment and Management", Khanna Publishers New Delhi, 2016.
3. Deodhar, S.V. "Construction Equipment and Job Planning", Khanna Publishers, New Delhi, 2012.

Online Resources:

1. <https://nptel.ac.in/courses/105/103/105103206/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

FLUID MECHANICS & HYDRAULIC MACHINERY LAB

B. TECH- IV Semester

L/T/P/C

0/0 /2 /1

Pre-Requisites: FM & HHM Theory

Course Objectives:

- To provide practical knowledge in verification of principles of fluid flow.
- To impart knowledge in measuring pressure, discharge and velocity of fluid flow.
- To understand calculation of Minor Losses.
- To gain knowledge in performance testing of Hydraulic Turbines and Hydraulic Pumps.

LIST OF EXPERIMENTS:

1. Calibration of Venturi meter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice / mouthpiece by constant head method.
3. Calibration of contracted Rectangular Notch and / Triangular Notch
4. Determination of Coefficient for minor losses.
5. Verification of Bernoulli's equation.
6. Impact of jet on vanes
7. Study of Hydraulic jump.
8. Performance test on Pelton wheel turbine
9. Performance test on Francis turbine.
10. Performance characteristics of a single stage/ multi-stage centrifugal pump.
11. Performance characteristics of a reciprocating pump

COURSE OUTCOMES:

After the completion of this course, the students should be able to

CO1: Calibrate flow measuring devices used in pipes, channels and tank

CO2: Demonstrate practical understanding of the minor and friction losses in pipe flows and characterize laminar and turbulent flows

CO3: Demonstrate practical working of Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.

CO4: Compare results of analytical models with actual behavior of real fluid flows.

Reference Books:

1. D.S. Kumar, "Fluid Mechanics & Fluid Power Engineering", Kataria & Sons, 9th Edition, 2018
2. K, Subramanya, "Fluid Mechanics and Hydraulic Machines", Tata McGraw Hill Education Pvt. Ltd, 2nd Edition, 2019
3. Rajput.R.K. "Fluid Mechanics and Hydraulic Machines", S.Chand and Co, New Delhi, 6th Edition, 2016

Online Resources:

1. <http://fm-nitk.vlabs.ac.in/List%20of%20experiments.html>
2. <https://eerc03-iiith.vlabs.ac.in/List%20of%20experiments.html>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

ENGINEERING GEOLOGY LAB

B. TECH- IV Semester

**L/T/P/C
0/0 /2 /1**

Pre-Requisites: None

Course Objectives:

- To impart knowledge to identification of minerals and rocks.
- To develop knowledge on simple structural problems.
- To know to interpret a geological map with geological location.
- To develop skill of microscopic identification of rocks.

LIST OF EXPERIMENTS:

1. Study of physical properties and identification of minerals referred under the theory.
2. Megascopic description and identification of rocks referred under the theory.
3. Microscopic study of rocks.
4. Interpretation and drawing of sections of geological maps showing tilted beds, faults uniformities etc.
5. Simple Structural Geology problems.

LAB EXAMINATION PATTERN:

1. Description and identification of SIX minerals
2. Description and identification of Six (including igneous, sedimentary and metamorphic rocks)
3. Interpretation of a Geological map along with a geological section
4. Simple strike and Dip problems
5. Microscopic identification of rocks.

COURSE OUTCOMES:

After the completion of this course, the students should be able to

CO1:Learn about the ground surface features based on map patterns of contour with emphasis on practical application in civil engineering

CO2:Identify physical and mechanical properties of rocks and minerals and its application in civil engineering uses.

CO3:Measure strike and dip of the bedding planes

CO4:Interpret and draw sections for geological maps showing horizontal beds, vertical beds, inclined beds, folds, faults.

Reference Books:

1. N. Chenna kesavulu, “Engineering Geology”, Mc-Millan, India Ltd., 2nd Edition, 2018.
2. Subinoy Gangopadhyay, “Engineering Geology”, Oxford university press, 2012.
3. P.C. Varghese, “Engineering Geology for Civil Engineers”, PHI,2011.

Online Resources:

1. <https://mg-nitk.vlabs.ac.in/mining-geology/List%20of%20experiments.html>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

BUILDING DRAWING LAB – CAD

B. TECH- IV Semester

**L/T/P/C
0/1 /2 /2**

Pre-Requisites: Nil

Course Objectives:

- To develop skill for using CAD software.
- To impart knowledge to draw plan of buildings.
- To know to draw section and elevation of buildings.
- To develop skill to show perspective view of buildings.

Syllabus Content:

LIST OF EXPERIMENTS:

1. Introduction to Computer Aided Drafting
2. Software for CAD – Introduction to different software's
3. Practice exercises on CAD software and its commands
4. Drawing plan of Single storied buildings using CAD software
5. Drawing plan of Multi storied buildings using CAD software
6. Developing sections and elevations for Single storied buildings using CAD software
7. Developing sections and elevations for Multi storied buildings using CAD software
8. Detailing of building components like Doors, Windows, Roof Trusses etc. using CAD software's
9. Perspective View of One Storey Buildings using CAD software
10. Perspective View of Two Storey Buildings using CAD software

COURSE OUTCOMES:

After the completion of this course, the students should be able to

- CO1:** Understand the usage of AutoCAD commands
- CO2:** Able to draw the Plan, Section and elevation of the building structures
- CO3:** Understand the 2D & 3D building elements
- CO4:** Detail the building components in Auto CAD drawings.

Reference books:

1. M. N. Sessa Praksh & Dr. G. S. Servesh, "Computer Aided Design Laboratory", Laxmi Publications, 1st Edition, 2006.
2. P. J. Sha, "Engineering Graphics", S. Chand & Co, 2014.
3. H. P. Pitroda, "Computer Aided Design: Text book and Practice book", Walnut Publication, 2021

Online Resources:

1. <https://www.autodesk.in/campaigns/autocad-tutorials>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

PROJECT BASED LEARNING - 2

B. TECH- IV Semester

**L/T/P/C
0/0 /2 /1**

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

DESIGN OF STEEL STRUCTURES

B.Tech – V Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites – Strength of Materials - 2

Course Objectives:

- To introduce the students to limit state design of structural steel members
- To design Tension and Compression Members
- To impart knowledge on Plastic Analysis and design of Continuous beams
- To learn the design of Built up beams and plate girders
- To learn design of roof trusses and pre – engineered buildings

UNIT- I : Introduction To Structural Steel and Design Of Connections

General -Types of Steel -Properties of structural steel - I.S. rolled sections - Concept of Limit State Design - Design of Simple and eccentric Bolted and welded connections - Types of failure and efficiency of joint – prying action - Introduction to HSFG bolts.

UNIT II : Tension and Compression Members

Behaviour and Design of simple and built-up members subjected to tension - Shear lag effect- Design of lug angles - tension splice - Behaviour of short and long columns - Euler's column Theory - Design of simple and built-up compression members with lacings and battens - Design of column bases - slab base and gusseted base.

UNIT- III : Plastic Analysis and Design

Introduction to plastic analysis - Theorems of plastic Analysis - Design of continuous beams and portal frames using plastic design approach

UNIT- IV: Beams

Design of laterally supported and unsupported beams - Design of built-up beams - Design of plate girders

UNIT- V : Industrial Structures

Design of roof trusses – loads on trusses – purlin design using angle and channel sections – truss design, Design of joints and end bearings – Introduction to pre-engineered buildings

Course Outcomes:

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

CO1 : Recognize the design philosophy of steel structures and connections.

CO2 : Select the suitable section shape and size for tension and compression members.

CO3 : Able to calculate ultimate load of steel beams and portal frames using plastic analysis.

CO4 : Able to design beams, Built-up beams and plate girders.

CO5 : Identify and compute the design trusses on Industrial structures.

TEXT BOOKS:

1. Duggal S.K., “Design of Steel Structures”, Tata McGraw Hill, Publishing Co. Ltd., 3rd Edition, 2019

2. Bhavikatti S.S, “Design of Steel Structures”, Dreamtech Press, 3rd Edition, 2019

3. Subramanian N, “Steel Structures: Design and Practice”, Oxford Publishers, Revised Edition, 2018

REFERENCE BOOKS:

1. Gambhir M L, “Fundamentals of Structural Steel Design”, McGraw Hill Education India Pvt Limited, First Edition, 2017
2. Jack C. McCormac and Stephen F Csernak, “Structural Steel Design”, Pearson Education Limited, 6th Edition, 2018
3. Sarwar Alam Raz, “Structural Design in Steel”, New Age International Publishers, 3rd Edition, 2020

Code Books:

1. IS 800-2007, General Construction in Steel — Code of Practice, BIS Publication
2. IS 875(1-5):1987 Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures, BIS Publication
3. SP6(1) - 1964, Handbook for Structural Engineers, BIS Publication

Online Resources:

1. <https://nptel.ac.in/courses/105/105/105105162/>
2. <https://nptel.ac.in/courses/105/106/105106112/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

GEOTECHNICAL ENGINEERING

B.Tech – V Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites - No prerequisites are needed for enrolling into the course

Course Objectives:

- To attain adequate knowledge in assessing properties of soil.
- To understand the concept of permeability and seepage through soils
- To determine the stresses in soil due to applied loads
- To impart knowledge on shear strength of the soil.
- To learn the mechanism site investigation and testing methods.

UNIT – I : Introduction

Origin and classification of soils, index properties of soil, Compaction characteristics of different soils, lab and field compaction, quality control

UNIT – II : Permeability and Seepage through Soils

Effective stress principle, capillarity, Darcy's law, Permeability, Seepage through soils: piping, quick- sand condition, flow nets, flow through dams, filters.

UNIT – III : Stresses Distribution in Soil and Consolidation

Stress in soils due to applied loads, Boussinesq equation, Newmark's Influence Chart, Approximate Method, Compressibility and consolidation characteristics, Consolidation Settlement.

UNIT – IV : Shear Strength of Soils

Shear Strength and Mohr-Coulomb strength criterion, direct, UCS and tri-axial shear tests, strength of loose and dense sands, pore pressures, Skempton's coefficients.

UNIT – V : Site Investigation and Testing

Site investigations, methods of drilling, sampling, in situ test - SPT, CPT, plate load and geophysical tests, immediate settlement based on elastic theories and in-situ tests. Exposure to relevant software

Course Outcomes:

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

- CO1:** Identify the properties and characteristics of soils.
- CO2:** Analyze permeability and seepage through soils.
- CO3:** Ability to analyze the stress distribution and consolidation settlement.
- CO4:** Understand the principles of shear strength of soils.
- CO5:** Able to know site investigation methods and Testing of soils.

TEXT BOOKS:

1. Murthy, V.N.S., "Soil Mechanics and Foundation Engineering", CBS Publishers Distribution Ltd., First Edition, 2018
2. Gopal Ranjan and Rao, A.S.R., "Basic and Applied Soil Mechanics", New Age Ltd. International Publisher, 3rd Edition, 2019.
3. Braja M. Das and N. Sivakugan., "Introduction to Geotechnical Engineering", Cengage Learning, 2nd Edition, 2015.

REFERENCE BOOKS:

1. Punmia, B.C., Ashok Kumar Jain and Arun Kumar Jain “Soil Mechanics and Foundations”, Laxmi Publications Pvt. Ltd., 17th Edition 2019
2. Coduto, D.P., “Geotechnical Engineering – Principles and Practices”, Prentice Hall of India Pvt.Ltd., 2nd Edition, 2010
3. Das, B.M., “Principles of Geotechnical Engineering”, Brooks / Coles / Thompson Learning Singapore, 8th Edition, 2013

Online Resources:

1. <https://nptel.ac.in/courses/105/101/105101201/>
2. <https://nptel.ac.in/courses/105/105/105105168/>
3. <https://nptel.ac.in/courses/105/101/105101160/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

CONCRETE TECHNOLOGY

B.Tech – V Semester

L/T/P/C

3/ 0/ 0/ 3

Pre-Requisites – Construction Materials

Course Objectives:

- To develop knowledge on concrete mix proportioning.
- To determine the properties of concrete.
- To understand the concept of High Strength & High-Performance Concrete.
- To be familiar with the durability studies on concrete.
- To impart knowledge on new concrete and quality control.

UNIT – I : Concrete Mix Proportioning

Developments of concrete, Concrete mix proportioning: Principles and methods, Concrete manufacturing and its placement - Mix Design - IS and ACI Method

UNIT – II : Properties of Concrete

Fresh and hardened concrete properties and its testing method, Microstructural characterization, Statistical analysis of results - IS codal provisions

UNIT – III : High Strength and High Performance Concrete

High strength and high-performance concretes: Proportioning, Behaviour, Applications and Codal aspects- IS codal provisions

UNIT – IV : Durability study on Concrete

Durability of concrete under various exposure conditions, Alkali-silica reactions, Corrosion of steel in concrete, Protective measures - IS codal provisions

UNIT – V : Special Concrete and Quality Control

High volume fly ash concrete, Fibre reinforced concrete, Self-compacting concrete, Pervious concrete, Geopolymer concrete, Recycled aggregate concrete, Light weight aggregate concrete, Sustainable & durable construction, Quality control and quality assurance during production/construction.

Course Outcomes:

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

CO1: Acquire knowledge on the concrete mix proportioning and manufacturing.

CO2 : Understand the properties of concrete in fresh and hardened state.

CO3 : Ability to know development of High Strength and High Performance Concrete.

CO4 : Understand the importance of durability of concrete.

CO5 : Identify special concrete and Quality Control during construction.

TEXTBOOKS:

1. A.M.Neville, “Properties of Concrete”– Pearson Education Limited, 5th Edition, 2012
2. M.S.Shetty, “Concrete Technology”, S.Chand & Co., 8th Edition, 2019
3. A.R. Santha Kumar, “Concrete Technology”, Oxford university Press, 2nd Edition, 2018

REFERENCE BOOKS:

1. A.M.Neville & J.J.Brooks, “Concrete Technology”– Pearson Education Limited, 2nd Edition, 2019
2. M.L. Gambhir, “Concrete Technology”, Tata Mc. Graw Hill Publishers, 5th Edition, 2009
3. P.K.Mehta and J.M.Monteiro, “Concrete: Microstructure, Properties and Materials”, Mc-Graw Hill Publisher, 4th Edition 2017

Code Books:

1. IS 456:2000, Plain and Reinforced Concrete - Code of Practice, BIS Publication
2. IS 10262-2009, Guidelines for concrete mix design proportioning, BIS Publication
3. ACI 211.1-91, Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete

Online Resources:

1. <https://nptel.ac.in/courses/105/102/105102012/>
2. <https://nptel.ac.in/courses/105/104/105104030/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

HYDROLOGY AND WATER RESOURCE ENGINEERING

B.Tech – V Semester

L/T/P/C

3/ 0/ 0/ 3

Pre Requisites – Fluid Mechanics

Course Objectives:

- To introduce the student with concept of hydrological aspects of water.
- To gain knowledge of Runoff and Hydrograph.
- To understand the concept of Flood and Drought.
- To attain principle and design of Reservoirs.
- Able to know control and regulate the ground water resources.

UNIT – I : Precipitation And Abstractions

Hydrological cycle - Meteorological measurements – Requirements, types and forms of precipitation - Rain gauges - Spatial analysis of rainfall data using Thiessen and Isohyetal methods- Interception - Evaporation. Horton's equation, pan evaporation measurements and evaporation suppression - Infiltration- Horton's equation - double ring infiltrometer, infiltration indices

UNIT – II : Run off

Watershed, catchment and basin - Catchment characteristics - factors affecting runoff - Run off estimation using empirical – Strange's table and SCS methods – Stage discharge relationships flow measurements- Hydrograph – Unit Hydrograph – IUH.

UNIT – III : Flood And Drought

Natural Disasters-Flood Estimation- Frequency analysis- Flood control- Definitions of droughts Meteorological, hydrological and agricultural droughts- IMD method-NDVI analysis- Drought Prone Area Programme (DPAP).

UNIT – IV : Reservoirs

Classification of reservoirs, General principles of design, site selection, spillways, elevation – area- capacity - storage estimation, sedimentation - life of reservoirs – rule curve

UNIT – V : Groundwater and Management

Origin- Classification and types - properties of aquifers- governing equations – steady and unsteady flow - artificial recharge - RWH in rural and urban areas.

Course Outcomes:

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

CO1 : Define the key drivers on water resources and hydrological processes.

CO2 : Apply the knowledge of hydrological models to surface water problems.

CO3 : Explain the concept of Flood and Drought and management strategies.

CO4 : Describe the importance and design water storage reservoirs.

CO5 : Apply the concepts of groundwater for water resources management.

TEXTBOOKS:

1. Subramanya.K. "Engineering Hydrology"- Tata McGraw Hill,4th Edition 2017
2. JayaRamiReddy .P. "Hydrology", Laxmi Publication, 3rd Edition, 2016

3. Chahar BR, "Groundwater Hydrology", Mc Graw Hill Education, First Edition,2017

REFERENCE BOOKS:

1. David Keith Todd & Larry W. Mays "Groundwater Hydrology", John Wiley & Sons, 3rd Edition,2005
2. Ven Te Chow, David.R.Maidment and Mays, Larry W. Mays "Applied Hydrology", McGraw Hill Education, Indian Edition 2017
3. Raghunath .H.M., "Hydrology", New Age International publishers, 3rd Edition, 2015

Online Resources:

1. <https://nptel.ac.in/courses/105/104/105104103/>
2. <https://nptel.ac.in/courses/105/107/105107129/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

HIGHWAY ENGINEERING

B.Tech – V Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites – Surveying

Course Objectives:

- To impart knowledge on highway planning and development.
- To attain knowledge on Design Standards.
- To learn the desirable properties of highway materials and its characterization.
- To make familiar with design and evaluation of pavements.
- To obtain knowledge on Intelligent Transportation Systems.

UNIT – I : Highway Planning and Alignment

Overview of basic characteristics of Transportation systems, social factors and strategic consideration, Road development plans, Highway development projects in India, Road Development organizations, Stages in highway alignment and detailed project Report preparation, Introduction to transportation planning.

UNIT – II : Geometric Design Standards

Cross section elements, sight distances, horizontal and vertical alignments, curves.

UNIT – III : Pavement Material Characterization

Aggregate testing and blending, Bitumen and Bituminous Concrete testing and mixture design protocols, introduction to Super pave Mixture Design protocols

UNIT – IV : Design of Flexible and Rigid Pavements

IRC methods for the design of flexible and rigid highway pavements, Overview of different stages in flexible and rigid highway construction, Overview of Highway Evaluations and Maintenance

UNIT – V : Traffic Engineering

Traffic Characteristics, Highway capacity and level of service concepts, Traffic measurement and analysis, Road marking, Traffic signals, parking studies and analysis, traffic accidents, Introduction to Intelligent Transportation Systems - Exposure to relevant software

Course Outcomes:

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

- CO1:** Acquire skills in selecting the highway alignment and planning.
- CO2:** Design various highways cross sectional elements.
- CO3:** Gain knowledge on highway materials and construction practice.
- CO4:** Design flexible and rigid pavements as per IRC codes.
- CO5:** Extend knowledge on Traffic Engineering.

TEXT BOOKS:

1. Khanna, S.K., Justo, C.E.G and Veeraragavan, A, 'Highway Engineering', Nem Chand & Bros, 10th Edition, 2017
2. Srinivasa Kumar, R, Textbook of Highway Engineering, Universities Press, First Edition 2011
3. Paul H. Wright and Karen K. Dixon, Highway Engineering, Wiley Student Edition, 7th Edition, 2009

REFERENCE BOOKS:

1. Kadiyalai, L.R., 'Traffic Engineering and Transport Planning', Khanna Publishers, First Edition, 1999
2. Partha Chakraborty, "Principles of Transportation Engineering", PHI Learning, 2nd Edition, 2011
3. Fred L. Mannering, Scott S. Washburn, Walter P. Kilareski, "Principles of Highway Engineering and Traffic Analysis", John Wiley, 4th Edition, 2009

Online Resources:

1. <https://nptel.ac.in/courses/105/101/105101087/>
2. <https://nptel.ac.in/courses/105/105/105105107/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**STRUCTURAL ANALYSIS – 2
(Professional Elective – 1)**

B.Tech – V Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites – Structural Analysis - 1

Course Objectives:

- To learn the method of drawing influence lines for the Determinate structures
- To learn the method of drawing influence lines for the Indeterminate structures
- To impart knowledge on analysis of Arches
- To gain knowledge of girders and Suspension bridges
- To analyze the frames using Approximate analysis

UNIT – I : Influence Lines for Determinate Structures

Influence lines for reactions in statically determinate structures – Influence lines for shear force and bending moment in beam sections – Calculation of critical stress resultants due to concentrated and distributed moving loads - influence lines for member forces in pin jointed plane frames.

UNIT – II : Influence Lines for Indeterminate Beams

Influence line for support reactions, shearing force and bending moments for indeterminate beams- propped cantilevers, fixed beams and continuous beams - Muller Breslau's principle.

UNIT – III : Arches

Arches - Types of arches – Analysis of three hinged, two hinged and fixed arches - Parabolic and circular arches – Settlement and temperature effects

UNIT – IV : Suspension Bridges

Equilibrium of cable – length of cable - anchorage of suspension cables – stiffening girders - Cables with three hinged stiffening girders – Influence lines for three hinged stiffening girders.

UNIT – V : Approximate Analysis of Frames

Approximate analysis for gravity loadings - substitute frame method for maximum moments in beams and columns - Approximate analysis for horizontal loads - portal method and cantilever method - assumptions - axial force, shearing force and bending moment diagrams

Course Outcomes:

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

CO1: Draw influence lines for statically determinate structures

CO2: Understand draw the influence lines for statically indeterminate beams.

CO3: Analyse three hinged, two hinged and fixed arches

CO4: Analyse the suspension bridges with stiffening girders

CO5: Analyze rigid frames by approximate methods for gravity and horizontal loads.

TEXTBOOKS:

1. Bhavikatti,S.S, Structural Analysis II, Vikas Publishing House Pvt.Ltd.,4th Edition, 2014.
2. Punmia.B.C, Ashok Kumar Jain and Arun Kumar Jain, Theory of structures, Laxmi, Publications, 13th Edition, 2017

3. Gambhir. M.L., Fundamentals of Structural Mechanics and Analysis, PHI Learning Pvt. Ltd., First Edition, 2011

REFERENCE BOOKS:

1. Negi.L.S and Jangid R.S ., Structural Analysis , Tata McGraw-Hill Publishers, First Edition, 2004
2. Reddy C.S., Basic Structural Analysis, Tata McGraw Hill Publishing Co. Ltd., 3rdEdition,2010
3. Vazrani.V.N and Ratwani. M.M, Analysis of Structures, Vol.II, Khanna Publishers,13th Edition , 2015

Online Resources:

1. <https://nptel.ac.in/courses/105/105/105105166/>
2. <https://nptel.ac.in/courses/105/105/105105109/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
(Professional Elective – 1)**

B.Tech – V Semester

L/T/P/C

3/ 0/ 0/ 3

Pre Requisites – No prerequisites are needed for enrolling into the course

Course Objectives:

- To learn basic concepts of Environmental Impact Assessment
- To impart knowledge on Environmental Assessment
- To gain knowledge on Environmental management plan and report preparation.
- To evaluate Socio economic environment and cost benefit analysis.
- To learn the different case studies on infrastructure projects

UNIT - I : Introduction

Impacts of Development on Environment –Sustainable Development and Environmental Impact Assessment (EIA) – Objectives – Historical development – EIA Types EIA in project cycle –EIA Notification and Legal Framework in India– Selection & Registration Criteria for EIA Consultants, Stakeholders and their Role in EIA

UNIT - II : Environmental Assessment

Screening and Scoping in EIA – Drafting of Terms of Reference -Baseline monitoring, Prediction and Assessment of Impact on land, water, air, noise and energy, flora and fauna - Matrices –Networks – Checklist Methods - Mathematical models for Impact prediction – Analysis of alternatives.

UNIT – III : Environmental Management Plan

Plan for mitigation of adverse impact on water, air and land, water, energy, flora and fauna – Environmental Monitoring Plan – EIA Report Preparation – Review of EIA Reports – Environmental Clearance – Post Project Audit

UNIT – IV : Socio Economic Assessment

Baseline monitoring of Socio-economic environment – Identification of Project Affected Personal – Rehabilitation and Resettlement Plan- Economic valuation of Environmental impacts – Cost benefit Analysis- Public Consultation

UNIT – V : Case Studies

EIA case studies pertaining to Infrastructure Projects – Real Estate Development - Roads and Bridges – Mass Rapid Transport Systems - Ports and Harbour – Airports - Dams and Irrigation projects - Waste Processing and Disposal facilities Mining Projects.

Course Outcomes:

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

CO1: Carry out developmental projects for environmental and social assessments

CO2: Explain different methodologies for environmental impact prediction and assessment

CO3: Plan environmental impact assessments and environmental management plans

CO4: Assess socioeconomic investigation of the environment in a project

CO5: Knowledge to prepare environmental impact assessment reports

TEXTBOOKS:

1. Canter, R.L., Environmental impact Assessment, McGraw Hill Inc., 2nd Edition, 1995
2. Lohani, B., J.W. Evans, H. Ludwig, R.R. Everitt, Richard A. Carpenter, and S.L. Tu. Environmental Impact Assessment for Developing Countries in Asia, Volume 1 – Overview, Asian Development Bank, 1997
3. Peter Morris, Riki Therivel, "Methods of Environmental Impact Assessment", Routledge Publisher, 2nd Edition, 2009

REFERENCE BOOKS:

1. Barry Sadler and Mary McCabe, "Environmental Impact Assessment Training Resource Manual", United Nations Environment Programme, 2002
2. Judith Petts, Handbook of Environmental Impact Assessment Vol. I and II, Blackwell Science, New York, 1999.
3. Ministry of Environment and Forests, EIA Notification and Sectoral Guides, Government of India, New Delhi, 2010

Online Resources:

1. <https://nptel.ac.in/courses/124/107/124107160/>
2. <https://nptel.ac.in/courses/122/102/122102006/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
ADVANCED SURVEYING
(Professional Elective – 1)**

B.Tech – V Semester

L/T/P/C
3/ 0/ 0/ 3**Pre-Requisites** – Surveying**Course Objectives:**

- To understand the method of triangulation and leveling on construction surveys
- To calculate area calculation for earthworks
- To understand the surveying errors and correction methods
- To impart knowledge on topographical maps and numbering system
- To learn advanced surveying through EDM and GPS

UNIT – I

Control Surveys and Geodetic Reductions: Horizontal and Vertical Control Surveys. Triangulation, Trigonometrical Levelling, Boundary Surveys, Construction surveys

UNIT – II

Earthworks: Calculation of areas of a closed traverse, measurements from cross sections, Partition of land, Cross sections, Dip and Strike, Volumes, Mass-haul diagrams

UNIT – III

Surveying Errors and Correction methods: Errors in measurements, Mistakes, Sources of errors, Error propagation, Method of Weights, Least Square solutions

UNIT – IV:

Survey of India - Topographical maps, Map numbering System, Grid patterns

UNIT – V

EDM and GPS: Basic principles, classifications, applications, comparison with conventional Surveying - Electromagnetic wave theory - electromagnetic distance measuring system -principle of working and EDM instruments, Components of GPS – space segment, control segment and user segment, reference systems, satellite orbits, GPS observations

Course Outcomes:

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

CO1: Able to carry out construction survey through triangulation method and levelling.

CO2: Able to calculate the area for Earthworks

CO3: Understand about surveying errors and correction methods

CO4: Understand concepts of topographical maps and numbering system

CO5: Apply the knowledge of EDM and GPS in surveying

TEXT BOOKS:

1. Satheesh Gopi, Sathikumar & Madhu, “Advanced Surveying: Total Station, GIS and Remote Sensing”, Pearson Education India, 2nd Edition, 2017.
2. Chandra, A. M., “Higher Surveying”, New Age International Limited, 3rd Edition, 2015
3. Subramanian, R, “Surveying and Levelling”, Oxford University Press, 2nd Edition, 2012

REFERENCE BOOKS:

1. B. C. Punmia, Ashok K. Jain, Arun K. Jain, “Higher Surveying”, Laxmi Publications, 2017.
2. R. Agor, A Text Book of Advanced Surveying, Khanna Publishers, 5th Edition, 2016
3. Gopi Satheesh, R. Sathikumar and N. Madhu, Advanced Surveying: Total Station, GPS, GIS & Remote Sensing, Pearson Education, 2nd Edition, 2017

Online Resources:

1. <https://nptel.ac.in/courses/105/104/105104100/>
2. <https://nptel.ac.in/courses/105/107/105107121/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

CONCRETE TECHNOLOGY LAB

B.Tech – V Semester

**L/T/P/C
0/ 0/ 3/ 1.5**

Pre Requisites – Concrete Technology

Course Objectives:

- To impart understanding on properties of cement and Aggregates.
- To attain knowledge on Mix proportion Standards.
- To learn the properties of fresh and Hardened Concrete.
- To obtain knowledge on non-destructive testing.

LIST OF EXPERIMENTS

1. Normal consistency, Fineness, Initial setting and Final setting time of cement.
2. Specific gravity, Soundness and Compressive strength of Cement.
3. Specific gravity of Fine and Coarse aggregates.
4. Fineness modulus of Fine aggregate and Coarse aggregate.
5. Impact strength, Crushing strength and Water absorption test on coarse aggregate.
6. Concrete mix design (IS and ACI method).
7. Workability tests on concrete: Slump Cone, Compaction factor and Flow Table Test.
8. Compressive and Split-tensile strength of concrete.
9. Modulus of Elasticity/stress-strain curve in concrete.
10. Non-destructive Testing of Concrete by Rebound Hammer & UPV Test.

Course Outcomes:

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

CO1: Acquire knowledge on properties of cement and aggregate

CO2: Evaluate the workability of fresh Concrete

CO3: Determine the strength characteristics of harden concrete

CO4: Gain knowledge of Non-destructive test on concrete

Reference books:

1. A.M.Neville, “Properties of Concrete”– Pearson Education Limited, 5th Edition, 2012
2. M.S.Shetty, “Concrete Technology”, S.Chand & Co., 8th Edition, 2019
3. A.R. Santha Kumar, “Concrete Technology”, Oxford university Press, 2nd Edition,2018

Online Resources

1. <https://cs-iitd.vlabs.ac.in/List%20of%20experiments.html>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

GEOTECHNICAL ENGINEERING LAB

B.Tech – V Semester

**L/T/P/C
0/ 0/ 3/ 1.5**

Pre Requisites – Geotechnical Engineering

Course Objectives:

- To find out the method and practices of testing properties of the soil
- To learn the principles of permeability of soil
- To study the procedures of testing shear strength parameters of soil
- To obtain compression test on soil.

LIST OF EXPERIMENTS

1. Atterberg Limits (Liquid Limit, Plastic Limit and Shrinkage Limit)
2. Field density (Both sand replacement and core cutter methods)
3. Determination of Specific gravity of soil and Free swell index
4. Grain size distribution by sieve analysis
5. Permeability of soil by constant and variable head test methods
6. Standard Proctor's Compaction Test
7. California Bearing Ratio Test (CBR Test)
8. Determination of Coefficient of consolidation
9. Unconfined compression test,
10. Direct shear test
11. Vane shear test
12. Tri-axial compression test (Laboratory UU test)

Course Outcomes:

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

CO1: Identify and classify soils with reference to their characteristics

CO2: Learn about grain size distribution using sieve analysis

CO3: Calculate the permeability value of the soil

CO4: Determine the shear strength properties of the soil

Reference books:

1. Murthy, V.N.S., "Soil Mechanics and Foundation Engineering", CBS Publishers Distribution Ltd., First Edition, 2018
2. Gopal Ranjan and Rao, A.S.R., "Basic and Applied Soil Mechanics", New Age Ltd. International Publisher, 3rd Edition, 2019.
3. Punmia, B.C., Ashok Kumar Jain and Arun Kumar Jain "Soil Mechanics and Foundations", Laxmi Publications Pvt. Ltd. New Delhi, 17th Edition 2019.

Online Resources

1. <https://smfe-iiith.vlabs.ac.in/>
2. <https://nptel.ac.in/courses/105/101/105101160/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

HIGHWAY ENGINEERING LAB

B.Tech – V Semester

**L/T/P/C
0/ 0/ 3/ 1.5**

Pre Requisites–Highway Engineering

Course Objectives:

- To provide knowledge on test of aggregates
- Impart properties of bitumen by various tests
- To understand Mix Design of sub base and bituminous layer
- To gain knowledge on different Traffic Surveys

LIST OF EXPERIMENTS

Tests on aggregate

1. Shape Test - Flakiness and Elongation Index
2. Los Angeles Abrasion Test
3. *Los Angeles attrition test*

Tests on bitumen

4. Specific Gravity
5. Penetration Grade
6. Softening Point
7. Ductility Value
8. Flash and Fire Point

Mix design

9. Granular Sub-base
10. Bituminous Layer

Traffic Surveys

11. Volume count
12. Intersection turning movements
13. Speed study
14. Speed and delay study
15. Moving observer survey
16. Parking study

Course Outcomes:

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

CO1:Acquisition of skills in testing the aggregates

CO2:Student knows the procedure to design layer of bitumen road.

CO3:Measure the physical properties bitumen for their suitability as road material.

CO4:Analyze the traffic with various traffic surveys.

Reference books:

1. Khanna, S.K., Justo, C.E.G and Veeraragavan, A, 'Highway Engineering', Nem Chand & Bros, 10th Edition, 2017
2. Srinivasa Kumar, R, Textbook of Highway Engineering, Universities Press, First Edition 2011.
3. Kadiyalai, L.R., 'Traffic Engineering and Transport Planning', Khanna Publishers, First Edition, 1999

Online Resources

1. <https://ts-nitk.vlabs.ac.in/transportation-engineering/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

PROJECT BASED LEARNING - 3

B.Tech – V Semester

**L/T/P/C
0/ 0/ 2/ 1**

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

DESIGN OF RC STRUCTURES

B.Tech – VI Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites – Strength of Materials - 1

Course Objectives:

- To provide knowledge on design of beams for flexure
- To gain information on design of beams for shear and Torsion
- To understand limit state design of slabs and staircase
- To gain knowledge on design of columns
- To impart knowledge on design of Footings

UNIT – I : Design Concepts and Design of Beams for Flexure

Design Philosophies: Concepts of working stress in comparison with limit state method; Limit state design for flexure of singly and doubly reinforced rectangular and flanged section beams.

UNIT – II : Limit State Design of Beams for Shear, Torsion and Serviceability

Design for bond, anchorage and development length; Design of beams for shear; Limit state of serviceability for beams.

UNIT – III : Limit State Design of Slabs and Staircase

Design of one-way and two-way slabs - Design of flat slabs, Design of simple stair cases

UNIT – IV : Limit State Design of Columns

Types of columns – Design of columns for axial load, combined axial load with uniaxial and biaxial bending - Use of design aids.

UNIT – V : Limit State Design of Footing

Different types of footings–Design of isolated, square, rectangular, circular footings and combined footings.

Course Outcomes:

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

CO1: Design the singly reinforced, doubly reinforced and flange sections.

CO2: Design the RC beams under shear and torsion.

CO3: Design the one-way slab, two-way slab and staircase.

CO4: Design the axially loaded, uniaxial and biaxial bending columns.

CO5: Design the isolated square, rectangular and circular footings.

TEXT BOOKS:

1. B.C. Punmia, Ashok K. Jain and Arun K. Jain, “Limit State design of Reinforced Concrete”, Laxmi Publications (P) Ltd., 2nd Edition, 2016
2. Unnikrishnan Pillai and Devdas Menon, “Reinforced Concrete Design”, Tata McGraw Hill Publishing Company Ltd., 3rd Edition, 2017
3. N.Krishnaraju, “Design of Reinforced Concrete Structures, IS: 456-2000”, CBS Publications, 4th Edition, 2019

REFERENCE BOOKS:

1. N. Subramanian, “Design of Reinforced Concrete Structures”, Oxford University Press, First Edition, 2014
2. P.C. Varghese, “Limit State Design of Reinforced Concrete”, Prentice Hall of India, Pvt. Ltd., 2nd Edition, 2008
3. S.N. Sinha, “Reinforced Concrete Design”, Tata McGraw-Hill, Second Edition, 2002

Code books:

1. IS 456:2000 Plain and Reinforced Concrete – Code of Practice.
2. IS 875(1-5):1987 Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures.
3. SP 16:1980 Design Aids for Reinforced Concrete.
4. SP 34:1987 Handbook of concrete reinforcement and detailing.

Online Resources:

1. <https://nptel.ac.in/courses/105/105/105105105/>
2. <https://nptel.ac.in/courses/105/105/105105104/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
ESTIMATION AND VALUATION PRACTICE**

B.Tech – VI Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites – No prerequisites are needed for enrolling into the course

Course Objectives:

- To understand the types of estimates
- To identify the methods used for different structural estimation
- To understand the estimation of Roads.
- To understand rate analysis, Tenders and Contracts.
- To make the students to learn valuation of buildings.

UNIT – I : Introduction- Methods of estimates

General items of work in building – standard units – principles of working out quantities for detailed and abstract estimates –methods of estimates of buildings

UNIT – II : Quantity Estimation for Building and Structural Steel

Estimation of building - short wall and long wall method - Centre line method - Report writing- Estimate of R.C.C and structural Steel - Scheduling - Slab – beam – column

UNIT – III : Quantity Estimation for Roads

Road estimation - earthwork fully in banking - cutting - partly cutting & partly filling – Detailed estimate and cost analysis for roads

UNIT – IV : Rate Analysis, Tenders and Contracts

Schedule of Rate : PWD & CPWD - Rate analysis & preparation of bills - Data analysis of rates for various items of works - Substructure components - Rate analysis for R.C.C. slabs, columns and beams - Tenders- Tender document - Cost & quality control - Contracts - Types of contracts - Arbitration and legal requirements

UNIT – V : Valuation

Valuation- Capitalized value - Depreciation - Value of building - Mortgage – Lease- Measurement book, Stores. BOT & EPC - Case studies.

Course Outcomes:

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

- CO1:** Understand the methods of estimates of buildings.
- CO2:** Understand the concepts of estimate for different types of structures
- CO3:** Prepare detailed estimate for roads
- CO4:** Evaluate rate for works and learn about tenders and contracts
- CO5:** Prepare valuation reports of buildings

TEXT BOOKS:

1. Datta B.N. Estimating and Costing, Charator Publishing House, 28th Revised Edition,2016
2. Kohli D. D and Kohli R.C, "Estimating and Costing", S. Chand Publishers,13th Edition, 2013
3. Duncan Cartlidge, "Quantity Surveyor's Pocket Book", Routledge Publishers, 2012

REFERENCE BOOKS:

1. Vazirani V. N and Chandola S. P, "Estimating and costing", Khanna Publishers, 6th Edition, 2015
2. Rangwala, C. "Estimating, Costing and Valuation", Charotar Publishing House Pvt. Ltd., 17th Edition, 2017
3. PWD Data Book and CPWD Schedule of Rates (SoR)

Online Resources:

1. <https://nptel.ac.in/courses/105/103/105103093/>
2. <https://nptel.ac.in/courses/105/106/105106149/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

ENVIRONMENTAL ENGINEERING

B.Tech – VI Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites – No prerequisites are needed for enrolling into the course

Course Objectives:

- To impart knowledge about Water quality Standards
- To acquaint the students with the basic concepts of Water Distribution systems
- To understand the process of water treatment.
- To gain knowledge about air pollution.
- To make the students conversant with Solid waste management.

UNIT- I : Water Quality

Basics of water quality standards – Physical, chemical and biological parameters; Water quality index; Unit processes and operations; Water requirement.

UNIT – II : Distribution system

Distribution system requirement –method and layouts -Design procedures- Hardy Cross and equivalent pipe methods pipe – joints, valves such as sluice valves, air valves, scour valves and check valves water meters – laying and testing of pipelines – pump house - Conservancy and water carriage systems – sewage and storm water estimation – time of concentration – storm water overflows combined flow

UNIT- III : Drinking and Waste Water Treatment

Drinking water treatment, Sewerage system design, quantity of domestic wastewater, primary and secondary treatment, Effluent discharge standards; Sludge disposal; Reuse of treated sewage for different applications

UNIT – IV: Air Pollution

Types of pollutants, their sources and impacts, air pollution control, air quality standards, Air quality Index and limits.

UNIT – V: Municipal Solid Wastes

Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/recycle, energy recovery, treatment and disposal).

Course Outcomes:

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

CO1: Acquire the knowledge of the water quality standards and requirement.

CO2: Understand the methods of water distribution system.

CO3: Demonstrate the steps involved in drinking and waste water treatment.

CO4: Explain the impacts of Air Pollution.

CO5: Gain knowledge management of Municipal Solid Waste.

TEXT BOOKS:

1. Howard S. Peavy, Donald R. Rowe and George Tchobanoglous, “Environmental Engineering”, McGraw Hill, First Edition 2017
2. Duggal, K. N., Elements of Environmental Engineering, S. Chand & Co., 3rd Edition, 2008.
3. Birdie, G. S. and Birdie, Water Supply and Sanitary Engineering, Dhanpat Rai & Sons,

Revised Edition, 2014

REFERENCE BOOKS:

1. Manual on Water supply and Treatment – CPHEEO, 1999
2. Davis M. L. and Cornwell D. A., Introduction to Environmental Engineering, Tata McGraw Hill Education Pvt. Ltd., 5th Edition, 2017
3. Punmia B. C., Ashok Jain & Arun Jain, Water Supply Engineering, Laxmi Publication Pvt., Ltd., 2nd Edition, 2016

Online Resources:

1. <https://nptel.ac.in/courses/103/107/103107084/>
2. <https://nptel.ac.in/courses/105/106/105106119/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**FOUNDATION ENGINEERING
(Professional Elective – 2)**

B.Tech – VI Semester

L/T/P/C

3/ 0/ 0/ 3

Pre-Requisites – Geotechnical Engineering

Course Objectives:

- To attain adequate knowledge in soil exploration methods and testing.
- To attain knowledge on the earth pressure in soils
- To attain knowledge on types and failures of Foundation
- To impart knowledge on shallow foundations and settlement of structures.
- To learn the concepts of Pile Foundation.

UNIT – I : Soil Exploration

Soil exploration - Planning - Augur boring - Soundings - Sampling - Plate load test, static and dynamic penetrations tests - geophysical explorations

UNIT – II : Earth Pressure and Stability Analysis

Lateral Earth Pressure – Plastic equilibrium - Rankine's theory - Active and passive earth pressure for cohesionless and cohesive soils - Earth pressure at rest - Coloumb's wedge theory - Rebhann's and Culmann's graphical solutions, Stability analysis.

UNIT – III : Foundation

Foundation - functions and requisites- Different types - choice of foundation type – general principles of design. Bearing capacity - types of failures - Prandtl's and Terzaghi's bearing capacity analysis - Bearing capacity based on settlement and building codes.

UNIT –IV : Shallow Foundations

Shallow foundation - spread footings - combined footings - trapezoidal and strap footings -Raft foundation - Contact pressure distribution - settlement analysis - Types of settlement, Control

UNIT –V : Deep Foundation

Deep foundation - piles - types - load carrying capacity of pile - static and dynamic formula - pile load test - penetration test - pile groups - Efficiency - Feld's rule – Converse Labarre formula, Settlement of piles and pile groups - Negative skin friction – under-reamed piles

Course Outcomes:

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

CO1: Understand the methods of soil investigation for any civil engineering construction

CO2: To analyse earth retaining structures in various types of soil medium

CO3: Do proper bearing capacity estimation including IS code methods

CO4: Do proper foundation proportioning for any kind of shallow foundation system.

CO5: To estimate pile and pile group capacity for any kind of soils.

TEXT BOOKS:

1. Murthy, V.N.S, “A text book of Soil Mechanics and Foundation Engineering”, CBS Publishers & Distributors Pvt. Ltd., Revised Edition, 2018

2. Gopal Ranjan and Rao, “Basic and Applied Soil Mechanics”, New Age International (P) Limited, 3rd Edition, 2016
3. Donald P. Coduto, Man-Chu Ronald Yeung and William A. Kitch, “Geotechnical Engineering, Principles and Practices”, PHI Learning Private limited, 2nd Edition, 2010

REFERENCE BOOKS:

1. Nainan P Kurian, “Design of foundation Systems Principles and Practices”, Narosa Book Distributor, 3rd Edition, 2011
2. Punmia, B.C., “Soil Mechanics and Foundation Engineering”, Laxmi Publications Pvt. Ltd., 16th Edition, 2017
3. Shenbaga R Kaniraj, “Design Aids in Soil Mechanics and Foundation Engineering”, Tata McGraw Hill, Revised Edition, 2011

Online Resources:

1. <https://nptel.ac.in/courses/105/105/105105176/>
2. <https://nptel.ac.in/courses/105/101/105101083/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**REMOTE SENSING
(Professional Elective – 2)**

B.Tech – VI Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites–No prerequisites are needed for enrolling into the course

Course Objective

- To make the students to understand the concepts and components of remote sensing
- To understand the EMR interaction with atmosphere and earth material
- To gain knowledge about different types of remote sensing platforms and sensors
- To gain knowledge about sensing techniques
- To make the students to know application of Remote Sensing

UNIT – I : Remote Sensing And Electromagnetic Radiation

Definition – components of RS – History of Remote Sensing – Merits and demerits of data collation between conventional and remote sensing methods - Electromagnetic Spectrum – Radiation principles - Wave theory, Planck’s law, Wien’s Displacement Law, Stefan’s Boltzmannlaw, Kirchoff’s law – Radiation sources: active & passive - Radiation Quantities

UNIT – II : EMR Interaction with Atmosphere and Earth Material

Standard atmospheric profile – main atmospheric regions and its characteristics – interaction of radiation with atmosphere – Scattering, absorption and refraction – Atmospheric windows – Energy balance equation – Specular and diffuse reflectors – Spectral reflectance & emittance –Spectroradiometer – Spectral Signature concepts – Typical spectral reflectance curves for vegetation, soil and water – solid surface scattering in microwave region.

UNIT - III : Orbits and Platforms

Motions of planets and satellites – Newton’s law of gravitation - Gravitational field and potential -Escape velocity - Kepler’s law of planetary motion - Orbit elements and types – Orbital perturbations and maneuvers – Types of remote sensing platforms - Ground based, Airborne platforms and Space borne platforms – Classification of satellites – Sun synchronous and Geosynchronous satellites – Legrange Orbit.

UNIT – IV : Sensing Techniques

Classification of remote sensors – Resolution concept : spatial, spectral, radiometric and temporal resolutions - Scanners - Along and across track scanners – Optical-infrared sensors – Thermal sensors – microwave sensors – Calibration of sensors - High Resolution Sensors - LIDAR , UAV–Orbital and sensor characteristics of live Indian earth observation satellites

UNIT – V : Data Interpretation And Civil Engineering Applications

Photographic and digital products – Types, levels and open source satellite data products – selection and procurement of data– Visual interpretation: basic elements and interpretation keys– Digital interpretation – Concepts of Image rectification, Image enhancement and Image classification – Civil Engineering applications: highway and railway alignments, site selection for dams, town and regional planning

Course Outcomes:

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

CO 1: Understand the concepts and laws related to remote sensing

CO 2: Understand the interaction with atmosphere and earth material

CO 3: Acquire knowledge about satellite orbits and different types of satellites

CO 4: Understand the different types of remote sensors

CO 5: Learn concepts of satellite imagery and civil engineering applications

TEXTBOOKS:

1. Thomas M.Lillesand, Ralph W. Kiefer and Jonathan W. Chipman, “Remote Sensing and Image interpretation”, John Wiley and Sons, Inc, 7th Edition, 2015
2. George Joseph and C Jeganathan, “Fundamentals of Remote Sensing”, Universities Press (India) Private limited, Revised Edition, 2018
3. Basudeb Bhatta, “Remote Sensing and GIS”, Oxford University Press, 2nd Edition, 2011

REFERENCE BOOKS:

1. Verbyla, David, “Satellite Remote Sensing of Natural Resources”, CRC Press, 1995
2. Paul Curran P.J., “Principles of Remote Sensing”, Longman, RLBS, 2003
3. Charles Elachi and Jacob Van Zyl, “Introduction to Physics and Techniques of Remote Sensing”, Wiley Publication, 2nd Edition, 2006

Online Resources:

1. <https://nptel.ac.in/courses/105/108/105108077/>
2. <https://nptel.ac.in/courses/105/103/105103193/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**SYSTEM ANALYSIS IN CIVIL ENGINEERING
(Professional Elective – 2)**

B.Tech – VI Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites – No prerequisites are needed for enrolling into the course

Course Objectives:

- To make the students to understand the concepts of modelling techniques
- To understand the linear programming by different methods
- To gain knowledge on dynamic programming for resource allocation and scheduling
- To gain knowledge about decision making under risk
- To make the students to know concepts of simulation and its types
-

UNIT – I : Modeling Techniques

Concepts of Systems Engineering, Types of mathematical models, Formulation of a prescriptive model, Overview of optimization techniques

UNIT – II : Linear Programming

Linear Programming, Graphical method, Simplex method, Sensitivity analysis, Dual LP, Transportation problem, Assignment problem, Integer Linear Programming

UNIT – III : Dynamic Programming

Concepts of dynamic programming, Formulation of recursive equation, Resource allocation using DP, Capacity expansion, Inventory control. Nonlinear Optimization, Classical optimization techniques, Lagrange methods, Kuhn-Tucker conditions, steepest gradient technique and other gradient based search techniques, Overview of genetic algorithm.

UNIT – IV : Decision Theory

Decision analysis, Decision making under risk and uncertainty, Markovian decision process, stochastic inventory control

UNIT – V : Simulation

Types of simulation models, Monte-Carlo simulation, Applications of simulation, Overview of Multi Objective Optimization Techniques

Course Outcomes:

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

CO1 : Formulate and solve deterministic optimization models

CO2 : Apply Linear programming for practical problems

CO3 : Apply deterministic optimization techniques for resource allocation and scheduling

CO4 : Apply decision theory for decision making under uncertainty

CO5 : Formulate optimization models for planning and design of civil engineering systems

TEXT BOOKS:

1. Charles S. Revelle, E. Earl Whitlatch and Jeff R. Wright., “Civil and Environmental Systems Engineering”, Pearson Education Inc., 2nd Edition, 2003
2. P D Dahe, “Operations Research – A Systems Engineering Approach”, CENGAGE India, First Edition, 2019

REFERENCE BOOKS:

1. Fredrick S Hillier and Gerald J Lieberman, “Introduction to Operations Research”, McGraw Hill Education, 10th Edition, 2017
2. Luis Amador-Jimenez., “Civil Engineering Systems Analysis”, Apple Academic Press Inc.,2016

Online Resources:

1. <https://nptel.ac.in/courses/105/108/105108130/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**IRRIGATION AND HYDRAULIC STRUCTURES
(Professional Elective – 3)**

B.Tech – VI Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites – Hydraulics and Hydraulic Machinery

Course Objectives:

- To attain adequate knowledge on Dams and Reservoirs.
- To understand the forces acting and causes of Gravity Dam
- To determine the design principles of spillways
- To impart knowledge on weirs and barrages.
- To learn the mechanism of canal regulation works.

UNIT – I : Storage Works

Storage Works-Reservoirs - Types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve- Reservoir Sedimentation – Life of Reservoir. Types of dams, factors affecting selection of type of dam, factors governing selection of site for a dam

UNIT – II : Gravity Dams

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile, and practical profile of a gravity dam, limiting height of a low gravity dam, Factors of Safety - Stability Analysis, Foundation for a Gravity Dam, drainage and inspection galleries.

UNIT - III : Earth Dams and Spillways

Earth dams: types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage. Spillways: types of spillways, Design principles of Ogee spillways - Spillway gates. Energy Dissipaters and Stilling Basins Significance of Jump Height Curve and Tail Water Rating Curve - USBR and Indian types of Stilling Basins

UNIT - IV : Diversion Head Works

Diversion Head works: Types of Diversion head works- weirs and barrages, layout of diversion head work - components. Causes and failure of Weirs and Barrages on permeable foundations, -Silt Ejectors and Silt Excluders

Weirs on Permeable Foundations – Creep Theories - Bligh's, Lane's and Khosla's theories, Determination of uplift pressure- Various Correction Factors – Design principles of weirs on permeable foundations using Creep theories - exit gradient, U/s and D/s Sheet Piles- Launching Apron.

UNIT - V : Canal Regulation Works

Canal Falls - types of falls and their location, Design principles of Notch Fall and Sarada type Fall - Canal regulation works, principles of design of cross and distributary head regulators, types of Canal escapes - types of canal modules, proportionality, sensitivity, setting and flexibility. Cross Drainage works: types, selection of suitable type, various types, design considerations for cross drainage works

Course Outcomes:

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

CO 1: Identify the importance and functions of Dams and Reservoirs.

CO 2: Understand the concepts of Gravity dam.

CO 3: Ability to know types and design principles of Earth dam and spillway.

CO 4: Understand the principles of diversion head works.

CO 5: Able to know design considerations of canal regulation works.

TEXT BOOKS:

1. Santhosh kumar Garg, "Irrigation Engineering and Hydraulic structures", Khanna Publishers, 36th Edition, 2006
2. K. R. Arora , "Irrigation Engineering", Standard Publishers, 2nd Edition,2010
3. Dr. B. C. Punmia, Dr. Pande Brij Basi Lal, Ashok Kumar Jain, Arun Kumar Jain, "Irrigation and Water Power Engineering", Laxmi Publications,17th Edition, 2021

REFERENCE BOOKS:

1. R.S. Varshney, S.C. Gupta and R.L. Gupta, "Theory and Design of Irrigation Structures", Nem Chand & Bros, Revised Edition, 2009
2. A. M. Micheal, "Irrigation Theory and Practice", Vikas Publishing House, 2nd Edition, 2015
3. G.L. Asawa, "Irrigation and Water Resources Engineering" , New Age International Publishers, First Edtion, 2005

Online Resources:

1. <https://nptel.ac.in/courses/105/105/105105110/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**RAILWAY, AIRPORT AND HARBOUR ENGINEERING
(Professional Elective – 3)**

B.Tech – VI Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites – No prerequisites are needed for enrolling into the course

Course Objectives:

- To know about the basics of railway engineering.
- To study about the types and functions of track, junctions and railway stations.
- To learn about the aircraft characteristics, planning and components of airport.
- To study about the types and components of docks and harbours.
- To know about urban transportation systems and Intelligent Transportation Systems.

UNIT – I : Railway Engineering

Railway Engineering - Location surveys and alignment - Permanent way - Gauges - Components - Functions and requirements - Geometric design

UNIT – II :Track, Junction and Station

Track Junctions-Points and crossings - types and functions - design and layout - simple problems - Railway stations and yards. Signalling and interlocking - control systems of train movements.

UNIT – III : Airport Engineering

Airport Engineering-Aircraft characteristics - Airport obstructions and zoning - Runway - taxiways and aprons- Terminal area planning

UNIT – IV : Docks and Harbours

Docks and Harbours - Types - Layout and planning principles- breakwaters - docks- wharves and quays - Transit sheds- warehouses- navigation aids.

UNIT – V : Transportation Systems

Urban transportation systems - Bus transit - Mass Rapid Transit System - Light Rail Transit. Transport economics and Financing - Intelligent Transportation Systems (ITS)

Course Outcomes:

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

- CO1:** Understand the concept of cadastral maps
- CO2:** Able to know functions of track, junctions and railway stations
- CO3:** Understand the basics and components of Airport Engineering
- CO4:** Know the fundamentals and planning principles of docks and harbours
- CO5:** Acquire knowledge on Intelligent Transportation systems

TEXT BOOKS:

1. K.P. Subramaniam, “Highway Railway Airport and Harbour Engineering”, Scitech Publications (India) Pvt Ltd, Revised Edition, 2018
2. Saxena Subhash, C. and Satyapal Arora, “A textbook of Railway Engineering”, Dhanapat Rai and Sons, Delhi, Revised Edition 2010
3. Khanna. S.K. Arora. M. G and Jain. S. S, “Airport Planning and Design”, Nemchand and Bros, Roorkee, First Edition, 1994

REFERENCE BOOKS:

1. Venkatramaiah. C., “Transportation Engineering-Vol.2 Railways, Airports, Docks and Harbours, Bridges and Tunnels”, Universities Press (India) Private Limited, Hyderabad, 2015.
2. Rangwala, “Railway Engineering”, Charotar Publishing House, 27th Edition, 2017
3. Rangwala, “Airport Engineering”, Charotar Publishing House, 17th Edition, 2018

Online Resources:

1. <https://nptel.ac.in/courses/105/107/105107123/>
2. <https://nptel.ac.in/courses/114/106/114106025/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**GEOGRAPHICAL INFORMATION SYSTEM
(Professional Elective – 3)**

B.Tech – VI Semester

L/T/P/C

3/ 0/ 0/ 3

Pre-Requisites–No prerequisites are needed for enrolling into the course

Course Objectives:

- To attain adequate knowledge in Geo referencing of maps.
- To understand fundamental concept of GIS
- To attain knowledge on spatial analysis and buffering
- To impart knowledge GIS Project planning
- To learn the application of GIS in various field

UNIT – I : Introduction

GIS definition, development, application areas, Map Concept: Map-Definition, Elements of Maps, Types of maps, Advantages and disadvantages of analog /digital maps, Coordinate Systems- Geometric models of earth, Global/Local coordinate system, Projection Systems- Classification, Cylindrical projection, Conical projection, Selection of a particular projection

UNIT – II : Fundamental concepts of GIS

Fundamental concepts of GIS: Modeling Real World Features- Raster data model, vector data model, Data Formats- Spatial and Non-Spatial data

Database preparation and editing: Data collection and Input, Data conversion, Hardware & software Requirements, Topology – Editing and Error Rectification, Types of topology, Topological Relationships

UNIT – III : Spatial Analysis

Spatial Analysis: Buffer Analysis-Variations in Buffering, Applications of buffering, Overlay Analysis-Feature type and overlay, Vector Overlay methods, Network Analysis-Impedance, Shortest path analysis, closest facility, Concepts of Proximity analysis, Neighbourhoodoperations, DEM and TIN

UNIT – IV : GIS Project Planning

GIS Project Planning: Steps in GIS project, Problem Identification and Implementation of a GIS project.

UNIT – V : GIS Applications

GIS Applications: Transportation, Water Resources, Environment, Geology, Emergency Management, Agriculture, Urban planning, climate change, Business - Advances in GIS: Concepts and application of open-source Mobile and Web GIS.

Course Outcomes:

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

CO 1: Understand the concept of maps, coordinate system and projections

CO 2: Able to identify concept of GIS and Data preparation

CO 3: Able to know spatial analysis and buffering operations

CO 4: Understand the steps for planning GIS projects

CO 5: Applying the GIS concepts in various fields

TEXT BOOKS:

1. Char Pang Lo, Albert K. W. Yeung, “Concepts and Techniques of Geographic Information Systems”, Prentice Hall India Pvt. Ltd, New Delhi, 2nd Edition, 2016
2. Kang-Tsung Chang, “Introduction to Geographic Information Systems”, Tata McGraw Hill Publishing Company Ltd, New Delhi, 9th Edition, 2018
3. Paul Longley, “Geographic Information systems and Science”, John Wiley & Sons, 4th Edition, 2015

REFERENCE BOOKS:

1. Peter A. Burrough and Rachael A. McDonnell & Christopher D. Lloyd., “Principles of Geographical Information Systems”, Oxford University Press, 3rd Edition, 2016
2. Satheesh Gopi, R. Shathikumar, N. Madhu, “Advanced Surveying: Total Station, GPS, GIS & Remote Sensing”, Pearson Education, 2nd Edition, 2018
3. Michael N. DeMers, “Fundamentals of Geographic Information Systems”, John Wiley & Sons, 4th Edition, 2008

Online Resources:

1. <https://nptel.ac.in/courses/105/107/105107155/>
2. <https://nptel.ac.in/courses/107/105/107105088/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

Open elective - 1

B.Tech – VI Semester

**L/T/P/C
3 0/ 0/ 3**

Note: Students should take open electives from the list of open electives offered by the other departments/branches only.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

STRUCTURAL DESIGN AND DETAILING LAB

B.Tech – VI Semester

**L/T/P/C
0/ 0/ 3/ 1.5**

Pre-Requisites–Design of RC Structure

Course Objectives:

- To understand the principles of design and detailing of RC Elements
- To attain the knowledge of design of retaining walls and Tanks
- To understand concept of design and detailing of steel elements
- To enable the students to analyze multi – storey frames with software tool

LIST OF EXERCISES

Design drawing and detailing of RC elements / structures – preparation of detailed design documents, bar bending schedules of structural elements and reinforcement details (Structural drawing).

1. Framed structure
2. Retaining walls
3. Water tanks

Design and detailing of steel elements / structures

4. Built-up columns and Column bases
5. Roof trusses and joints including purlins
6. Gantry girder

Computer aided analysis and design

7. Multi-storey frame analysis for dead, live and wind loads – Applications.
8. Design of Reinforced concrete Beams and Columns
9. Design of Footings
10. Design of Steel beams, Columns and Trusses

Course Outcomes:

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

CO1: Draw and show the detailing of RC Elements.

CO2: Draw and show the detailing of Water Tanks

CO3: Draw and show the detailing of Steel Elements

CO4: Analyze the frame, elements and trusses by software tool.

REFERENCE BOOKS

1. B.C. Punmia, Ashok K. Jain and Arun K. Jain, “Limit State design of Reinforced Concrete”, Laxmi Publications (P) Ltd., 2nd Edition, 2016
2. Unnikrishnan Pillai and Devdas Menon, “Reinforced Concrete Design”, Tata McGraw Hill Publishing Company Ltd., 3rd Edition, 2017
3. N. Krishnaraju, “Design of Reinforced Concrete Structures, IS: 456-2000”, CBS Publications, 4th Edition, 2019

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

ENVIRONMENTAL ENGINEERING LAB

B.Tech – VI Semester

**L/T/P/ C
0/ 0/ 3/ 1.5**

Pre Requisites–Environmental Engineering

Course Objectives:

- To conduct test on determination of water standards
- To understand the procedure of determining various parameters of water
- To impart knowledge on evaluating chloride content
- To attain knowledge of B.O.D and C.O.D determination

LIST OF EXPERIMENTS

1. Determination of pH
2. Determination of Turbidity
3. Determination of Conductivity
4. Determination of Acidity.
5. Determination of iron.
6. Determination of Dissolved Oxygen.
7. Determination of Nitrates.
8. Determination of Chlorine demand
9. Determination of total Phosphorous.
10. Determination of B.O.D
11. Determination of C.O.D

Course Outcomes

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

CO1: Test water to determine pH and conductivity

CO2: Estimate quality of water

CO3: Determine chloride content in water

CO4: Determine BOD and COD of water

REFERENCE BOOKS:

1. Howard S. Peavy, Donald R. Rowe and George Tchobanoglous, “Environmental Engineering”, McGraw Hill, First Edition 2017
2. Duggal, K. N., Elements of Environmental Engineering, S. Chand & Co., 3rd Edition, 2008.

Online Resources:

1. <https://ee1-nitk.vlabs.ac.in/List%20of%20experiments.html>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)****ADVANCED ENGLISH COMMUNICATIONS SKILLS LAB****B.Tech – VI Semester****L/T/P/ C
0/ 0/ 3/ 1.5****Prerequisite:** English Language and Interactive Communication Skills Lab**Introduction**

The introduction of the Advanced English Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen, speak, read, and write in English both for their professional and interpersonal communication in the globalised context.

The proposed lab should be a laboratory course to enable students to use ‘good’ English and perform the following:

- Gather ideas and information to organize ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice-versa.
- Take part in social and professional communication.

Course Objectives

This Lab focuses on using multi-media instruction for language development to meet the following targets. By the end of the course the students will be able

- To prepare the students for their placements by improving communication skills.
- To familiarize and train students with the types and elements of Résumé/ Curriculum Vitae.
- To expose students to the concepts of report writing familiarize and train students to write technical reports.
- To practice interview skills as an observer, an interviewer and/or an interviewee.

Course Outcomes

After completing this course, students will be able to:

- CO1** Participate in group discussion to present their viewpoints briefly and effectively.
- CO2** Inculcate flair for writing and felicity in written expression in Résumé / Curriculum Vitae / Reports.
- CO3** Participate confidently with appropriate body language in interviews.
- CO4** Enhance their team building skills and capabilities for effective decision making.

Syllabus**Module 1: Fundamentals of Interpersonal Communication**

- ❖ Listen to process information- give information, as part of a simple explanation – conversation starters: small talk-exposure to functional aspects of intonation- accent- tone- pauses for practice – compare information and ideas from multiple sources- converse with reasonable accuracy over a wide range of everyday topics.
- ❖ Lexical chunks for accuracy and fluency- factors influencing the fluency, Role play-deliver a five-minute formal / informal talk – greetings – respond to greetings – invite and offer – accept – decline – take leave- making a request-apology etc.

- ❖ Listening for gist- listening for details-Being an active listener: giving verbal and non-verbal feedback – Summarizing academic readings and lectures - conversational speech listening to and participating in conversation – persuasion.

Module 2: Effective Writing Skills

- ❖ Résumé Writing-Concept of Résumé Writing-Professional career objective-Resume-Curriculum vitae, Biodata: Difference-Format of Résumé and Types of Résumés -Tips to build a winning Résumé-Tips to write effective cover letter-Statement of Purpose-Letters of Recommendation.
- ❖ Report Writing-Elements of Report Writing- Significance, format, layout, and mechanism- types of Reports-Newspaper Reports-Technical reports -Special Reports-Report in manuscript format.

Module 3: Presentation Skills

Oral presentations - individual and group through JAMsessions/seminars/PPTs and Written presentations through posters/projects/reports.

Module 4: Group Discussion

Concept and process of Group Discussion-Importance of Group Discussion-Do's and Don'ts of Group Discussion-Group Discussion for placements-Practice on topics–Current affairs, Abstract topics, General awareness, Business and economy, Education and Social issues.

Module 5: Interview Skills

Interview Skills: Meaning and Purpose of an Interview-Types of interviews-telephonic interview, video conference-(n)etiquette; Interview preparation techniques-Dress code at an interview-Types of interview questions-FAQs in HR Interview.

Minimum Requirement of infrastructural facilities for Advanced English Communication Skills Lab:

The Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics
- Audio-visual aids
- LCD Projector
- Public Address system
- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo
- Headphones of High quality
- Forty movable chairs and Eight round tables to accommodate 5 students per each table

Prescribed Lab Manual: A book titled **A Coursebook of Advanced Communication Skills Lab** published by Universities Press, Hyderabad.

Suggested Software: The software of the topics prescribed above are procured and used.

- **Globarena**
- **Open source software**
- **Oxford Advanced Learner's Compass, 8thEdition**
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)**
- **The following software from 'train2success.com'**
 - **Positive Thinking**
 - **Interviewing Skills**
 - **Telephone Skills**
 - **Time Management**

- **Skill mate**
- **Presentation skills, Cambridge (with VCD)**

Books Prescribed:

1. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. **English Language Communication : A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
3. **Advanced Communication Skills Laboratory Manual** by Sudha Rani, D, Pearson Education 2011.
4. **Technical Communication** by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
5. **Business and Professional Communication: Keys for Workplace Excellence.** Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

- The practical examinations for the Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
- For the English Language lab sessions, there shall be continuous evaluation during the year for 30 sessional marks and 70 End Examination marks. Of the 30 marks, 20 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

Mini Project: As a part of Internal Evaluation

- **Seminar/ Professional Presentation**
- **A Report on the same has to be prepared and presented.**
- **Teachers may use their discretion to choose topics relevant and suitable to the needs of students.**
- **Not more than two students to work on each mini project.**
- **Students may be assessed by their performance both in oral presentation and written report.**

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

PROJECT BASED LEARNING - 4

B.Tech – VI Semester

**L/T/P/ C
0/ 0/ 2/ 1**

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

B.Tech – VII Semester

L/T/P/ C

3/ 0/ 0/ 3

Pre Requisites: None

Course Objective:

- To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business, operations cost analysis, markets, forms of business organizations, capital budgeting and financial accounting and financial analysis.

Unit I

Introduction & Demand Analysis.

Definition. Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants. Law of Demand and its exceptions. Elasticity of Demand: Definition. Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting. Factors governing demand forecasting. methods of demand forecasting.

Unit II

Production & Cost Analysis: Production Function

Isoquants and Is costs. MRTS. Least Cost Combination of Inputs. Cobb - Douglas Production function. Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts. Break - even Analysis (BEA) -Determination of Break - Even Point (simple problems) - Managerial Significance.

Unit III

Markets & New Economic Environment:

Types of competition and Markets. Features of Perfect competition, Monopoly and Monopolistic Competition. Price - Output Determination in case of Perfect Competition and Monopoly. Pricing Objectives and Policies of Pricing. Methods of Pricing. Eusness: Features and evaluation of different forms of Business Organization: Sole Proprietorship. Partnership. Joint Stock Company, Public Enterprises and their types. New Economic Environment Changing Business Environment in Post liberalization scenario.

Unit IV

Capital Budgeting:

Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements. Methods and sources of raising capital Trading Forecast. Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals. Methods of Capital Budgeting: Payback Method. Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Unit V

Introduction to Financial Accounting & Financial Analysis:

Accounting concepts and conventions - Introduction IFRS Ledger. Double - Entry Book Keeping, Journal, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance sheet with simple adjustments).

Financial, Analysis: Analysis and Interpretation of Liquidity Ratios. Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart

References:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand '2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis. New Age International Publishers, Hyderabad 2013
3. M' Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi. 2012.
4. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi, 2012.

Course Outcomes:

- CO1** Understand the nature, scope and importance of Managerial Economics.
- CO2** Know what is demand, analyze demand and how elasticity of demand is used for pricing decisions and to evaluate methods for forecasting demand.
- CO3** Know how production function is carried out to achieve least cost combination of Inputs and how to analyze cost.
- CO4** Understand the characteristics of different kinds of markets and outline different form of business organization and analyze how capital budgeting techniques are used for investment decisions.
- CO5** Know how to prepare final accounts and how to interpret them, analyze and interpret financial statements using ratio analysis.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
REPAIR & REHABILITATION OF STRUCTURES
(Professional Elective – 4)**

B.Tech – VII Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites – No prerequisites are needed for enrolling into the course

Course Objectives:

- To attain adequate knowledge on distress of structures.
- To understand inspection and testing methods to evaluate concrete structures
- To attain knowledge on corrosion of steel reinforcement
- To impart knowledge on selection of Repair Material
- To learn the different repair and rehabilitation methods of structures

UNIT – I : Introduction

Introduction - Deterioration of Structures - Distress in the Structures - Causes and Prevention - Types of Damage.

UNIT – II : Inspection and Testing

Inspection - Damage Assessment - Estimation of Strength, Chemical and other durability tests – Non – Destructive Testing

UNIT – III : Corrosion and Fire Rating

Corrosion of Steel Reinforcement: Causes, Mechanism and Prevention – Damage of structure due to Fire – Fire Rating of Structures

UNIT – IV : Repair Materials

Ideal characteristics for selection of repair materials, premixed cement concrete and mortars, polymer modified mortars and concrete, epoxy and epoxy systems

UNIT – V : Repair /Rehabilitation methods

Shortcreting and Guniting, Repair and strengthening of columns and beams using ferrocement jacketing, fiber wrap technique, Foundation Rehabilitation methods.

Course Outcomes

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

- CO1** : Identify the reasons for distress and deterioration of structures.
- CO2** : Apply condition assessment of structures by various tests
- CO3** : Understand corrosion Mechanism and damage of structure due to fire
- CO4** : Select a suitable repair material for various field applications
- CO5** : Select suitable repair and rehabilitation methods for Civil Infrastructure

TEXT BOOKS:

1. J. Bhattacharjee, “Concrete Structures-Repair, Rehabilitation and Retrofitting”, CRS Publishers and Distributors, First Edition, 2019
2. R. Dodge Woodson, “Concrete Structures-Protection, Repair and Rehabilitation”, Elsevier, First Edition, 2019
3. Santhakumar A.R, “Concrete Technology”, Oxford University Press, 2nd Edition, 2018

REFERENCE BOOKS:

1. CPWD Handbook on Repair and Rehabilitation of RCC buildings, Govt of India Press, NewDelhi, 2014
2. ACI 546R-14, Guide to Concrete Repair, American Concrete Institute, 2014
3. Gupta B L and Amit Gupta., Maintenance Repair of Civil structures,Standard Publication, First Edition, 2009

Online Resources:

1. <https://nptel.ac.in/courses/105/106/105106202/>
2. <https://nptel.ac.in/courses/105/105/105105213/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**CONSTRUCTION PLANNING AND MANAGEMENT
(Professional Elective – 4)**

B.Tech – VII Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre-Requisites – No prerequisites are needed for enrolling into the course

Course Objectives:

- To learn the concept of construction management along with functions
- To gain knowledge of the various techniques used for construction planning
- To learn the time cost analysis of civil engineering works
- Acquire knowledge on various types of construction contracts and tenders
- Able to learn the concept of Linear Programming in Construction

UNIT – I : Introduction

Significance of Construction Management - Objectives and functions of construction management, construction management team, principles of organization and types of organization.

UNIT – II : Construction Planning

Construction planning, bar charts, network techniques in construction management – CPM, Expected likely, pessimistic and optimistic time, normal distribution curve and network problems of PERT.

UNIT - III : Time Cost Analysis

Cost time analysis in network planning, updating, Earned value Management, simple problems of civil engineering works.

UNIT – IV: Contracts and Tenders

Contracts: Introduction, types of construction contracts and their advantages and disadvantages, conditions of contracts, Introduction to Indian contract act.

Tender: Tender form, Tender Documents, Tender Notice, Work Order. Safety in construction: Safety measures, workmen compensation act, construction labour act. Demolition of buildings – safety measures

UNIT – V: Linear programming and optimization in construction

Introduction to optimization – Linear programming, Importance of optimization in construction, Simple problems on formulation of LP, Graphical method, Simplex method

Course Outcomes

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

CO1: Identify and report the importance and necessity of construction management

CO2: Understand the network techniques in construction management

CO3: Interpret the terms related to time cost analysis in network planning

CO4: Categorize various Contracts and Tenders in construction

CO5: Interpret the concept of Linear Programming in Construction

TEXT BOOKS:

1. Srinath L.S., PERT and CPM: Principles and Application, East-West Press, First Edition, 2001
2. Peret, F, Construction Project Management an Integrated approach, Taylor and Francis Group, 3rd Edition, 2019
3. Punmia B.C. and Khandelwal, Project Planning and Control with PERT and CPM, Laxmi

Publications, 4th Edition, 2016

REFERENCE BOOKS:

1. Gahloj. P.S. and Dhiv. B.M., Construction Planning and Management, WileyEastern Ltd., 2nd Edition, 2018
2. Kumar Neeraj Jha., Construction Project Management: Theory and Practice, Pearson Education, 2nd Edition, 2015
3. Seetharaman S., Construction Engineering and Management, Umesh Publications, 4th Edition, 2012

Online Resources:

1. <https://nptel.ac.in/courses/105/103/105103093/>
2. <https://nptel.ac.in/courses/105/104/105104161/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**PAVEMENT MANAGEMENT SYSTEM
(Professional Elective – 4)**

B.Tech – VII Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre-Requisites – Highway Engineering

Course Objectives:

- To attain adequate knowledge on process of pavement management
- To understand the concepts of Pavement Management System
- To find out the strategies for rehabilitation and maintenance
- To impart knowledge on Framework for pavement design
- To learn the steps involved in Pavement Management Systems

UNIT – I : Pavement Management Process & Data Requirements

Application of system concepts to pavement management, pavement management levels & functions - Data needs, assessment of pavement performance, evaluation of pavement structural capacity, distress & safety, combined measures of pavement quality, data management

UNIT – II : Pavement Management System

Concepts of pavement management systems, pavement performance prediction – concepts, modeling techniques, structural conditional deterioration models, mechanistic & empirical models

UNIT – III : Rehabilitation and Maintenance Strategies

Development of models for pavement deterioration – determining the future needs – rehabilitation and maintenance strategies – developing combined programs for maintenance & rehabilitation

UNIT – IV : Project Level Design

Framework for pavement design, characterization of physical design inputs, basic structural response models – variability, reliability and risk – generating alternate design strategies - selection of optimal design strategy

UNIT – V : Implementation of PMS

Major steps in implementing PMS – pavement construction management & pavement maintenance management – cost and benefit of pavement management – future directions and need for innovations in pavement management

Course Outcomes:

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

CO1: Identify the process of Pavement Management Process and Data Requirements

CO2: Understand about the pavement management process and modeling techniques

CO3: Interpret the rehabilitation and maintenance strategies to present and future needs

CO4: Design Framework for pavement and determine structural response model

CO5: Able to manage and implement Pavement Management Systems

TEXT BOOKS:

1. Haas R. C. G., W. Ronald Hudson, John P. Zaniewski, “Modern Pavement Management”, Krieger Publishing Company, First Edition, 1994
2. OECD, “Pavement Management Systems”, O E C D, 1987
3. Shahin, M.Y., “Pavement Management for Airports, Roads and Parking Lots”, Chapman & Hall, New York, 1994.

REFERENCE BOOKS:

1. Hudson, W. R., R. Haas, and W. Uddin., “Infrastructure Management: Integrating Design, Construction, Maintenance, Rehabilitation, and Renovation”, McGraw Hill. New York, 1997.
2. Susan Brown, “Pavement Management Systems”, Transportation Research Board, 1993
3. “Structural Design of Asphalt Pavements NCHRP”, TRR, and TRB Special Reports.

Online Resources:

1. <https://www.youtube.com/watch?v=IDv67Eppaos>
2. <https://ocw.mit.edu/courses/civil-and-environmental-engineering/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**STRUCTURAL DYNAMICS AND DESIGN OF EARTHQUAKE RESISTANT STRUCTURES
(Professional Elective – 5)**

B.Tech – VII Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre-Requisites–No prerequisites are needed for enrolling into the course

Course Objectives:

- To impart knowledge on theory of vibrations.
- To attain knowledge on two degree and Multi degree of freedom.
- To learn basic elements in the seismology
- To obtain knowledge on response and design spectra.
- To impart ductile detailing of the structural elements.

UNIT – I : Theory of Vibrations

Concept of inertia and damping – Types of Damping – Difference between static forces and dynamic excitation – Degrees of freedom – SDOF idealisation – - Formulation of equation of motion of SDOF system – Free and Forced Vibration of damped and un damped structures

UNIT – II : Multiple Degree Of Freedom System

Two degree of freedom system – Normal modes of vibration – Natural frequencies - Mode shapes - Introduction to MDOF systems – Decoupling of equations of motion

UNIT – III : Elements of Seismology

Causes of Earthquake – Geological faults – Tectonic plate theory – Elastic rebound – Epicentre – Hypocentre – Primary, shear and Raleigh waves – Seismogram – Magnitude and intensity of earthquakes – Magnitude and Intensity scales - Information on some disastrous earthquakes

UNIT – IV : Response of Structures to Earthquake

Response and design spectra – Design earthquake – concept of peak acceleration – Site specific response spectrum – Effect of soil properties and damping – Liquefaction of soils – Importance of ductility – Methods of introducing ductility into RC structures.

UNIT – V : Design Methodology

Evaluation of Earthquake forces as per IS 1893 - 2002, Earthquake Resistant Design and detailing provisions for Reinforced Concrete Buildings as per IS 13920 – 1993

Course Outcomes:

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

CO1 : Gain knowledge on the damping and Degree of freedom

CO2 : Understand concepts of Multi degree of freedom

CO3 : Understand about magnitude, Intensity and characteristics of Earthquake

CO4: Able to know the response of structures due to earthquake

CO5 : Able to design ductile detailing for structural elements

TEXT BOOKS:

1. A.K. Chopra, “Dynamics of structures”, Pearson Education India, 3rd Edition, 2020
2. Clough R.W, “Dynamics Of Structures”, CBS Publishers, 2nd Edition, 2015
3. Pankaj Agarwal and Manish Shrikhande, “Earthquake resistant design of structures”, PHI Learning, Revised Edition, 2017

REFERENCE BOOKS:

1. Mario Paz and Young Hoon Kim, “Structural Dynamics: Theory and Computation”, Springer Publisher, 6th Edition. 2018,
2. Shashikant K. Duggal, “Earthquake Resistant Design of Structures”, Oxford Higher Education, 2nd Edition, 2013
3. Dr. Vinod Hosur, “Earthquake-Resistant Design of Building Structures”, Wiley, 2012

Code Books:

1. IS 13920 – 1993, Ductile Detailing of Reinforced Concrete Structures Subjected To Seismic Forces - Code Of Practice, BIS Publication
2. IS 1893 (Part 1)-2002 - Criteria for Earthquake Resistant Design of Structures (Part 1 General Provisions and Buildings), BIS Publication

Online Resources:

1. <https://nptel.ac.in/courses/105/101/105101004/>
2. <https://nptel.ac.in/courses/105/106/105106151/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**BUILDING INFORMATION MODELLING
(Professional Elective – 5)**

B.Tech – VII Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites – No prerequisites are needed for enrolling into the course

Course Objectives:

- To learn the fundamentals and components of BIM
- To understand the BIM Architectural Drafting and Rendering
- To impart the knowledge on BIM analysis and Design
- To learn the role of BIM in scheduling and estimation
- To learn BIM modelling for residential and Multi storey buildings

UNIT – I : Introduction

Introduction to Building Information Modelling (BIM): Background of Building Information Modelling (BIM); Components of BIM, BIM Focus, Users of BIM information and Project Delivery Methods using BIM

UNIT – II : Drafting and Rendering

BIM in Pre-Construction Phase: Conceptual Design in Terms Shape, Orientation, Site in terms of Green Strategy, Architectural BIM, Architectural Drafting, Architecture 3D Rendering.

UNIT – III : Structural BIM Design

Systems and Materials, Structural Rebar Detailing, Green Design Decisions. BIM Analysis: Day lighting, Energy Analysis and Energy Cost; Documentation.

UNIT – IV : BIM in Planning and Construction Phase

BIM In Fabrication, BIM In Construction, Gate keeping, 4D BIM – Construction Scheduling, 5D – Construction Cost Estimation, Quantity Take off, Clash Detection and Construction Logistics.

UNIT – V : Case studies on BIM

Architectural BIM in Residential Buildings and 3D Rendering Services; Structural BIM Modelling for Multi Storey– Residential Building and BIM Implementation during New Construction

Course Outcomes:

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

- CO1** : Study the background of BIM and its role in construction management
- CO2** : Make architectural drafting and 3D Rendering
- CO3** : Extend knowledge on structural BIM Analysis and Design
- CO4** : Apply BIM in construction design, planning and construction phases.
- CO5** : Apply BIM for case studies

TEXT BOOKS:

1. De Wilde, P., Mahdjoubi, L., & Garrigós, A. G., “Building Information Modelling (BIM) in Design, Construction and Operations”, WIT Press, Volume 192, 2019
2. Kymmell, W., “Building Information Modeling: Planning and Managing Construction Projects with 4D CAD and Simulations”, McGraw-Hill Education, First Edition, 2008
3. Karen M. Kensek, “Building Information Modeling”, Routledge, 2014

REFERENCE BOOKS:

1. Elvin, G., “Integrated Practice in Architecture: Mastering Design-Build, Fast-Track, And Building Information Modelling”, John Wiley & Sons, First Edition, 2007
2. Ingibjörg Birna Kjartansdóttir, Stefan Mordue, Paweł Nowak, David Philp, Jónas Thór Snæbjörnsson, “Building Information Modelling BIM”, Warsaw University of Technology, Warsaw, 2017

Online Resources:

1. <https://www.classcentral.com/course/building-information-modelling-10604>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**SUSTAINABLE MATERIALS AND GREEN BUILDINGS
(Professional Elective – 5)**

B.Tech – VII Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites – No prerequisites are needed for enrolling into the course

Course Objectives:

- To impart knowledge about alternative material for sustainability in construction
- To acquaint the students with selection of energy efficient materials for construction
- To understand the concept of design of building for energy efficiency
- To gain knowledge about Green Performance rating for building
- To make the students conversant with Sustainable construction techniques.

UNIT - I: Embodied energy, Operational energy in Building and Life cycle energy. Ecological footprint, Bio-capacity and calculation of planet equivalent Role of Material: Carbon from Cement, alternative cements and cementitious material, Alternative fuel for cements for reduction in carbon emission. Sustainability issues for concrete. Role of quality, minimization of natural resource utilization, High volume fly ash concrete, geo-polymer concrete- Concrete with alternative material for sustainability

UNIT - II: Reduction in water consumption in concrete, Recycled aggregate, Energy for grinding crushing of cement aggregate and reduction Clay Bricks, Types kilns, Comparative energy performance emission performance and financial performance, Indoor air quality Paints, Adhesive and sealants for use in building, Volatile organic content (VOC) emission issues and indoor air quality for Sustainability and Health hazard

UNIT - III: Operational energy reduction and net zero building, Optimization for design of building for energy efficiency Use of Building Integrated Photo Voltaic (BIPV) and other renewable energy in buildings, basic concepts and efficiency Energy codes ECBC requirement, Concepts of OTTV

UNIT - IV: Radiation budget, Surface water balance, Effects of trees and microclimatic modification through greening, Green Performance rating, requirements of LEED, GRIHA, IGBC

UNIT - V: Sustainable construction techniques, Design issues relating to sustainable development including site and ecology, community and culture, health, materials, energy, and water- Domestic and Community buildings using self-help techniques of construction; adaptation, repair and management-portable architecture. Types of foundations and construction methods; Basics of Formwork and Staging; Modular construction methods for repetitive works; Precast concrete construction methods

Course Outcomes:

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

- CO1:** Identify alternative materials for civil engineering construction.
- CO2:** Know the background reasons for energy efficient materials to build environment
- CO3:** Apply concepts of energy efficiency in optimizing the building performance
- CO4:** Understand a importance of green performance in buildings and its rating
- CO5:** Extend their conventional knowledge of construction with sustainable practices

TEXT BOOKS:

1. Charles J. Kibert, “Sustainable Construction - Green Building Design and Delivery”, John Wiley & Sons, 5th Edition, 2021

2. Regina Leffers, “Sustainable Construction and Design”, Prentice Hall, 1st Edition, 2009.
3. Bradley. A.S; Adebayo, A.O., Maria, P., “Engineering Applications in Sustainable Design and Development”, Cengage Learning, 1st Edition, 2016

REFERENCE BOOKS:

1. Meg Calkins, “Materials for Sustainable Sites: A Complete Guide to the Evaluation, Selection and Use of Sustainable Construction Materials”, JohnWiley & Sons, 1st Edition, 2009
2. Bradley. A.S; Adebayo, A.O., Maria, P., “Engineering Applications in Sustainable Design and Development”, Cengage Learning, 1st Edition, 2016
3. Guttila Yugantha Jayasinghe and Shehani Sharadha Maheepala, “A text book on Green Buildings: Towards to the sustainable construction”, LAP LAMBERT Academic Publishing, First Edition, 2018

Online Resources:

1. <https://nptel.ac.in/courses/105/102/105102195/>
2. <http://www.nitttrc.edu.in/nptel/courses/video/105102195/L02.html>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

Open Elective - 2

B.Tech – VII Semester

**L/T/P/C
3/ 0/ 0/ 3**

Note: Students should take open electives from the list of open electives offered by the other departments/branches only.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

Mini Project & Internship

B.Tech – VII Semester

**L/T/P/C
0/ 0/ 0/2**

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

Major Project Phase - I

B.Tech – VII Semester

**L/T/P/C
0/ 0/ 8/ 4**

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**DESIGN OF PRESTRESSED CONCRETE
(Professional Elective – 6)**

B.Tech – VIII Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites –No prerequisites are needed for enrolling into the course

Course Objectives:

- To impart knowledge on fundamentals of prestressing
- To attain understanding on prestressing systems
- To learn analysis of simple and composite section.
- To impart concepts on design of simply supported beams.
- To obtain knowledge on Shear and bond in prestressed concrete beams.

UNIT – I : Introduction

Fundamentals of prestressing - Classification and types of prestressing Concrete Strength and strain characteristics - Steel mechanical properties - Auxiliary Materials like duct formers.

UNIT – II : Prestressing Systems

Principles of pre-tensioning and post tensioning - study of common systems of prestressing for wires strands and bars. Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members - I.S. code provisions.

UNIT – III : Analysis of Sections

Analysis of Sections In flexure, simple sections in flexure, kern distance - cable profile - limiting zones - composite sections - cracking moment of rectangular sections.

UNIT – IV : Design of Beams

Design of Simply Supported Beams - Allowable stress as per IS 1343 - elastic design of rectangular and I-sections.

UNIT – V : Shear and Bond

Shear and bond in prestressed concrete beams - conventional design of shear reinforcement - Ultimate shear strength of a section - Prestress transfer in pre tensioned beams-Principles of end block design.

Course Outcomes:

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

- CO1** : Understand about classification and types of prestressing Concrete
- CO2** : Apply concepts of pre-tensioning and post tensioning system
- CO3** : Analyze the simple and composite section
- CO4** : Able to design beams with rectangular section
- CO5** : Apply the concepts of Shear and bond in prestressed concrete beams

TEXT BOOKS:

1. Krishna Raju. N, “Prestressed Concrete”, Tata Mc Graw Hill, 6th Edition, 2018
2. Lin.T.Y and Ned H. Burns, “Design of Prestressed concrete structures”, Wiley,3rd Edition, 2010
3. Rajagopalan, N, “Prestressed concrete”, Narosa Publishing House,2nd Edition, 2010

REFERENCE BOOKS:

1. Edward G. Nawy P.E., “Prestressed Concrete: A Fundamental Approach”, Pearson, 3rd Edition, 1999
2. P. Dayaratnam, P Sarah, “Prestressed Concrete Structures”, Medtech, 7th Edition, 2017
3. F. K. Kong, R. H. Evans, “Reinforced and Prestressed Concrete”, CRC Press, 3rd Edition, 1990

Code Books:

1. IS 1343 : 2012, “Prestressed Concrete — Code of Practice”, BIS Publication

Online Resources:

1. <https://nptel.ac.in/courses/105/106/105106117/>
2. <https://nptel.ac.in/courses/105/106/105106118/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**SMART CITIES PLANNING AND DEVELOPMENT
(Professional Elective – 6)**

B.Tech – VIII Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites – No prerequisites are needed for enrolling into the course

Course Objectives:

- To introduce students on smart city basic concepts and global standards
- To understand smart community, smart transportation and smart buildings
- To understand Energy demand and Green approach to meet Energy demand
- To identify Smart Transportation system in cities
- To identify the Right transition process for benefits of the citizens and city

UNIT – I: Introduction

Introduction to Smart Urban Infrastructures and Smart Cities: Introduction to City Planning - Understanding Smart Cities - Dimensions of Smart Cities – Global Experience of Smart Cities – Global Standards and Performance Benchmarks, Practice Codes -Indian scenario - India “100 Smart Cities” Policy and Mission.

UNIT – II: Smart Cities Planning and Development

Introduction to Smart Community – Smart community concepts: Concept of Smart Community - Smart Transportation – Smart Building and Home Device - Smart Health - Smart Government - Smart Energy and Water – Cyber Security, Safety, and Privacy - Internet of Things, Block chain, Artificial Intelligence, Alternate Reality, Virtual Reality.

UNIT – III : Smart Urban Energy Systems

Conventional vs. Smart, City components, Energy demand, Green approach to meet Energy demand, Index of Indian cities towards smartness – A statistical analysis -Meeting energy demand through direct and indirect solar resources - Efficiency of indirect solar resources and its utility, Capacity limit for the indirect solar resources - Effectiveness in responsive environment in smart city; Smart communication using green resources.

UNIT – IV: Smart Urban Transportation Systems

Smart Urban Transportation Systems: Smart Transportation Technologies - Driverless and connected vehicles - Ride sharing solutions - The "improve" pathway - The "shift" pathway – Smart Roads and Pavement systems.

UNIT – V: Smart City Transition

Towards Smart Cities: The transition of legacy cities to Smart -. Right transition process - The benefit of citizens, cities to adopt effective management and governance approaches - Factors in the transition phase of legacy cities to smart cities and their managerial implications.

Course Outcomes:

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

CO1 : Recognize smart city concepts and their international and national standards

CO2 : Recognize smart community, transportation and building concepts

CO3 : Develop and calibrate energy demand and their capacity limits

CO4 : Predict the various smart urban transportation systems

CO5 : Able to make right transition process framework for benefit of citizens and city

TEXT BOOKS:

1. G. R.Kanagachidambaresan, R. Maheswar, V. Manikandan, K. Ramakrishnan, “Internet of Things in Smart Technologies for Sustainable Urban Development”, Springer, 2020
2. “Society 5.0: A People-centric Super-smart Society”, Hitachi-UTokyo Laboratory, Springer, 2020
3. Katharine S. Willis, Alessandro Aurigi, “The Routledge Companion to Smart Cities”, Routledge International Handbooks, 2020

REFERENCES:

1. YuminJoo, Yu-Min Joo, Teck-Boon Tan, “Smart Cities in Asia: Governing Development in the Era of Hyper-Connectivity”,Edward Elgar Publishing, 2020
2. Yoshiki Yamagata, Perry P. J. Yang, “Urban Systems Design: Creating Sustainable Smart Cities in the Internet of Things Era”, Elsevier, 2020
3. Christopher Grant Kirwan, Zhiyong Fu, “Smart Cities and Artificial Intelligence: Convergent Systems for Planning, Design and Operations”, Elsevier, 2020

Online Resources:

1. <https://nptel.ac.in/courses/124/107/124107158/>
2. <https://nptel.ac.in/courses/105/105/105105160/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**AIR POLLUTION AND CONTROL
(Professional Elective – 6)**

B.Tech – VIII Semester

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites –No prerequisites are needed for enrolling into the course

Course Objectives:

- To attain adequate knowledge on sources of air pollutants
- To understand the system to Control Particulate Pollutants
- To find out the strategies for Control of Gaseous Pollutants
- To impart knowledge on Automobile Pollution And its Control techniques
- To learn the steps involved in Air Quality Modelling

UNIT – I : Air Pollution

Definition of Air Pollution – Sources & Classification of Air Pollutants – Effects of air pollution – Global effects – Air Quality and Emission standards – Sampling of Pollutants in ambient air – Stack sampling.

UNIT – II : Control of Particulate Pollutants

Properties of particulate pollution – Particle size distribution – Control mechanism – Dust removal equipment – Design and operation of settling chambers, cyclones, wet dust scrubbers, fabric filters & ESP.

UNIT – III : Control of Gaseous Pollutants

Process and equipment for the removal by chemical methods – Design and operation of absorption and adsorption equipment – Combustion and condensation equipment, fugitive gas emissions and control.

UNIT – IV : Automobile Pollution and Control

Sources, Theoretical Considerations, Operating conditions Vs Emissions, Pollution control Measures, Emission Standards.

UNIT – V : Air Quality Modelling and Control of Air Pollution

Importance of Air quality Modelling, Components of air quality Modelling, Types of air quality models, Dispersion based models and Receptor based models, Control of Air Pollution: Zoning and site selection – Other Management controls, AP Legislation.

Course Outcomes:

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

CO1 : Recognize the effects of Air pollution and learnt standards of Air quality

CO2 : Able to know the techniques to control particulate Pollutants

CO3 : Analyze the systems to control the gaseous pollutants

CO4 : Identify the causes of automobile pollution and its control technique

CO5 : Able to frame air quality modelling and management controls

TEXT BOOKS:

1. *Abhishek Tiwary, Ian Williams & Colls, J., Air Pollution: Measurement, Modeling and Mitigation, CRC Press, 4th Edition, 2019*
2. Noel, D. N., *Air Pollution Control Engineering, Tata McGraw Hill Publishers, 3rd Edition, 2007*
3. Daniel A. Vallero., *Fundamentals of Air Pollution, Academic Press, 4th Edition, 2008*

REFERENCE BOOKS:

1. Jack Hardisty, D. M. Taylor, S. E. Metcalfe., Computerized Environmental Modelling, Wiley, 1993
2. Lyons and Scott, Principles of Air Pollution Meteorology, CRC Press, First Edition, 1990
3. Arya, S.P., Air pollution meteorology and dispersion, Oxford University Press, First Edition, 1999

Online Resources:

1. <https://nptel.ac.in/courses/105/107/105107213/>
2. <https://nptel.ac.in/courses/105/104/105104099/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

Open Elective - 3

B.Tech – VIII Semester

**L/T/P/C
3/ 0/ 0/ 3**

Note: Students should take open electives from the list of open electives offered by the other departments/branches only.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

Technical Seminar

B.Tech – VIII Semester

**L/T/P/C
0/ 0/ 2/ 1**

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

Major Project Phase - II

B.Tech – VIII Semester

**L/T/P/C
3/0/16/ 8**

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**DISASTER PREPAREDNESS & PLANNING MANAGEMENT
(OPEN ELECTIVE – CIVIL ENGINEERING)**

B.Tech –EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science)

L/T/P/C

3/ 0/ 0/ 3

Pre-Requisites–No prerequisites are needed for enrolling into the course

Course Objectives:

- To Know about the state of art of disaster management in world
- To Study the various natural disasters and its mitigation measures
- To understand human induced Hazards and its case studies
- To impart knowledge on remote sensing and GIS
- To expose students to various technologies used for disaster mitigation and management.

UNIT – I : Introduction

Hazard, vulnerability and risk, Types of disasters, Disaster management cycle, role of civil engineers in disaster management, Progress of disaster management in world, vulnerability profile of India, Disaster management act, Disaster management in India

UNIT – II : Natural Disasters

Hydro - meteorological based disasters –Tropical cyclones, floods, drought and desertification zones, Geographical based disasters – Earthquake, Tsunamis, Landslides and avalanches – Causes, Types, effects and Mitigation measures, coastal zone management

UNIT – III : Human induced hazards

Human induced hazards: chemical industrial hazards, major power breakdowns, traffic accidents, etc. Case studies

UNIT - IV: Remote sensing and GIS for Disaster Management

Introduction to remote sensing and GIS, its applications in disaster mitigation and management, case studies

UNIT - V: Disaster Management

Risk assessment and hazard mapping –mitigation and management options – warning and forecasting

Course Outcomes

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

CO 1: Attain knowledge on various types, stages, phases in disaster management

CO 2: Recognize various types of natural disaster, Mitigation and Management Systems

CO 3: Know the different types of manmade disasters and its effects

CO 4: Explain Remote sensing technology and GIS in disaster mitigation and management.

CO 5: Know the concepts of risk, warning and forecasting methods in disaster management

TEXT BOOKS:

1. Pradeep Sahni, “Disaster Risk Reduction in South Asia”, Prentice Hall, First Edition, 2003
2. Singh B.K., “Handbook of Disaster Management: Techniques & Guidelines”, Rajat Publication, 2008
3. Ghosh G.K., “Disaster Management”, APH Publishing Corporation, First Edition, 2011

REFERENCE BOOKS:

1. Rajib, S and Krishna Murthy, R.R. “Disaster Management Global Challenges and Local Solutions”, Universities Press, First Edition, 2012
2. Navele, P & Raja, C.K., “Earth and Atmospheric Disasters Management, Natural and Manmade”, B.S. Publications, First Edition, 2019
3. Tushar Battacharya., “Disaster Science and Management”, Tata McGraw Hill Company, 2012

Online Resources:

1. <https://nptel.ac.in/courses/105/104/105104183/>
2. <https://nptel.ac.in/courses/124/107/124107010/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**ENVIRONMENTAL MANAGEMENT
(OPEN ELECTIVE – CIVIL ENGINEERING)**

B.Tech –EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science)

L/T/P/C

3/ 0/ 0/ 3

Pre Requisites –No prerequisites are needed for enrolling into the course

Course Objectives:

- To introduce the environmental management policies and legal aspects in India
- To study the various steps involved in Environment management system standard
- To understand the importance of Environmental Impact Assessment
- To know about the environment management plan
- To know about the Environmental management techniques and control measure

UNIT – I : Introduction to Environmental Management

Scope and nature of Environment Management - its need and brief discussion on the ethical, legal and financial reasons for Environment Management, the framework and approach to develop Environment management system, Policies and legal aspect in India

UNIT – II : Environment management system (EMS) standard

Guideline to implement effective Environment management system, core element of EMS, EMS standard: ISO 14000, its evolution, principle and specification, benefit of EMS. Planning and its implementation, Comparison of other standards with ISO 14000

UNIT – III : Environmental Impact Assessment

EIA definition, its need and principle, scoping, screening and the baseline condition, different methodologies, Impact identification and decision making, EIA case studies in India

UNIT - IV : Environment management plan

Planning and identification of baseline condition and impact, monitoring and evaluation of risk, mitigation plan, legislation and environmental audit, disaster management plan, Life cycle assessment and risk analysis

UNIT – V : Environmental management techniques and control measure

Environmental monitoring, modelling and risk assessment, Implementation of sustainable design, control measure for different environment pollution such as air pollution, water pollution, soil and noise pollution

Course Outcomes:

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

CO1 : Comprehend the need for Environmental Management

CO2 : Identify the attributes of Environment Management system and standards

CO3 : Apply different methodologies for impact assessment

CO4 : To understand the various Environment management plan

CO5 : Identify the techniques and control measures for Environment management

TEXT BOOKS:

1. John Pallister ., Environmental Management, Oxford University Press,2nd Edition,2017

2. Ajith Sankar ., Environmental Management, Oxford University Press, First Edition, 2015

3. Krishnamoorthy Bala., Environmental Management, PHI Learning,3rd Edition,2017

REFERENCE BOOKS:

1. V Murali Krishna, Valli Manickam., Environmental Management, ELSEVIER, 1stEdition, 2017
2. Jacob Thomas ., Environmental Management, Pearson Education India.1st Edition,2014
3. M.C. Dash., Concepts of Environmental Management for Sustainable Development, Dreamtech Press &Wiley, First Edition, 2019

Online Resources:

1. <https://nptel.ac.in/courses/120/108/120108004/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**URBAN PLANNING
(OPEN ELECTIVE – CIVIL ENGINEERING)**

B.Tech –EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science)

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites –No prerequisites are needed for enrolling into the course

Course Objectives:

- To introduce the history of town planning and its importance
- To study the various steps involved in urban planning and its methods
- To know the importance of housing development
- To understand the importance of public transport and non-motorized transport.
- To introduce the concept of smart cities in India

UNIT – I : Introduction

History of Town Planning - Definitions and Objectives of Planning - Examples of planned and unplanned cities - Retrofitting medieval towns and existing cities - Healthy city planning

UNIT – II : Basic Planning Methods

Base map preparation - survey techniques - Analytical methods - region classification - Demographic methods - population forecasting - Introduction of Remote sensing, GIS and GPS in urban planning context - Regional planning

UNIT – III : Housing Development

Policies and schemes - Housing typologies - Housing for the poor and elderly - Housing finance options – under privileged population management - Planning and management of local streets, water supply and storm water drainage - municipal solid waste management systems - new possibilities for recycling.

UNIT – IV : Transport and Mobility

Costs of congestion - Public and Para-transit modes (taxis and autos) - Feeder systems for the use of public transport - non-motorized transport facilities - cycling and walking infrastructure – Integrated public transport

UNIT – V: Smart Cities

Smart city developments across the world - Specific priorities for Smart Cities in India – Leveraging recent technologies in enhancing urban living: internet of things (IoT) - Recreation - Renewable energy - green corridors, green space and green buildings - Safety and security of urban population.

Course Outcomes:

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

CO1 : Describe the importance of proper urban planning for a healthy city

CO2 : Apply basic methods for urban planning

CO3 : Describe housing development schemes

CO4 : Design public transport and non-motorized transport facilities for a city

CO5 : Describe smart city developments in India and abroad and its various elements

TEXT BOOK:

1. Peter Hall, Mark Tewdwr-Jones, Urban and Regional Planning. Taylor & Francis, 6th Edition, 2019
2. Joy Sen., Sustainable Urban Planning. The Energy and Resources Institute, New Delhi, 2013 Edition, 2013
3. Rao M. P., Urban Planning Theory And Practice, CBS Publishers, Revised Edition, 2019

REFERENCE BOOKS:

1. Peter Hall, Cities of Tomorrow: An Intellectual History of Urban Planning and Design Since 1880, Wiley-Blackwell, 4th Edition, 2014
2. Randall Crane and Rachel Weber, The Oxford Handbook of Urban Planning. Oxford University Press, 2012
3. Amiya Kumar Das., Urban Planning in India, Rawat Pubns, First Edition 2007

Online Resources:

1. <https://nptel.ac.in/courses/124/107/124107158/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**ELECTRICAL POWER UTILISATION AND SAFETY
(OPEN ELECTIVE – ELECTRICAL AND ELECTRONICS ENGINEERING)**

B.Tech –CIVIL, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science)

L/T/P/C

3/ 0/ 0/ 3

Prerequisites: None

Course Objectives:

- To provide information of importance various parameters in electrical system.
- To analyze and design illumination scheme, electrification, earthing system and protection system for an application.

Unit-I:

Electric Heating and Welding Advantages of electric heating, resistance heating, types of furnaces, induction heating, types of induction furnaces, dielectric heating, types of welding- arc and resistance

Unit-II:

Illumination Scheme Basic terms used in illumination scheme, Electric lamps, Recommended levels of illumination, types of lighting schemes, design of lighting schemes, factory lighting, street lighting, flood lighting

Unit-III:

Electrical Installation, Estimating and Costing Types of loads, Load assessment, Electrical supply systems, wiring systems, Permissible voltage drops and conductor size calculations, Estimating and costing for residential and commercial service connections (single phase and three phase)

Unit-IV:

Power Factor Effects of power factor, causes of low power factor, disadvantages of low power factor, methods of improving power factor, most economical power factor.

Unit-V:

Electrical Safety, Earthing System and Protective Devices Electrical shock mechanisms, factors influencing the electric shock, body current thresholds (tolerable body current limit), thevenin's concepts and accidental equivalent circuits (step and touch potentials), protection against electric shock, purpose of earthing, IS rules for earthing of electrical installations, factors governing the resistance of earth electrode, methods of earthing, measurement of earth resistance, methods of reducing earth resistance, fuse, miniature circuit breakers (MCB) and earth leakage circuit breakers (ELCB).

Text Books:

1. E. Openshaw Taylor, Utilisation of Electrical Energy, Universities Press.
2. H. Partab, Art and Science of Utilisation of Electrical Energy, Dhanpat Rai & Co.
3. J. B. Gupta, Utilization of Electric Power and Electric Traction, S. K. Kataria & Sons, New Delhi.
4. G. C. Garg, Utilization of Electric Power and Electric Traction, Khanna Publishers, Delhi.
5. R. K. Rajput, Utilisation of Electrical Power, Laxmi Publications (P) Ltd., New Delhi.

References:

1. N. V. Suyranarayana, Utilisation of Electric Power Including Electric Drives and Electric Traction, New Age Publishers, New Delhi.
2. J. B. Gupta, A Course in Electrical Installation Estimating and Costing, S. K. Kataria & Sons, New Delhi.
3. Dr. J. G. Jamnani, Elements of Electrical Design, Mahajan Publishing House

Course outcomes:

On successful completion of this course, students are able to:

CO1: Know about the electric heating and welding

CO2: Gain the knowledge on illumination system.

CO3: Understand the electrical installation, estimation and costing.

CO4: Understand the importance of power factor.

CO5: Gain the knowledge on safety and protection.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**CONCEPTS OF CONTROL SYSTEMS
(OPEN ELECTIVE – ELECTRICAL AND ELECTRONICS ENGINEERING)**

**B.Tech –CIVIL, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) L/T/P/C
3/ 0/ 0/ 3**

Prerequisites: None

Course Objectives:

- To understand the different ways of system representations such as Transfer function representation and state space representations and to assess the system dynamic response.
- To assess the system performance using time domain analysis and methods for improving it.

Unit-I:

Basic concepts of control system: Terminology - plant, process, system, disturbances, controlled variable, manipulated variable etc., Block diagram of basic control system, application areas with examples. Classifications of control systems, Concept of superposition for linear systems with examples.

Unit-II:

Mathematical modelling of systems: Translational and rotational mechanical systems, electrical systems, Force voltage and force current analogy, Position servo mechanism. Block diagram and signal flow graph representation of physical systems along with rules, properties, comparison and limitation, Mason's gain formula.

Unit-III:

Time response analysis: Standard test signals along with examples of their usage, steady state errors for step, ramp and parabolic inputs, analysis of first and second order systems, Transient response specifications with numerical examples, Basic control actions and two position, proportional, PI, PID and rate feedback controllers, Limitations of time domain analysis.

Unit-IV:

Frequency response analysis: Need of frequency response analysis, Sinusoidal response of linear system, methods used in frequency response, Frequency domain specifications.

Unit-V:

Stability: Concept of stability, types of stability, Routh's stability criterion, special cases with numerical examples, stability of closed loop system, concept of root locus, open loop and closed loop transfer poles, step by step procedure for root loci, numerical examples.

Text Books:

1. Katsuhiko Ogata, Modern control theory, Pearson Education International, Fifth edition.
2. Norman S Nise, Control system engineering, John Wiley & Sons, Inc., Sixth edition
3. Richard C. Dorf, Robert H Bishop, Modern control systems, Pearson Education International, Twelfth edition.

References:

1. Farid Golnaraghi, Benjamin C Kuo, Automatic control systems, John Wiley & Sons, Inc.,Nineth edition
2. J.Nagrath and M.Gopal,Control System Engineering, New Age International Publishers,5th Edition, 2007

Course Outcomes:

On successful completion of this course, students are able to:

CO1: Understand the basic concept control systems.

CO2: Know the mathematical model of the systems.

CO3:Estimate the time domain specifications and steady state error.

CO4:Know the frequency response analysis.

CO5:Understand concept of stability.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**RENEWABLE ENERGY SOURCES
(OPEN ELECTIVE – ELECTRICAL AND ELECTRONICS ENGINEERING)**

**B.Tech –CIVIL, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) L/T/P/C
3/ 0/ 0/ 3**

Prerequisites: None

Course Objectives:

- To introduce to the technology of renewable sources of energy.
- To learn about the solar radiation, its applications and radiation measuring instruments.
- To study the Geothermal biomass energy resources, biomass systems.
- To learn the methods of energy extraction from the wind and oceans.

Unit-I:

Global and National Energy Scenario: Over view of conventional & renewable energy sources, need, potential & development of renewable energy sources, types of renewable energy systems, Future of Energy Use, Global and Indian Energy scenario, Energy for sustainable development, renewable electricity and key elements, Global climate change, CO2 reduction potential of renewable energy- concept of Hybrid systems

Unit-II:

Solar Energy: Solar energy system, Solar Radiation, Availability, Measurement and Estimation, Solar Thermal Conversion Devices and Storage, Solar-Electrical Power Generation, general Solar Photo Voltaic (SPV) system, Different configurations, SPV system components and their characteristics, Stand-Alone and Grid Connected SPV systems, other Miscellaneous Applications of Solar Energy.

Unit-III:

Wind Energy: Wind Energy Conversion, Potential, Nature of the wind, Wind Data and Energy Estimation, Site selection, Types of wind turbines, Wind farms, Wind Generation and Control., classification of wind, characteristics, offshore wind energy – Hybrid systems, wind energy potential and installation in India

Unit -IV:

Hydel and Tidal Power Systems: Basic working principle, Classification of hydel systems: Large, small, micro – measurement of head and flow – Energy equation – Types of turbines – Numerical problems. Tidal power – Basics – Kinetic energy equation – Numerical problems – Wave power – Basics – Kinetic energy equation.

Unit- V:

Bio-Mass, Geothermal& Ocean Energy: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I. C. Engine operation and economic aspects. Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India. Ocean Energy: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles.

Text Books:

1. Godfrey Boyle, Renewable Energy, Oxford university, press, 3rd edition, 2013.

2. Ahmed and Zobaa, Ramesh C Bansal, Handbook of renewable technology World scientific, Singapore.
3. Ramesh & Kumar, Renewable Energy Technologies, Narosa.
4. Chetong Singh Solanki, Renewable energy technologies – A practical guide for beginners –, PHI.

References:

1. B.H. Khan, Non-conventional energy source TMH-2nd edition.
2. Karlsson, Kenneth Bernard; Skytte, Klaus Morthorst, Integrated energy systems modeling, DTU International Energy Report 2015.

Course outcomes:

On successful completion of this course, students are able to:

CO1: Know about the global and national energy scenario.

CO2: Understand the concept of solar energy.

CO3: Know the basics of wind energy.

CO4: Differentiate the hydel and tidal power plants.

CO5: Explore the bio-mass, geothermal and ocean energy.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**NON-CONVENTIONAL ENERGY SOURCES
(OPEN ELECTIVE – MECHANICAL ENGINEERING)**

B.Tech –CIVIL, EEE, ECE, CSE, CSE(AI&ML) & CSE(Data Science)

**L/T/P/C
3/ 0/ 0/ 3**

Prerequisite – Nil

COURSE OBJECTIVES:

- Introduce to the technology of renewable sources of energy
- Learn about the solar radiation, its applications and radiation measuring instruments
- Learn about the various types of geothermal resources and its applications
- Study the biomass energy resources, bio-mass systems.
- Learn the methods of energy extraction from the wind and oceans learn to the technology of direct energy conversion methods

UNIT – I

PRINCIPLES OF SOLAR RADIATION:

Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT – II

SOLAR ENERGY COLLECTION:

Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

SOLAR ENERGY STORAGE AND APPLICATIONS:

Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT – III

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria.

BIO-MASS: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Biogas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C. Engine operation and economic aspects.

UNIT – IV

GEOHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy, Potential in India.

OCEAN ENERGY: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT – V

DIRECT ENERGY CONVERSION: Need for DEC, Carnot cycle, limitations and principles of DEC. Thermoelectric generators, see beck, pettier and joule Thomson effects, Figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

COURSE OUTCOMES:

The students will be able to

- CO1** Apply the technology to capture the energy from the renewable sources like sun, Wind, ocean, biomass, geothermal.
- CO2** Use different renewable energy sources to produce electrical power minimize the use of conventional energy sources to produce electrical energy
- CO3** Identify the fact that the conventional energy resources are depleted
- CO4** Understand direct energy conversion
- CO5** Learn different methods in solar energy system.

TEXTBOOKS:

1. Non-Conventional Energy Sources /G.D. Rai
2. Renewable Energy Technologies /Ramesh & Kumar /Narosa

REFERENCE BOOKS:

1. Renewable energy resources/ Tiwari and Ghosal/ Narosa.
2. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
3. Non-Conventional Energy Systems / K Mittal /Wheeler
4. Solar Energy /Sukhame

ONLINE RESOURCES:

1. NPTEL Course: Non-Conventional Energy Resources by Dr. Prathap Haridoss, IIT Madras.

Link: <https://nptel.ac.in/courses/121/106/121106014/>

2. NPTEL Course: Non-Conventional Energy Systems by Prof. L. Umanand, IISc Bangalore.

Link: <https://nptel.ac.in/courses/108/108/108108078/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**ROBOTICS
(OPEN ELECTIVE – MECHANICAL ENGINEERING)**

B.Tech –CIVIL, EEE, ECE, CSE, CSE(AI&ML) & CSE(Data Science)

**L/T/P/C
3/ 0/ 0/ 3**

Prerequisite – Nil

COURSE OBJECTIVES:

- Students will be able to understand the concepts of robotics – classification by coordinate system and control system.
- Students will be able to determine the degrees of freedom, end effectors, electric hydraulic and pneumatic devices.
- Students will possess the concepts of homogeneous transformations.
- Student will understand the Jacobean problems, Newton – Euler transmutations.
- Students will know about the actuators and feedback components, resolvers, encoders - velocity sensors.
- Students will be able to know the applications of robots in manufacturing.

UNIT – I

INTRODUCTION

Automation and Robotics – An over view of Robotics – classification by coordinate system and control systems – Components of Industrial Robotics: Degrees of freedom – End effectors: Types of grippers: Mechanical, Magnetic, Vacuum cup – General considerations on gripper selection and design.

UNIT – II

MOTION ANALYSIS

Basic rotation matrices – Composite rotation matrices – Euler Angles – Equivalent Angle and Axis – Homogeneous transformation – Problems.

Manipulator Kinematics: D.H. Notation – Joint coordinates and world coordinates – Forward and inverse kinematics – problems.

Differential Kinematics: Differential kinematics of planar and spherical manipulators – Jacobians – Problems.

UNIT – III

ROBOT DYNAMICS

Lagrange – Euler formulations – Newton – Euler formulations – Problems on planar two link manipulators.

UNIT – IV

TRAJECTORY PLANNING

Joint space scheme – cubic polynomial fit – Avoidance of obstacles – Types of motion – Slew motion – Joint interpolated motion – straight line motion – problems.

UNIT – V

ROBOT ACTUATORS AND FEED BACK COMPONENTS

Actuators: Pneumatic and Hydraulic actuators. Electric Actuators: DC servo motors – stepper motors. Feedback components: position sensors – potentiometers, resolvers and encoders – Velocity sensors – Tactile sensors.

Robot Application in Manufacturing: Material handling – Assembly and Inspection.

COURSE OUTCOMES:

The students will be able to

CO1 Apply the knowledge of robotics in real time human life applications.

CO2 Analyse the concept of CAD/CAM and automation to the robotics.

CO3 Compare knowledge of robot applications in manufacturing like, material handling, loading and unloading etc.

CO4 Experiment the robotics to the spot and continuous arc welding and spray painting.

CO5 Relate the Robot Application in Manufacturing.

TEXTBOOKS:

1. Groover M P, “Industrial Robotics”, Pearson Edu., 2012 1st Edition, ISBN Number: 0070265097, 9780070265097, 978-0070265097.
2. JJ Craig, “Introduction to Robotic Mechanics and Control”, Pearson, 2008 3rd edition. ISBN-13: 978-0201543612

REFERENCE BOOKS:

1. Fu K S, “Robotics”, McGraw Hill, 1st Ed., 2008, ISBN 13: 9780070226258.
2. Richard D.Klafter, “Robotic Engineering”, Prentice Hall, 1st Ed., 1989, ISBN-13: 9780137820535.

ONLINE RESOURCES:

1. NPTEL Course: Introduction to Robotics by Dr. Balaraman Ravindran, IIT Madras.
Link: <https://nptel.ac.in/courses/107/106/107106090/>
2. NPTEL Course: Introduction to Robotics by Prof. Ashish Dutta, IIT Kanpur.
Link: <https://nptel.ac.in/courses/112/104/112104298/>
3. <http://www.robogrok.com/index.html>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**MECHATRONICS
(OPEN ELECTIVE – MECHANICAL ENGINEERING)**

B.Tech –CIVIL, EEE, ECE, CSE, CSE(AI&ML) & CSE(Data Science)

**L/T/P/C
3/ 0/ 0/ 3**

Prerequisite – Nil

COURSE OBJECTIVES:

- Know the basic concepts of mechatronics.
- Know the various actuating systems like Hydraulic, pneumatic, mechanical and electrical actuating system.
- Know about the micro processor and micro controllers.
- Know about the system and interfacing and data acquisition.

UNIT – I

Mechatronics systems, elements, levels of mechatronics system, Mechatronics design system, measurement systems, control systems, microprocessor-based controllers, advantages and displacement, position, proximity, velocity, motion, force, acceleration, torque, fluid pressure, liquid flow, liquid level, temperature and light sensors.

UNIT – II

Solid state electronic devices, PN Junction diode, BJT, FET, DIA and TRIAC. Analog signal conditioning, amplifiers, filtering. Introduction to MEMS & typical applications.

UNIT – III

Hydraulic and pneumatic actuating systems, Fluid systems, Hydraulic and pneumatic systems, components, control valves, electro-pneumatic, hydro-pneumatic, electro-hydraulic servo systems: Mechanical actuating systems and electrical actuating systems.

UNIT – IV

Digital electronics and systems, digital logic control, micro processors and micro controllers, programming, process controllers, programmable logic controllers, PLCs versus computers, application of PLCs for control.

UNIT – V

System and interfacing and data acquisition , DAQS, SCADA, A to D and D to A conversions; Dynamic models and analogies, System response . Design of mechatronics systems & future trends.

COURSE OUTCOMES:

The students will be able to

CO1 Use the control system, mechatronics design systems and measurement systems.

CO2 Work on various actuating systems.

CO3 Convert the signals from one form to another form.

CO4 Estimate the micro controllers and micro processors.

CO5 Develop the simple programming code for PLC's.

TEXTBOOKS:

1. Mechatronics Integrated Mechanical Electronics Systems/KP Ramachandran &GKVijaya Raghavan/WILEY india Edition/2008
2. Mechatronics Electronics control systems in Mechanical andElectrical Engineering/W Bolton/Pearson Education press/3rd edition,2005.

REFERENCE BOOKS:

1. Mechatronics Source books by Newton C Braga, Thomson Publications, Chennai.
2. Mechatronics – N.Shanmugam/ Anuradha Agencies Publishers.
3. Mechatronics System Design/Devdas shetty/Richard/Thomson.

ONLINE RESOURCES:

1. NPTEL Course: Mechatronics by Prof. Pushparaj Mani Pathak, IIT Roorkee.Link:
<https://nptel.ac.in/courses/112/107/112107298/>
2. NPTEL Course: Mechatronics and Manufacturing Automation by Dr. Shrikrishna N.Joshi, IIT Guwahati.

Link: <https://nptel.ac.in/courses/112/103/112103174/>

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**DIGITAL IMAGE PROCESSING
(OPEN ELECTIVE – ELECTRONICS & COMMUNICATION ENGINEERING)**

B.Tech –CIVIL, EEE, MECH, CSE, CSE(AI&ML) & CSE(Data Science)

L/T/P/C

3/ 0/ 0/ 3

Pre Requisites: None

Course Objectives

- To familiarize the students with digital image fundamentals.
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To Understand the concepts of image compression techniques.

UNIT- I

Digital Image Fundamentals & Image Transforms: Digital Image Fundamentals, Sampling and Quantization, Relationship between Pixels,

Image Transforms: 2-D FFT, Properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar Transform, Slant Transform, Hotelling Transform.

UNIT -II

Image Enhancement (Spatial Domain): Introduction, Image Enhancement in Spatial Domain: Enhancement through Point Operation, Types of Point Operation, Histogram Manipulation, Linear and Non — Linear Gray Level Transformation, Spatial domain filtering.

Image Enhancement (Frequency Domain): Low Pass (Smoothing) filters, High Pass (Sharpening) filters and Homomorphism filtering.

UNIT -III

Image Restoration: Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT-IV

Image Segmentation: Detection of Discontinuities, Edge Linking And Boundary Detection, Thresholding, Region based Segmentation.

Morphological Image Processing: Dilation and Erosion operations, Opening and Closing operations, Hit or Miss Transformation.

UNIT-V

Image Compression: Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy and Lossless Predictive Coding, Transform Based Compression, JPEG 2000 Standards.

Text Books

1. Digital Image Processing – Rafael C. Gonzalez, Richard E. Woods, 3rd Edition, Pearson, 2008
2. Fundamentals of Digital Image Processing — A.K.Jain, PHI, 1989

Reference Books

1. Digital Image Processing using MATLAB — Rafael C. Gonzalez, Richard E Woods and Steven L.Eddings, 2nd Edition, TMH, 2010.
2. Digital Image Processing- S Jayaraman, S Esakkirajan, T Veerakumar- TMH, 2010.

3. Digital Image Processing with MATLAB & Labview — Vipula Singh, Elsevier.

Course Outcomes

After completion of this course students able to

- CO1** Gain the knowledge of digital image fundamentals and image transforms.
- CO2** Understand image enhancement in spatial and frequency domain.
- CO3** Understand the different methods to restore an image.
- CO4** Analyze image segmentation techniques and morphological image processing.
- CO5** Analyze the different image compression techniques.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**WIRELESS AND MOBILE COMMUNICATION
(OPEN ELECTIVE – ELECTRONICS & COMMUNICATION ENGINEERING)**

B.Tech –CIVIL, EEE, MECH, CSE, CSE(AI&ML) & CSE(Data Science)

**L/T/P/C
3/ 0/ 0/ 3**

Pre Requisites: None

Course Objectives

- To provide the student with an understanding of the Cellular concept, Frequency reuse, Hand-off strategies.
- To enable the student to analyze and understand wireless and mobile cellular communication systems over a stochastic fading channel
- To provide the student with an understanding of Co-channel and Non-Co-channel interference
- To give the student an understanding of cell coverage for signal and traffic, diversity techniques and mobile antennas.
- To give the student an understanding of frequency management, Channel assignment and types of hand off.

UNIT - I

Introduction to Cellular Mobile Radio Systems: Limitations of Conventional Mobile Telephone Systems, Basic Cellular Mobile System, First, Second, Third and Fourth Generation Cellular Wireless Systems, Uniqueness of Mobile Radio Environment- Fading, Coherence Bandwidth, Delay Spread, Doppler Spread and Coherence Time. Fundamentals of Cellular Radio System Design: Concept of Frequency Reuse, Co-Channel Interference, Co-Channel Interference Reduction Factor, Desired C/I From a Normal Case in a Omni Directional Antenna System, Trunking and Grade of Service, Improving Coverage and Capacity in Cellular Systems-Cell Splitting, Sectoring, Microcell Zone Concept.

UNIT - II

Co-Channel Interference: Measurement Of Real Time Co-Channel Interference, Design of Antenna System, Diversity Techniques-Space Diversity, Polarization Diversity, Frequency Diversity, Time Diversity, Directional Diversity. Non-Co-Channel Interference: Adjacent Channel Interference, Near End Far End Interference, Cross Talk, Effects on Coverage and Interference by Power Decrease, Antenna Height Decrease, Effects of Cell Site Components.

UNIT - III

Cell Coverage for Signal and Traffic: Signal Reflections in Flat and Hilly Terrain, Effect of Human Made Structures, Phase Difference Between Direct and Reflected Paths, Constant Standard Deviation, Straight Line Path Loss Slope, General Formula for Mobile Propagation Over water and Flat Open Area, Near and Long Distance Propagation, Path Loss From a Point to Point Prediction Model in Different Conditions, Merits of Lee Model. Cell Site and Mobile Antennas: Space Diversity Antennas, Umbrella Pattern Antennas.

UNIT - IV

Frequency Management and Channel Assignment: Numbering and Grouping, Access and Paging Channels, Channel Assignments to Cell Sites and Mobile Units, Channel Sharing and Borrowing, Sectorization, Overlaid Cells, Non Fixed Channel Assignment.

UNIT - V

Handoffs and Dropped Calls: Handoff Initiation, Types of Handoff, Delaying Handoff, Advantages of

Handoff, Power Difference Handoff, Forced Handoff, Mobile Assisted and Soft Handoff, inter system Handoff, Introduction to Dropped Call Rates and their Evaluation.

Text Books

1. Mobile Cellular Telecommunications—W.C. Y. Lee, McGraw Hill, 2nd Edn., 1989.
2. Wireless Communications – Theodore. S. Rappoport, Pearson Education, 2nd Edn., 2002.
3. Mobile Cellular Communication – Gottapu sashibhushana Rao, Pearson, 2012.

Reference Books

1. Principles of Mobile Communications—Gordon L. Stuber, Springer International, 2nd Edn., 2001.
2. Modern Wireless Communications-Simon Haykin, Michael Moher, Pearson Education, 2005.
3. Wireless Communications Theory and Techniques, Asrar U. H .Sheikh, Springer, 2004.
4. Wireless Communications and Networking, Vijay Garg, Elsevier Publications, 2007.
5. Wireless Communications —Andrea Goldsmith, Cambridge University Press, 2005.

Course Outcomes

By the end of the course, the student will be able to

- CO1** Estimate the impairments due to multi path fading channel.
- CO2** Explain an Importance of the fundamental techniques to overcome the different fading effects.
- CO3** Distinguish the co-channel and Non co-channel interference.
- CO4** Inspect cell coverage for signal and traffic, diversity techniques and mobile antennas.
- CO5** Relate and explain the functioning of frequency management, Channel assignment and types of handoff.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**SENSOR NETWORKS
(OPEN ELECTIVE – ELECTRONICS & COMMUNICATION ENGINEERING)**

B.Tech –CIVIL, EEE, MECH, CSE, CSE(AI&ML) & CSE(Data Science)

**L/T/P/C
3/ 0/ 0/ 3**

Pre-requisites: None

Course Objectives:

- To introduce the various types of sensor & networks in wireless
- To explore the analysis of various sensors & networks

UNIT-I

OVERVIEW OF WIRELESS SENSOR NETWORKS: Challenges for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks.

UNIT-II

ARCHITECTURES: Single-Node Architecture-Hardware Components, Energy Consumption of Sensor Nodes , Operating Systems and Execution Environments, Network Architecture - Sensor Network Scenarios, Gateway Concepts.

UNIT-III

NETWORKING SENSORS: Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts -S-MAC , The Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses.

UNIT-IV

INFRASTRUCTURE ESTABLISHMENT: Topology Control , Clustering, Time Synchronization, Localization and Positioning.

UNIT-V

SENSOR NETWORK PLATFORMS AND TOOLS: Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-levels of twareplatforms, Node-level Simulators.

TEXTBOOKS

1. HolgerKarl&AndreasWillig,"ProtocolsAndArchitecturesforWirelessSensorNetworks", John Wiley,2005.
2. Feng Zhao &Leonidas J. Guibas, -Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.

REFERENCES

1. Kazem Sohraby, Daniel Minoli, &Taieb Znati, -Wireless Sensor Networks- Technology, Protocols, And Applicationsl,JohnWiley, 2007.
2. AnnaHac, -Wireless Sensor Network Designsll, John Wiley, 2003.

Course Outcomes

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

CO1 Understand the overview of sensor & networks.

CO2 Explore the various architectures of sensors & network

CO3 Uunderstand the various protocols in sensor networks.

- CO4** Identify the infrastructure and establishment of sensor networks.
CO5 Explore various sensor network platforms and tools.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**BIOMEDICAL INSTRUMENTATION
(OPEN ELECTIVE – ELECTRONICS & COMMUNICATION ENGINEERING)**

B.Tech –CIVIL, EEE, MECH, CSE, CSE(AI&ML) & CSE(Data Science)

L/T/P/C

3/ 0/ 0/ 3

Pre Requisites: None

Course Objectives

The following are the course objectives

- To study bioamplifier, biosignals and measurement of physiological parameters.
- To know about different bioelectrodes and activities of heart.
- To understand therapeutic and cardiac instrumentation.
- To study EEG and EMG machines, recordings and interpretations.

UNIT-I

Components of Medical Instrumentation System: Bioamplifier, Static and Dynamic Characteristics of Medical Instruments, Biosignals and Characteristics, Problems encountered with Measurements from Human beings. Organization of Cell, Derivation of Nernst equation for Membrane Resting Potential Generation and Propagation of Action Potential, Conduction through Nerve to Neuromuscular Junction.

UNIT -II

Bio Electrodes: Biopotential Electrodes-External Electrodes, Internal Electrodes, Biochemical Electrodes. Mechanical Function, Electrical Conduction System of the Heart, Cardiac Cycle, Relation between Electrical and Mechanical Activities of the Heart.

UNIT -III

Cardiac Instrumentation: Blood Pressure and Blood Flow Measurement, Specification of ECG Machine, Einthoven Triangle, Standard 12-Lead Configurations, Interpretation of ECG waveform with respect to Electro Mechanical Activity of the Heart.

UNIT -IV

Therapeutic Equipment: Pacemaker, Defibrillator, Shortwave Diathermy, Hemodialysis Machine. Respiratory Instrumentation: Mechanism of Respiration, Spirometry, Pneumotachograph Ventilators.

UNIT -V

Neuro-Muscular Instrumentation: Specification of EEG and EMG Machines, Electrode Placement for EEG and EMG Recording, Interpretation of EEG and EMG.

Text Books

1. Biomedical Instrumentation and Measurements — by Leslie Cromwell, F.J. Weibell, E.A. Pfeiffer, PHI.
2. Medical Instrumentation, Application and Design — by John G. Webster, John Wiley.

Reference Books

1. Principles of Applied Biomedical Instrumentation — by L.A. Geddes and L.E. Baker, John Wiley and Sons.
2. Hand-book of Biomedical Instrumentation — by R.S. Khandpur, McGraw-Hill, 2003.
3. Biomedical Telemetry — by Mackay, Stuart R., John Wiley.

Course Outcomes

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

- CO1** Understand the functions of bio amplifiers, characteristics of medical instruments and bio signals.
- CO2** Discuss the various internal, external Bio electrodes and relations between electrical and mechanical activities of heart.
- CO3** Compare various concepts of Cardiac Instrumentation and gain the knowledge about
- CO4** Analyze the Therapeutic Equipment and their operation.
- CO5** Acquires knowledge about neuro-muscular Instrumentation like ECG EMG and EEG.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**DATABASE MANAGEMENT SYSTEMS
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)**

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science)

L/T/P/C

3/ 0/ 0/ 3

Pre-requisites: Data Structures, Mathematics-I

Course Objectives:

This Course provides an emphasis on how to organize, maintain and retrieve information efficiently and effectively from a Database and it presents an introduction to data base management systems (DBMS) and relational data model. Also the course introduces the concepts of transactions and transaction processing and the issues and techniques relating to concurrency and recovery in multi-user database environments.

UNIT- I: Introduction

Database system Applications - Database System versus File Systems - View of Data– Instances and schema - Data Models - Database Languages -DDL-DML - Database Users and Administrator –Transaction Management - Database System Structure-Application Architectures – History of Database Systems.

UNIT- II: Database Design and ER model

Basic concepts - Entity sets and Relationship Sets – Constraints - Keys - Design Issues - Entity-Relationship Diagram- Weak Entity Sets - Extended E-R Features - Designing of an E-R Database Schema-Reduction of an E-R Schema to Tables.

UNIT- III: Relational Model

Introduction to the Relational Model – Structure of Relational Databases - Relational Algebra –Relational Calculus – Domain relational Calculus, Tuple Relational Calculus - Integrity and Security –Domain Constraints, Referential Integrity Constraints-Triggers-security and Authorization – SQL- Basic Structure, Set operations, Aggregate Operations –Null values- Nested Sub queries – Views –Modification of Database-Joined relations, Case Statement, NVL Function, Conversion Functions.

UNIT- IV: Informal Design guidelines for Relation Schema

Functional Dependencies– Normal Forms based on Primary Keys-Decomposition–Desirable properties of Decomposition – First Normal Form, Second Normal Form–Third Normal Form- Boyce- Codd Normal Form - Multivalued Dependency- Fourth Normal Form- Fifth Normal Form-Transactions-Transaction Concept- Transaction state- Implementation of atomicity and Durability- Concurrent Executions – Serializability, Recoverability-Implementation of Isolation.

UNIT-V: Concurrency Control

Lock Based Protocols, Dead Lock Handling, Multiple Granularity, Time-stamp Based Protocols, Validation Based Protocols.

Recovery System: Failure Classification, Storage Structure, Recovery and Atomicity, Log Based recovery, Shadow Paging, Recovery with concurrent transactions.

Storage and File Structure - File Organization – Organization of records in file - Data Dictionary Storage – Indexing and Hashing – Basic Concepts , Ordered Indices, B+ Tree Index files, B- tree index files – Static Hashing – Dynamic Hashing – Comparison of Indexing and Hashing.

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Perceive the fundamental concepts of database management.

CO-2: Analyze database models & Entity Relationship models and to draw the E-R diagram for the given case study.

CO-3: Apply relational Database Theory, and be able to write relational algebra expressions for queries.

CO-4: Apply Normalization Process to construct the database and explain Basic Issues of Transaction processing.

CO-5: Compare the basic Database storage structures and access techniques: File Organization indexing methods including B- Tree and Hashing.

TEXT BOOKS:

1. Database System Concepts, Silberschatz, Korth , sixth Edition, McGraw hill.
2. Database Systems,Ramez Elmasri Shamkant B.Navathe Pearson Education,6th edition

REFERENCE BOOKS:

1. Database Management Systems, Raghu ramakrishnan, Johannes Gehrke, TATA Mc Graw Hill
2. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
3. Database Systems ,The Complete Book, Hector Garcia-Molina, Jeffrey D.Ullman, Jennifer Widom.
4. An Introduction to Database Systems, C.J. Date ,Eighth edition

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**JAVA PROGRAMMING
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)**

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science)

L/T/P/C

3/ 0/ 0/ 3

Pre-Requisites: Programming for Problem Solving

Course Objectives:

- This course introduces computer programming using the JAVA programming language with object-oriented programming principles.
- The use of Java in a variety of technologies and on different platforms.
- To understand fundamentals of object-oriented programming in Java which includes defining classes, invoking methods, using class libraries.
- Using API to solve real world problems.

UNIT-I

OOP Concepts: OOP Features, OOP Concepts-Data Abstraction, Encapsulation, Inheritance, Polymorphism, Classes and Objects, Procedural and Object Oriented Programming paradigms.

Java Programming: History of Java, Data Types, Variables, Constants, Scope and Life Time of Variable, Operators, Type Conversion and Casting, Conditional Statements, Iterative statements, Break and Continue statements, Access Controls, Arrays, Methods and Constructors, Static variables and Static methods, This reference, Overloading methods, Garbage collection, Nested Classes, and Inner Classes.

UNIT-II

Inheritance: Inheritance - types of Inheritance, Member access rules, Method Overriding, Super keyword, Preventing Inheritance: Final classes and methods.

Interfaces: Abstract class, defining an Interface, Abstract Vs Interface, implementing and extending Interface.

UNIT-III

Packages- Defining, creating and accessing a Package, and importing Packages.

Exception Handling- Exception Handling, Types of Exceptions. Usage of try, catch, throw, throws and finally, re-throwing exceptions, and User defined Exceptions.

UNIT-IV

Multi Threading- Creating Thread, Life cycle of Thread, Thread priorities, Synchronization of Threads, Inter-Thread Communication, and Producer Consumer Problem.

Collection Framework in Java- Overview of Java Collection Frame work, Generics, Commonly used Collection Classes and Interfaces-Array List, Vector, Hash Table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, Calendar, and Properties.

UNIT-V

GUI Programming with Java- AWT class Hierarchy, Introduction to Swing, Swing vs. AWT, Containers-JFrame, JApplet, and JPanel, Swing components- JButton, JLabel, JTextField, and JTextArea. Layout manager and its types.

Event Handling- Events, Event classes, Event Listeners, Delegation event model, Examples: handling a button click, and handling mouse and keyboard events.

Applet: Create an Applet, Life Cycle of an Applet, and passing parameters to Applet.

Course Outcomes:

CO-1: Understand the use of OOP concepts and solve real world problems using OOP techniques.

CO-2: Solve the inter-disciplinary applications using the concept of inheritance.

CO-3: Develop robust and faster applications by applying different exception handling mechanisms.

CO-4: Understand the multithreading concepts and develop efficient applications.

CO-5: Design GUI based applications and develops applets for web applications.

TEXT BOOK:

1. Java The Complete Reference, 8th Edition. herbert schildt. Indian edition.

REFERENCE BOOKS:

1. Java for Programmers, P.J. Dietel and H.M Dietel, Pearson Education (OR) JAVA: How to Program P.J. Dietel and H.M. Dietel, PHI.
2. Object Oriented Programming through Java, P. Radha Krishna, University Press.
3. Thinking in Java, Bruce Ecel, Pearson Education
4. Programming in Java, S. Malhotra and S. Choudary, Oxford Univ. Press.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**INTRODUCTION TO NETWORK SECURITY
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)**

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science)

L/T/P/C

3/ 0/ 0/ 3

Pre requisites: Data Communications and Computer Networks.

Course Objectives:

- To explain the objectives of information security and importance and application of each of confidentiality, integrity, authentication and availability. Understand various cryptography concepts and techniques.
- To illustrate various symmetric key and asymmetric key cryptographic algorithms.
- To define the basic requirements of message authentication, hashing algorithms.
- To describe E-Mail Security with PGP, S/MIME.
- To discuss the requirements of SET, understand intrusion detection and Firewalls.

UNIT – I

Security Concepts: Introduction, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security, **Cryptography Concepts and Techniques:** Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, Steganography.

UNIT – II

Symmetric key Ciphers: Block Cipher principles, Feistel Cipher Structure, DES algorithm, AES algorithm, Multiple Encryption and Triple DES, Block cipher operation, Stream ciphers, RC4. **Asymmetric key Ciphers:** Principles of public key cryptosystems, RSA algorithm, Diffie- Hellman Key Exchange.

UNIT – III

Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm(SHA-512). **Message authentication codes:** Authentication requirements, HMAC, Digital signatures.

UNIT – IV

E-Mail Security: Pretty Good Privacy-Notations, PGP Operation-Authentication and Confidentiality, Cryptographic Keys and Key Rings, Message Transmission and Reception. **S/MIME-S/MIME** Functionality, Messages, Certificate Processing, Certification Authorities

UNIT – V

Web Security: Requirements, Secure Electronic Transaction (SET), Intruders, Firewall Design principles, Trusted Systems, Intrusion Detection Systems(Online Chapters and Appendices: Chapter 22,Chapter 23).

Course Outcomes:

After the completion of this course, the students should be able to

- CO-1:** Identifies various types of vulnerabilities, attacks, mechanisms and security services.
- CO-2:** Compare and contrast symmetric and asymmetric encryption algorithms.
- CO-3:** Implementation of message authentication, hashing algorithms.
- CO-4:** Explore E-Mail security, S/MIME Functionality.
- CO-5:** Develop intrusion detection system and designing of various types of firewalls.

TEXT BOOK:

1. Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 6th Edition

REFERENCE BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security :Forouzan Mukhopadhyay, Mc Graw Hill, 3rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**INTRODUCTION TO CLOUD COMPUTING
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)**

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science)

L/T/P/C

3/ 0/ 0/ 3

Prerequisites:

1. A course on “Computer Networks”
2. A course on “Operating Systems”
3. A course on “Distributed Systems”

Course Objectives:

- This course provides an insight into cloud computing
- Topics covered include- distributed system models, different cloud service models, service-oriented architectures, cloud programming and software environments, resource management.

UNIT-I

Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing.

UNIT-II

Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models

UNIT-III

Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications, on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure Managing the Cloud application, Migrating Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

UNIT-IV

Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of IaaS, Pros and Cons of IaaS, Summary of IaaS Providers, Platform as a Service, Characteristics of PaaS, Suitability of PaaS, Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaS Providers, Other Cloud Service Models.

UNIT-V

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue ,service, Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM, Cloud Models, IBM Smart Cloud, SAP Labs, SAP HANA Cloud Platform, Virtualization Services Provided by SAP, Sales force, Sales Cloud, Service Cloud: Knowledge as a Service, Rack space, VMware, Manjrasoft, Aneka Platform

Course Outcomes:

- CO-1:** Ability to understand various service delivery models of a cloud computing architecture.
- CO-2:** Ability to understand the ways in which the cloud can be programmed and deployed.
- CO-3:** Understanding Cloud Computing Architecture and Management
- CO-4:** Understanding cloud service Models.

CO-5: Understanding cloud service providers.

TEXT BOOK:

1. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp 2011.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**INTERNET OF THINGS (IoT)
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)**

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science)

L/T/P/C

3/ 0/ 0/ 3

Pre-requisites: Basic Programming Knowledge, Communications Protocols

Course Objectives:

- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web based services on IoT devices

UNIT I

Introduction to Internet of Things –Definition and Characteristics of IoT , Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data Analytics, Communication Protocols, Embedded Systems, IoT Levels and Templates, Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle.

UNIT II

IoT and M2M – Introduction to M2M, Difference between M2M and IoT, Software Defined Networks, Network Function Virtualization, differences between SDN and NFV for IoT, Basics of IoT System Management with SNMP, NETCONF, NETOPEER.

UNIT IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python programs with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from gpio pins.

UNIT V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Web servers – Web server for IoT, Cloud for IoT, Python web application framework, Designing a RESTful web API.

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Interpret the vision of IoT from global context.

CO-2: Perceive building blocks of Internet of Things and its characteristics.

CO-3: Learn the basic concepts of Python. Implement the python programming using Raspberry.

CO-4: Perceive the application areas of IoT. Realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks

CO-5: Determine the Market perspective of IoT. Develop Python web applications and cloud servers for IoT.

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547

2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

REFERENCE BOOK:

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1st Edition, Academic Press, 2014.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**DATA STRUCTURES AND ALGORITHMS
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)**

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science)

L/T/P/C

3/ 0/ 0/ 3

Prerequisites: A course on “Programming for Problem Solving”.

Course Objectives:

- Exploring basic data structures such as stack and queues.
- Introduce a variety of data structures such as hash tables, search trees, heaps, graphs.

UNIT -I

Basic Concepts: Algorithm specification- Introduction , Performance analysis and Performance measurement. Arrays: The Abstract data type, Sparse matrices- Introduction, Sparse matrix representation, Transposing a matrix.

Stacks and Queues : Stack AbstractData Type, Stack operations, Queue AbstractData Type, Queue operations. Evaluation of expressions- Expressions, Postfix notations, Infix to postfix.

UNIT -II

Linked Lists: Singly linked lists and chains, Representing chains, Linked stacks and Queues, Doubly linked lists, Circular lists.

Trees: Introduction, Binary trees- The abstract data type, Properties of binary trees, Binary tree representations, Binary tree traversals- Inorder traversal, Preorder traversal, Post order traversal.

Binary search trees: Definition, Searching a binary search tree, Insertion into a binary search tree, Deletion from a binary search tree, Joining and Splitting binary search trees, Height of a binary search tree.

UNIT-III

Heaps: Priority Queues, Definition of MAX heap, insertion into a MAX Heaps, Deletion from a MAX Heaps.

Efficient Binary Search Trees: Optimal binary search trees, AVL trees, rotations of AVL trees. Multiway Search Trees: M-way search trees, B-trees.

UNIT -IV

Hashing: Introduction, Hash functions, Collision resolution Techniques - Hash table overflow, Extendible hashing.

Graphs: The Graph Abstract Data Type- Introduction, Definition, Graph representations, Elementary graph operations-Depth first search, Breadth first search.

UNIT -V

Sorting-Types of sorting, Insertion sort, Selection sort, Quick sort, Merge sort, Heapsort, External sorting- K-way merge sort, Comparison of all sorting methods.

Course Outcomes:

- CO-1:** Define the basic techniques of algorithm analysis
- CO-2:** Examine the linear and non linear data structures.
- CO-3:** Develop Priority Queues and Balanced Trees.
- CO-4:** Understand Hashing Techniques and Graph applications.
- CO-5:** Apply suitable algorithms for sorting Technique.

TEXT BOOK:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.

REFERENCE BOOKS:

1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R.F. Gilberg and B.A. Forouz and Cengage Learning.
2. Data Structures using C—A.S.T anenbaum, Y.Langsam, and M.J. Augenstein, PHI/ Pearson Education.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**ARTIFICIAL INTELLIGENCE
(OPEN ELECTIVE – CSM (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING))**

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(Data Science)

L/T/P/C

3/ 0/ 0/ 3

Pre-Requisites: None

Course Objectives:

- To learn the difference between optimal reasoning vs human like reasoning
- To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities
- To learn different knowledge representation techniques
- To understand the applications of AI: namely Game Playing.
- To understand Theorem Proving, Expert Systems.

UNIT - I

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents Basic Search Strategies: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

UNIT - II

Advanced Search: Constructing Search Trees, Stochastic Search, A* Search Implementation, Minimax Search, Alpha-Beta Pruning Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

UNIT - III

Advanced Knowledge Representation and Reasoning: Knowledge Representation Issues, Nonmonotonic Reasoning, Other Knowledge Representation Schemes Reasoning Under Uncertainty: Basic probability, Acting Under Uncertainty, Bayes' Rule, Representing Knowledge in an Uncertain Domain, Bayesian Networks

UNIT - IV

Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees.

UNIT - V

Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

Course Outcomes:

- CO-1:** Possess the ability to formulate an efficient problem space for a problem expressed in English.
- CO-2:** Possess the ability to select a search algorithm for a problem.
- CO-3:** Possess the skill for representing knowledge using the appropriate technique
- CO-4:** Possess the ability to apply AI techniques to solve problems of Game Playing,
- CO-5:** Possess the Expert Systems, Machine Learning and Natural Language Processing

TEXT BOOK:

1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition,

PrenticeHall, 2010.

REFERENCE BOOKS:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009.
2. George F. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**INTRODUCTION TO MACHINE LEARNING
(OPEN ELECTIVE – CSM (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING))**

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(Data Science)

**L/T/P/C
3/ 0/ 0/ 3**

Pre-requisites: Programming for Problem solving,

Course Objectives:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses
- To understand the basic theory underlying machine learning.
- To be able to apply machine learning algorithms to solve problems of moderate complexity.
- To be able to read current research papers and understands the issues raised by current research.

UNIT-I

The ingredients of machine learning, Tasks: the problems that can be solved with machine learning, Models: the output of machine learning, Features, the workhorses of machine learning.. (Text Book 1- page no: 1-80)

UNIT- II

Binary classification and related tasks: Classification, Scoring and ranking Beyond binary classification: Handling more than two classes, Regression, Unsupervised and descriptive learning. (Text Book 1- page no: 81-127)

UNIT-III

Intoduction of Concept Learning, Models: Decision trees, Ranking and probability estimation trees, Tree learning as variance reduction. (Text Book 1- page no: 129-156)

UNIT-IV

Rule models: Learning ordered rule lists, Learning unordered rule sets, The Perceptron: a heuristic learning algorithm for linear classifiers. (Text Book 1- page no: 194-218, 262-297).

UNIT- V

Support vector machines, Probabilistic models: The normal distribution and its geometric interpretations, Probabilistic models for categorical

Course Outcomes: After the completion of this course the students should be able to :

CO-1: Explain the theory underlying machine learning.

CO-2: Learn beyond binary classification.

CO-3: Recognize and implement various genetic algorithms.

CO-4: Construct algorithms to learn tree, to learn linear, non-linear models and Probabilistic models.

CO-5: Able to analyze the data.

TEXT BOOKS:

1. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
2. The R Book. Second Edition. Michael J. Crawley. 3. Machine Learning, Tom M. Mitchell, MGH.

REFERENCE BOOKS:

1. Understanding Machine Learning: From Theory to Algorithms, Shai Shalev-Shwartz, Shai BenDavid, Cambridge.

2. Machine Learning in Action, Peter Harington, 2012, Cengage.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

NEURAL NETWORKS

(OPEN ELECTIVE – CSM (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(Data Science)

L/T/P/C

3/ 0/ 0/ 3

Pre requisites: None

Course Objectives:

- To understand the biological neural network and to model equivalent neuron models.
- To understand the architecture, learning algorithm and issues of various feed forward and feedback neural networks.

UNIT – I

Introduction: A Neural Network, Human Brain, Models of a Neuron, Neural Networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks Learning Process: Error Correction Learning,

UNIT – II

Memory Based Learning, Hebbian Learning, Competitive, Boltzmann Learning, Credit Assignment Problem, Memory, Adaption, Statistical Nature of the Learning Process

Single Layer Perceptron : Adaptive Filtering Problem, Unconstrained Organization Techniques, Linear Least Square Filters, Least Mean Square Algorithm, Learning Curves, Learning Rate Annealing Techniques,

UNIT-III

Perceptron –Convergence Theorem, Relation Between Perceptron and Bayes Classifier for a Gaussian Environment Multilayer Perceptron: Back Propagation Algorithm XOR Problem, Heuristics, Output Representation and Decision Rule, Computer Experiment, Feature Detection.

UNIT-IV

Back Propagation Algorithm XOR Problem, Heuristics, Output Representation and Decision Rule, Computer Experiment, Feature Detection.

UNIT-V

Back Propagation and Differentiation, Hessian Matrix, Generalization, Cross Validation, Network Pruning Techniques, Virtues, and Limitations of Back Propagation Learning, Accelerated Convergence, Supervised Learning

Course Outcomes:

By completing this course the student will be able to:

CO-1: Describe different neural networks of various architectures

CO-2: Understand the feed forward and feed backward.

CO-3: Design the training of neural networks.

CO-4: Learn various learning rules.

CO-5: Develop the testing of neural networks and do the perform analysis of these networks for various pattern recognition application.

TEXT BOOKS:

1. Neural Networks a Comprehensive Foundations, Simon Haykin, PHI edition.

REFERENCE BOOKS:

1. Artificial Neural Networks – B. Yegnanarayana Prentice Hall of India P Ltd 2005
2. Neural Networks in Computer Intelligence , Li Min Fu TMH 2003
3. Neural Networks -James A Freeman David M S Kapura Pearson Education 2004.
4. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**INTRODUCTION TO CYBER SECURITY
(OPEN ELECTIVE – CSM (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING))**

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(Data Science)

**L/T/P/C
3/ 0/ 0/ 3**

Prerequisites: Basic Computer knowledge.

Course Objectives:

- To introduce the methodologies and framework of ethical hacking for enhancing the security.
- To learn about cybercrimes and how they are planned.
- To learn the vulnerabilities of mobile and wireless devices.
- To learn about the cyber-Law and legal perspectives.

UNIT – I

Introduction to Cybercrime: Introduction, Cybercrime and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, Cyber-crime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.

(Text Book-1 : Page no : 1 – 39)

UNIT – II

Cryptography: Introduction Cryptography, Steganography, Objectives of Cryptography: Confidentiality, Integrity, Authenticity, Non-repudiation, Accountability, Types of Attacks:

Passive Attacks, Active Attacks, Introduction to Symmetric key cryptography, Asymmetric Key Cryptography, Hashing. (Text Book-2)

UNIT – III

Cyber Offenses: How Criminals Plan Them: Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector.(Text Book-1 : Page no : 45 –78)

UNIT – IV

Cybercrime: Mobile and Wireless Devices:Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones. (Text Book-1 : Page no : 81-119)

UNIT – V

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow.(Text Book-1 : Page no :125-170)

Course Outcomes:

CO-1: After the completion of this course, the students should be able to

CO-2: Outline key terms and concepts in cyber law, intellectual property and cybercrimes.

CO-3: Understand basic cryptography and stenography.

CO-4: Explore the vulnerabilities, threats and cybercrimes posed by criminals.

CO-5: Identify various security challenges phased by mobile devices and identify various types of tools and methods used in cybercrime, develops the secure counter methods to maintain security protection.

TEXT BOOKS:

- 1 .Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA.
2. Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 6th Edition

REFERENCE BOOKS:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.
2. Introduction to Cyber Security, Chwan-Hwa (john) Wu, J. David Irwin. CRC Press T&F Group.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**INTRODUCTION TO DATA SCIENCE
(OPEN ELECTIVE – CSM (DATA SCIENCE))**

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(AI&ML)

**L/T/P/C
3/ 0/ 0/ 3**

Pre-requisites: Basics of Computer science and Mathematics

Course Objectives:

- To understand the basic concepts of Data Science
- To learn data pre processing and techniques for data analytics
- Understand the statistical concepts for data science.

UNIT-I:

Introduction: What Is Data Science? How Does Data Science Relate to Other Fields? Data Science and Statistics, Computer Science, Engineering, and Business Analytics. Data Science, Social Science, and Computational Social Science, The Relationship between Data Science and Information Science, Information vs. Data, Skills for Data Science, Tools for Data Science, Issues of Ethics, Bias, and Privacy in Data Science.(TB1)

UNIT-II:

Data: Introduction, Data Types, Structured Data, Unstructured Data, Challenges with Unstructured Data, Data Collections, Open Data, Social Media Data, Multimodal Data, Data Storage and Presentation, Data Pre-processing, Data Cleaning, Data Integration, Data Transformation , Data Reduction, Data Discretization.(TB1)

UNIT-III:

Techniques: Introduction, Data Analysis and Data Analytics, Descriptive Analysis, Variables, Frequency Distribution, Measures of Centrality, Dispersion of a Distribution, Diagnostic Analytics, Correlations, Predictive Analytics, Prescriptive Analytics, Exploratory Analysis, Mechanistic Analysis, Regression.(TB1)

UNIT-IV:

Statistical Data Analysis: Role of statistics in data science, Kinds of statistics, Descriptive statistics, Inferential statistics, Probability theory , Random variables, Independence, Four perspectives on probability, Bayesian probability, Probability distribution .(TB2)

UNIT-V:

Machine Learning for Data Science: Overview of machine learning, Supervised machine learning , Regression methods, Classification methods, KNN classification, Decision tree classification, Naive Bayes classification, Unsupervised machine learning, Clustering methods, K-means, Principle Component Analysis (PCA), Association Analysis, Apriori algorithm, FP-Growth Analysis. (TB2)

Course Outcomes: After completing this course the students will be able to

CO1: Understand the basic concepts of Data Science.

CO2: Learn about types of data and data pre processing.

CO3: Understand the techniques for data analytics.

CO4: Learn the statistical fundamentals related to Data Science.

CO5: Understand the concepts of Machine Learning for Data Science.

TEXT BOOK

1. Chirag Shah, A Hands-On Introduction To Data Science, Cambridge University Press.
2. Data Science Fundamentals and Practical Approaches. Dr. Gypsy Nandi, Dr. Rupa Kumar Sharma.

REFERENCE BOOKS

1. Doing Data Science, Straight Talk from The Frontline. Cathy O'Neil and Rachel Schutt, O'Reilly, 2014.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**DATA HANDLING AND VISUALIZATION
(OPEN ELECTIVE – CSM (DATA SCIENCE))**

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(AI&ML)

**L/T/P/C
3/ 0/ 0/ 3**

Pre-requisites: Fundamentals of Data Science

Course Objectives:

- Understand basics of Data Visualization
- Learn about visualization of distributions.

UNIT-I:

Introduction to Visualization: Visualizing Data-Mapping Data onto Aesthetics, Aesthetics and Types of Data, Scales Map Data Values onto Aesthetics, Coordinate Systems and Axes- Cartesian Coordinates, Nonlinear Axes, Coordinate Systems with Curved Axes, Colour Scales-Colour as a Tool to Distinguish, Colour to Represent Data Values ,Colour as a Tool to Highlight.

UNIT-II:

Directory of Visualizations- Amounts, Distributions, Proportions, x–y relationships, Geospatial Data. Visualizing Distributions: Visualizing Amounts-Bar Plots, Grouped and Stacked Bars, Dot Plots and Heatmaps, Visualizing Distributions: Histograms and Density Plots- Visualizing a Single Distribution, Visualizing Multiple Distributions at the Same Time.

UNIT-III:

Visualizing Proportions-A Case for Pie Charts, A Case for Side-by-Side Bars, A Case for Stacked Bars and Stacked Densities, Visualizing Proportions Separately as Parts of the Total ,Visualizing Nested Proportions- Nested Proportions Gone Wrong, Mosaic Plots and Treemaps, Nested Pies ,Parallel Sets.

UNIT-IV:

Visualizing Associations Among Two or More Quantitative Variables-Scatterplots, Correlograms, Dimension Reduction, Paired Data. Visualizing Time Series and Other Functions of an Independent Variable-Individual Time Series , Multiple Time Series and Dose–Response Curves, Time Series of Two or More Response Variables

UNIT-V:

Visualizing Trends-Smoothing, Showing Trends with a Defined Functional Form, Detrending and Time-Series Decomposition, Visualizing Geospatial Data-Projections, Layers, Choropleth Mapping, Cartograms, Visualizing Uncertainty-Framing Probabilities as Frequencies, Visualizing the Uncertainty of Point Estimates, Visualizing the Uncertainty of Curve Fits, Hypothetical Outcome Plots.

Course Outcomes: After completing this course the students will be able to

CO1: Understand the fundamentals of Data Visualization.

CO2: Learn the concepts of Visualizing Distributions

CO3: Understand how to Visualizing Proportions and Nested Proportions

CO4: Learn the concepts of Visualizing Associations and Time series data.

CO5: Understand the different Visualizing Trends

TEXT BOOK

1. Claus Wilke, “Fundamentals of Data Visualization: A Primer on Making Informative and Compelling Figures”, 1st edition, O’Reilly Media Inc, 2019.

REFERENCE BOOKS

1. Tony Fischetti, Brett Lantz, R: Data Analysis and Visualization,O'Reilly ,2016
2. Ossama Embarak, Data Analysis and Visualization Using Python: Analyze Data to Create Visualizations for BI Systems,Apress, 2018

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**INTRODUCTION TO BIG DATA
(OPEN ELECTIVE – CSM (DATA SCIENCE))**

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(AI&ML)

L/T/P/C

3/ 0/ 0/ 3

Pre-requisites: DBMS

Course Objectives:

- To understand the basic concepts of Big Data
- To learn distributed computing and big data analytics
- Understand the fundamentals of Hadoop and Map Reduce.

UNIT-I:

Grasping the Fundamentals of Big Data: The Evolution of Data management, Understanding the Waves of Managing Data. Defining big data, Building a Successful Big Data Management Architecture, The Big Data Journey. Examining Big Data Types, Defining Structured Data, Defining Unstructured Data, Putting Big Data Together.(TB1)

UNIT-II:

Types of Digital Data: Classification of Digital Data: Structured data, Semi-structured data and Unstructured. Introduction to Big Data: Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, What is Big Data?, Why Big Data?, Traditional Business Intelligence (BI) versus Big Data, A Typical Data Warehouse Environment, A Typical Hadoop Environment, What is New Today?, What is Changing in the Realms of Big Data? (TB2)

UNIT-III:

A Brief History of Distributed Computing, Giving thanks to DARPA, Understanding the Basics of Distributed Computing. Big Data Technology Components: Exploring the Big Data Stack, Big Data Analytics, Big Data Applications. Cloud and Big Data: Defining the Cloud in the Context of Big Data, Understanding Cloud Deployment and Delivery Models, Making Use of the Cloud for Big Data, Providers in the Big Data Cloud Market.(TB1)

UNIT-IV:

Introduction to Hadoop: Features and advantages and versions of Hadoop. Hadoop Ecosystems and distributions. Hadoop versus SQL. Introducing Hadoop, RDBMS versus Hadoop, Distributed Computing Challenges, History of Hadoop, Hadoop Overview, HDFS (Hadoop Distributed File System), Processing Data with Hadoop, Managing Resources and Applications with Hadoop YARN (Yet Another Resource Negotiator), Interacting with Hadoop Ecosystem: PIG, HIVE & HBase. (TB2)

UNIT-V:

MapReduce Fundamentals: Tracing the Origins of MapReduce, Understanding the map Function, Adding the reduce Function, Putting map and reduce Together, Optimizing MapReduce Tasks. Integrating Big Data with the Traditional Data Warehouse, Big Data Analysis and the Data Warehouse, Changing the Role of the Data Warehouse.(TB1)

Course Outcomes: After completing this course the students will be able to

CO1: Understand the importance of Big Data.

CO2: Learn about the types of data and Big Data Analytics.

CO3: Understand the Big Data technology components and applications.

CO4: Learn the basics of Hadoop Eco system.

CO5: Understand the map reduce fundamentals.

TEXT BOOK

1. Big Data for Dummies, Judith Hurwitz, Alan Nugent, Dr. Fern Halper, and Marcia Kaufman, Wiley
2. Big Data and Analytics, Seema Acharya, Subhasinin Chellappan, Wiley publications.

REFERENCE BOOKS

1. Big Data, Black BookTM , DreamTech Press, 2015 Edition.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**INTRODUCTION TO COMPUTER FORENSICS
(OPEN ELECTIVE – CSM (DATA SCIENCE))**

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(AI&ML)

**L/T/P/C
3/ 0/ 0/ 3**

Pre-requisites: Fundamentals of Computers

Course Objectives:

- Understand the fundamentals of computer forensics.
- Learn about the different computer forensics systems and data collection methods.
- Understand Computer Forensics Analysis.

UNIT-I:

Computer Forensics Fundamentals: Introduction to Computer Forensics, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/ Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps Taken by Computer Forensics Specialists. Types of Computer Forensics Technology: Types of Military Computer Forensic Technology and Business Computer Forensic Technology. Specialized Forensics Techniques, Encryption Methods and vulnerabilities, Protecting Data from Being Compromised.

UNIT-II:

Types of Computer Forensics Systems: Internet Security Systems, Intrusion Detection Systems, Firewall Security Systems, Storage Area Network Security Systems , Network Disaster Recovery Systems, Public Key Infrastructure Systems, Wireless Network Security Systems, Instant Messaging (IM) Security Systems, Net Privacy Systems, Identity management Security Systems, Identity Theft, Biometric Security Systems, Homeland Security Systems.

UNIT-III:

Computer Forensics Evidence and Capture: Data Recovery Defined, Data Back-up and Recovery, The Role of Back-up in Data Recovery, The Data-Recovery Solution. Evidence Collection and Data Seizure: Why Collect Evidence? Collection Options, Obstacles, Types of Evidence, The Rules of Evidence ,Volatile Evidence, General Procedure, Collection and Archiving, Methods of Collection, Artifacts, Collection Steps.

UNIT-IV:

Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene, Computer Evidence Processing Steps, Legal Aspects of Collecting and Preserving, Computer Forensic Evidence. Computer Image Verification and Authentication: Special Needs of Evidential Authentication, Practical Consideration, Practical Implementation.

UNIT-V:

Computer Forensics Analysis: Discovery of Electronic Evidence, Electronic Document Discovery: A Powerful New Litigation Tool, Identification of Data: Timekeeping, Forensic Identification and Analysis of Technical Surveillance Devices. Reconstructing Past Events: How to Become a Digital Detective, Useable File Formats, Unusable File Formats, Converting Files.

Course Outcomes: After completing this course the students will be able to

CO1: Understand the definition of computer forensics fundamentals.

CO2. Describe the types of computer forensics technology. Analyze various computer forensics systems.

CO3. Illustrate the methods for data recovery, evidence collection and data seizure.

CO4. Summarize duplication and preservation of digital evidence. Evaluate the effectiveness of available digital forensics tools.

CO5. Employ fundamental computer theory in the context of computer forensics practices

Text Books:

1. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.

Reference Books:

1. Real Digital Forensics by Keith J. Jones, Richard Bejtlich, Curtis W. Rose, Addison- Wesley Pearson Education
2. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Stuart, CENGAGE Learning.
3. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**MANAGEMENT SCIENCE
(OPEN ELECTIVE – MBA)**

B.Tech – CIVIL, EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science)

L/T/P/C

3/ 0/ 0/ 3

Pre-requisites: None

Course Objectives:

- This course is intended to familiarize the students with the framework for the managers and leaders available for understanding and making decisions relating to issues related organizational structure, production operations, marketing, human resource management, product management and strategy.

UNIT - I:

Introduction to Management and Organization: Concepts of Management and organization-nature, importance and Functions of Management, Systems Approach to Management - Taylor's Scientific Management Theory- Fayal's Principles of Management- Maslow's theory of Hierarchy of Human Needs- Douglas McGregor's Theory X and Theory Y - Herzberg Two Factor Theory of Motivation - Leadership Styles, Social responsibilities of Management, Designing Organizational Structures: Basic concepts related to Organization - Departmentation and Decentralization, Types and Evaluation of mechanistic and organic structures of organization and suitability.

UNIT - II:

Operations and Marketing Management: Principles and Types of Plant Layout-Methods of Production(Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement - Business Process Reengineering(BPR) - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Deming's contribution to quality, Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Store Records - JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

UNIT - III:

Human Resources Management (HRM): Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating - Capability Maturity Model (CMM) Levels - Performance Management System.

UNIT - IV:

Project Management (PERT/ CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

UNIT - V:

Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

TEXT BOOKS:

1. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.
2. P. Vijay Kumar, N. Appa Rao and Ashnab, Chnalill, Cengage Learning India, 2012.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane: Marketing Management, Pearson, 2012.
2. Koontz and Wehrich: Essentials of Management, McGraw Hill, 2012.
3. Thomas N. Duening and John M. Ivancevich Management - Principles and Guidelines, Biztantra, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2012.
5. Samuel C. Certo: Modern Management, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: Management, Wiley, 2012.
7. Parnell: Strategic Management, Cengage, 2012.
8. Lawrence R Jauch, R. Gupta and William F. Clueck: Business Policy and Strategic Management Science, McGraw Hill, 2012.

Course Outcomes:

CO1 Outline the fundamentals of management and contributions to management.

CO2 Define the social Responsibilities of an organization towards stakeholders and build the suitable organization structure and to identify factors influencing plant location and layout decisions.

CO3 Know importance of materials management, evaluate quality of products using SQC techniques and Identify the basic concepts of marketing mix and Human Resource concepts.

CO4 Know how PERT and CPM different and to construct network by proper planning organizing an managing the efforts to accomplish a successful project.

CO5 Appraise all contemporary management practices and analyze how these contemporary management practices one applicable in modern business and service organizations.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**ENTREPRENEURSHIP DEVELOPMENT
(OPEN ELECTIVE – MBA)**

B.Tech – CIVIL, EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science)

**L/T/P/C
3/ 0/ 0/ 3**

Pre-requisites: None

Course Objective: The objective of the course is to make students understand the nature of entrepreneurship, and to motivate the student to start his/her own enterprise. The objective of the course is to enlighten with the fragrance of Corporate Good Governance and Business Ethics, so that they would become the best entrepreneurs / managers of the corporate world.

Unit – I

Nature of Entrepreneurship; Characteristics – Qualities and skills of an Entrepreneur – Functions of entrepreneur – Entrepreneur scenario in India and Abroad. Forms of Entrepreneurship: Small Business – Importance in Indian Economy – Types of ownership – Sole trading – Partnership – Joint stock company and other forms. First – Mover disadvantages, Risk Reduction strategies, Market scope strategy, Imitation strategies and Managing Newness

Unit – II

Aspects of Promotion: Generation of new entry opportunity, SWOT Analysis, Technological Competitiveness, legal regulatory systems, patents and trademarks, Intellectual Property Rights- Project Planning and Feasibility Studies- Major steps in product development. Financial Aspects: Sources of raising Capital, Debt-Equity, Financing by Commercial Banks, Government Grants and Subsidies, Entrepreneurship Promotion Schemes of Department of Industries (DIC), KVIC, SIDBI, NABARD, NSIC, APSFC, IFCI and IDBI. New Financial Instruments.

Unit - III

Introduction to Business Ethics: Necessity for Business Ethics-Need for Ethical guideline –Salient Issues in Ethics and Commerce- Ethics as a Luxury – Earlier attempts at Ethics in Industry – Justification for Ethics – Effect of Migration of National Character – Shadow Economy – Basic Principles in Ethics – Corporate Climate and corporate climate audits – Political Issues – Nature and theory of Ethics – The Naturalistic fallacy - G.E.Moore’s Philosophy.

Unit – IV

Understanding Corporate Governance: Corporate Governance- Capitalism at crossroads – Historical perspective of Corporate Governance – Issues of Corporate Governance – Theoretical basis of Corporate Governance – Corporate Governance mechanisms – Indian Model of Governance – Good Corporate Governance – Corporate Governance committees – OECD Principles – Indian Committee and guidelines – The confederation of Indian Industry’s initiative. Corporate Governance Models, Corporate Social Responsibility.

Unit – V

Corporate Social Responsibility: System Concept of Business Society – Social Responsibility – Social Responsibility tools – approaches to Ethics – Corporate Social Accountability - Business in a Social World – Ethics and Social Responsibility – professional ethics – Ethics of practicing company secretaries- Ethical investing.

Text Books:

1. Robert D Hisrich, Michael P Peters, Dean A Shepherd: Entrepreneurship, TMH, 2009
2. Vasanth Desai: Entrepreneurship, HPH, 2009
3. C.S.V.Murthy: Business Ethics & Corporate Governance, Himalaya, 2009.

References:

1. Bholanath Dutta: Entrepreneurship Text and Cases, Excel, 2009
2. David Martin: Corporate Governance, Viva, 2009
3. H. Nandan: Fundamentals of Entrepreneurship, PHI, 2009.
4. Barringer: Entrepreneurship, Pearson,2009.
5. Ronald D Francis & Mukti Mishra: Business Ethics, TMH, 2009
6. RK Mishra,Gitarani: Corporate Governance, Excel,2009
7. A.C.Frenando: Corporate Governance, Pearson, 2006
8. V.Balachandran &V.Chandrasekaran: Corporate Governance & Social Responsibility, PHI, 2009
9. A.C.Fernando: Business Ethics, Pearson, 2009
10. Laura P Hartman & Abha Chatterjee: Business Ethics, TMH, 2009
11. Tripat Kaur: Values and Ethics in Management, 2/e, Paragon International,2009.

Course Outcomes:

- CO1** Explain characteristics, Qualities, Skills and Functions of Entrepreneur.
- CO2** Demonstrates Entrepreneur Scenario in India and abroad.
- CO3** Summarizes necessity for business ethics and ethical guidelines in business.
- CO4** Interprets about Government Grants and subsidies and Entrepreneurship promotion schemes.
- CO5** Prioritizes corporate social responsibility and professional ethics by company secretaries.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**INTELLECTUAL PROPERTY RIGHTS
(OPEN ELECTIVE – MBA)**

B.Tech – CIVIL, EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science)

**L/T/P/C
3/ 0/ 0/ 3**

Pre-requisites: None

Course Objectives:

- In the interest of the national economic growth the innovations and improvements are to be owed and used for the production and distribution process. The Students of technology will be benefited by knowing the process of obtaining recognition of their innovations. This course will enable them to know the legal process of registering the innovation.

UNIT – I

INTRODUCTION TO INTELLECTUAL PROPERTY: Introduction, types of intellectual property, International organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

TRADE MARKS: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade marks registration processes.

UNIT – III

LAW OF COPY RIGHTS: Fundamental of copy right law, originally of material, rights of reproduction, rights of perform the work publicity, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

LAW OF PATENTS: Foundation of patent law, patent searching process ownership rights and transfer.

UNIT- IV

TRADE SECRETS: Trade secret law, determination of trade secret status, liability for misappropriations of trade secrets, protection for submission trade secret litigation.

UNIT-V

NEW DEVELOPMENT OF INTELLECTUAL PROPERTY: New developments in trade mark law: Copyright law, patent law, intellectual property audits.

TEXT BOOKS & REFERENCES:

1. Intellectual property rights, Deborah, E. Bouchux, cengage learning
2. Intellectual property right – Unleashing the knowledge economy, prabuddhaganguli, Tate Mc Graw Hill Publishing company ltd.

Course Outcomes:

CO1 Outline the increasing importance of Intellectual Property Rights

CO2 Utilize post registration procedures and trade mark registration process

CO3 Explain the copyright principles and rights

CO4 Prioritize the law of patents and patent ownership

CO5 Develop the trade secret and maintenance