GAYATRI VIDYA PARISHAD COLLEGE FOR DEGREE AND PG COURSES (A),

RUSHIKONDA, VISAKHAPATANAM 530045 | website: www.gvpcdpgc.edu.in

(Approved by A.I.C.T.E | Affiliated to Andhra University | An ISO 9001:2015 Certified Institute)

ENGINEERING AND TECHNOLOGY PROGRAM

DEPARTMENT OF CIVIL ENGINEERING

(Accredited by NBA)

I Year I Semester Syllabus with effective from 2020-21(R20 Regulation)

I Year II Semester Syllabus with effective from 2020-21(R20 Regulation)

GAYATRI VIDYA PARISHAD COLLEGE FOR DEGREE AND PG COURSES (A)

ENGINEERING AND TECHNOLOGY PROGRAM
DEPARTMENT OF CIVIL ENGINEERING
ADMITTED BATCH 2020-21 (R-20 Regulation)

B. Tech I Year - I Semester

Course code	Category	Course Title	Hours per week L	T	P	Internal Marks	External Marks	Total Marks	Credits
	BSC	Engineering Mathematics – I	3	0	0	30	70	100	3
	BSC	Engineering Chemistry	3	0	0	30	70	100	3
	HSMC	English	3	0	0	30	70	100	3
	ESC	Computer Programming with C and Numerical Methods (CPNM)	3	0	0	30	70	100	3
	PCC	Introduction to Civil Engineering	3	0	0	30	70	100	3
	HSMC	English Language Lab	0	0	3	50	50	100	1.5
	BSC	Engineering Chemistry Lab	0	0	3	50	50	100	1.5
	ESC	Computer Programming with C and Numerical Methods Lab	0	0	3	50	50	100	1.5
Total			**15**	**0**	**9**	**300**	**500**	**800**	**19.5**

B. Tech I Year - II Semester

Course code	Category	Course Title	Hours per week L	T	P	Internal Marks	External Marks	Total Marks	Credits
	BSC	Engineering Mathematics – II	3	0	0	30	70	100	3
	BSC	Engineering Physics	3	0	0	30	70	100	3
	ESC	Engineering Graphics	1	0	4	30	70	100	3
	ESC	Civil Engineering Materials	3	0	0	30	70	100	3
	ESC	Engineering Mechanics	3	0	0	30	70	100	3
	ESC	Workshop Lab	0	0	3	50	50	100	1.5
	BSC	Engineering Physics Lab	0	0	3	50	50	100	1.5
	ESC	Engineering Geology Lab	0	0	3	50	50	100	1.5
Total			**13**	**0**	**13**	**300**	**500**	**800**	**19.5**

ENGINEERING MATHEMATICS - I

(Common for Civil Engineering, Computer Science and Engineering, Electronics and Communication Engineering and Mechanical Engineering)

(Effective from the admitted batch of 2020-21)

Description	Subject Teaching Methodology	L	T	P	C
Course Code	**ENGINEERING MATHEMATICS -I**	**3**	**0**	**0**	**3**
	Total Marks : 100	**Ses.**		**Ext.**	
		30		**70**	
		Ext. Exam Time 3 Hrs.			

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Course Objectives:

- To transmit the knowledge of Partial differentiation.
- To know of getting maxima and minima of function of two variables and finding errors and approximations.
- To expand a periodical function as Fourier series and half-range Fourier series.
- To evaluate double and triple integrals, volumes of solids and area of curved surfaces.

Course Outcomes:

CO 1: Find the partial derivatives of functions of two or more variables.
CO 2: Evaluate maxima and minima, errors and approximations.
CO 3: To expand a periodical function as Fourier series and half-range Fourier series.
CO 4: Have a fundamental understanding of Fourier series and be able to give Fourier expansions of a given function.
CO 5: Evaluate double and triple integrals, volumes of solids and area of curved surfaces.

SYLLABUS

UNIT-I
(Partial Differentiation)

Introduction - Functions of two or more variables - Partial derivatives - Homogeneous functions – Euler's theorem - Total derivative - Change of variables – Jacobins. Mean value Theorems (without proofs)

UNIT-II
(Applications of Partial Differentiation)

Geometrical interpretation -Tangent plane and Normal to a surface -Taylor's theorem for functions of two variables - Errors and approximations -Total differential. Maxima and Minima of functions of two variables - Lagrange's method of undetermined multipliers - Differentiation under the integral Sign - Leibnitz's rule.

UNIT-III
(Fourier Series)

Introduction - Euler's Formulae - Conditions for a Fourier Expansion - Functions having points of discontinuity - Change of Interval - Odd and Even Functions - Expansions of Odd or Even Periodic Functions, Half-Range Series - Parseval's Formula. Practical Harmonic analysis.

UNIT-IV
(Multiple Integrals)

Introduction - Double Integrals - Change of Order of Integration - Double Integrals in Polar Coordinates - Triple Integrals - Change of Variables.

UNIT-V
(Multiple Integrals-Applications)

Area enclosed by plane curves - Volumes of solids - Area of a curved surface - Calculation of Mass - Center of gravity - Moment of inertia - product of inertia – principal axes- Beta Function - Gamma Function - Relation between Beta and Gamma Functions.

TEXT BOOK:
Scope and Treatment as in "Higher Engineering Mathematics", by Dr. B.S. Grewal, 43rd Edition, Khanna publishers.
REFERENCE BOOKS:
1.   Graduate Engineering Mathematics by V B Kumar Vatti., I.K.International publishing house Pvt. Ltd.
2.   Advanced Engineering Mathematics by Erwin Kreyszig.
3.   A text book of Engineering Mathematics, by N.P. Bali and Dr. Manish Goyal, Lakshmi Publications.
4.   Advanced Engineering Mathematics by H.K. Dass. S. Chand Company.
5.   Higher Engineering Mathematics by B.V. Ramana, Tata Mc Graw Hill Company.
6.   Higher Engineering Mathematics by Dr. M.K.Venkataraman.

*****

ENGINEERING CHEMISTRY
(CIVIL ENGINEERING)
(Effective from the admitted batch of 2020-2021)

Description	Subject Teaching Methodology		L	T	P	C
Course Code	**ENGINEERING CHEMISTRY**		3	1	0	3
	Total Marks : 100		Ses.		Ext.	
			30		70	
Prerequisite (s)	Knowledge of theoretical and experimental chemistry from +2 Level.		**Ext. Exam Time 3 Hrs.**			

Course Objectives

1. To apply the basic knowledge of chemistry to the engineering discipline.

2. To develop knowledge about water and its treatment for industrial and potable purposes.

3. To develop understanding in the areas of polymers, mechanism of corrosion of metals and corrosion control methods, fuels, lubricants and building materials, conducting polymers, bio-degradable polymers and fiber reinforced plastics and apply the knowledge for solving existing challenges faced in various engineering and societal areas.

Course Outcomes

CO.1: Analyze and determine the water quality and prescribe the remedial measures for domestic as well as industrial usage.

CO.2: Student will differentiate the moulding techniques of plastic materials & classify the polymers and can apply to specific purposes.

CO.3: Students can able to design the metallic materials to prevent corrosion.

CO.4: Student will apply suitable lubrication mechanisms for various machinery parts.

CO.5: To understand the properties of engineering materials and their applications.

Chapter – 1: Water Chemistry (8 Hrs)
Sources of water – Impurities and their influence of living systems – WHO Limits – Hardness and its determination – boiler troubles and their removal – water softening methods – lime-soda, zeolite and ion0exchange - Municipal water treatment-break point chlorination – Desalination of sea water – reverse osmosis method. **(CO1)**

Chapter – 2: Polymers and Plastics (8 Hrs)
Polymers: Definition – types of polymerization (addition- polythene, polyvinylchloride, polystyrene & condensation) – mechanisms of addition polymerization – radical and ionic polymerization - styrene monomer - storage and biological effects of styrene.
Plastics: Thermosetting and thermoplastics – effect of polymer structure on properties of cellulose derivatives – vinyl resins – nylon (6, 6), reinforced plastics – conducting polymers. **(CO2)**

Chapter – 3: Corrosion (8 Hrs)

Corrosion: Origin and theory – types of corrosion - chemical and electrochemical, pitting, inter -granular, waterline, stress – galvanic series – factors effecting corrosion.

Corrosion Controlling Methods: Protective coatings - metallic coatings, electroplating and electroless plating – chemical conversion coatings – phosphate, chromate, anodized, organic coatings – paints and special paints. **(CO3)**

Chapter – 4: Fuels and Lubricants (8 Hrs)

Solid Fuels: Wood and coal, ranking of coal – analysis (proximate and ultimate) coke manufacture – Otto Hoffmann's process – applications.

Liquid Fuels: Petroleum refining – motor fuels – petrol and diesel oil – knocking – octane number – cetane number.

Gaseous Fuels: Biogas, LPG and CNG – characteristics – applications.

Lubricants: Classification – mechanism – properties of lubricating oils – selection of lubricants for engineering applications. **(CO4)**

Chapter 5: Building Materials (8 Hrs)

Portland Cement: Manufacture of cement - dry and wet processes – chemical composition of cement - setting and hardening of cement - cement concrete - RCC - decay of concrete and protective measures - special cements.

Refractories: Classifications - properties - engineering applications.

Ceramics: Classification – properties - engineering applications. **(CO5)**

Text Books

- Engineering Chemistry – P.C. Jain and M. Jain, 16th Ed., Dhanpath Rai and Sons, New Delhi.
- A Text book of Engineering Chemistry, S.S. Dara, 12th Ed., S. Chand & Co. New Delhi.

Reference Books

- Engineering Chemistry, B.K. Sharma, Krishna Prakashan, 6th Ed., Meerut.
    - Engineering Chemistry - B.L. Tembe, Kamaluddin and M.S. Krishnan (NPTEL).

ENGLISH

(Common for all Branches)
(Effective from 2020-2021 Admitted Batches)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	Credits
					Ses.	Ext.			
	ENGLISH	3	0	0	30	70	100	3hrs	3

Objectives:
- To make students understand the explicit and implicit meanings of a text/topic;
- To give exposure to new words and phrases, and aid to use them in different contexts;
- To apply relevant writing formats to draft essays, letters, emails and presentations; and
- To adapt oneself to a given situation and develop a functional approach to finding solutions: adaptability and problem solving.

Outcomes:
- Students will be able to analyse a given text and discover the various aspects related to language and literature;
- Learn the various language structures, parts of speech and figures of speech;
- Develop one's reading and writing abilities for enhanced communication; and
- Learn to apply the topics in real-life situations for creative and critical use.

Textbook:

Language and Life: A Skills Approach Board of Editors, Orient Blackswan Publishers, India. 2018.

Topics:

On the conduct of life: William Hazlitt

Life skills: Values and Ethics

If: Rudyard Kipling

The Brook: Alfred Tennyson

Life skills: Self-Improvement

How I Became a Public Speaker: George Bernard Shaw

The Death Trap: Saki

Life skills: Time Management

On saving Time: Seneca

Chindu Yellama

Life skills: Innovation

Muhammad Yunus

Politics and the English Language: George Orwell

Life skills: Motivation

Dancer with a White Parasol: Ranjana Dave

Grammar:

Prepositions – Articles – Noun-Pronoun Agreement, Subject-Verb Agreement – Misplaced Modifiers – Clichés, Redundancies.

Vocabulary:

Introduction to Word Formation – Root Words from other Languages – Prefixes and Suffixes – Synonyms, Antonyms – Common Abbreviations

Writing:

Clauses and Sentences – Punctuation – Principals of Good Writing – Essay Writing – Writing a Summary

Reference Books:

❖ *Practical English Usage*, Michael Swan. OUP. 1995.
❖ *Remedial English Grammar*, F.T. Wood. Macmillan.2007
❖ *On Writing Well*, William Zinsser. Harper Resource Book. 2001
❖ *Study Writing*, Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
❖ *Communication Skills*, Sanjay Kumar and PushpLata. Oxford University Press. 2011.
❖ *Exercises in Spoken English*, Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

******

COMPUTER PROGRAMMING WITH C & NUMERICAL METHODS (Common for CE and CSE)		
Instruction: 3 Hours /week		Credits: 3
Internal: 30 Marks	External Exam: 70 Marks	Total: 100 Marks

COURSE OBJECTIVES:

1. Aims to provide exposure to problem-solving through C programming.
2. Aims to train the student to the basic concepts of the C-programming language and Numerical Methods

COURSE OUTCOMES:

CO1. Student will be able to write code using control structures & arrays.

CO2. Student will be able to write code using strings & functions.

CO3. Student will be able to write code using user defined data types.

CO4. Student will be able to write code using Pointers for operations on files.

CO5. Student will be able to write code for Numerical & Integral Methods.

UNIT-I

Introduction to C, Decision Making, Branching, Looping, Arrays: Basic structure of C program, Constants, Variables and data types, Operators and Expressions, Arithmetic Precedence and associativity, Type Conversions. Managing Input and Output Operations, Formatted Input, Formatted Output, Decision making with if statement, Simple if statement, the if…else statement, Nesting of if…else statement, the else if ladder, switch statement, the (? :) operator, the GOTO statement., The while statement, The do statement, The for statement, Jumps in Loops, One, Two-dimensional Arrays.

UNIT-II

Functions & Strings: Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions: No Arguments and no Return Values, Arguments but no Return Values, Arguments with Return Values, No Argument but Returns a Value, Functions that Return Multiple Values. Nesting of functions, recursion, passing arrays to functions, passing strings to functions, The scope, visibility and lifetime of variables, Character Arrays. Declaration and initialization of Strings, reading and writing of strings, String handling functions, Table of strings.

UNIT-III

Structure and Unions: Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, arrays of structures, arrays within

structures, structures within structures, structures and functions and unions, size of structures and bit-fields- Program applications.

UNIT-IV

Pointers & File handling: Accessing the address of a variable, declaring pointer variables, initializing of pointer variables, accessing variables using pointers, chain of pointers, pointer expressions, pointers and arrays, pointers and character strings, array of pointes, pointers as function arguments, functions returning pointers, pointers to functions, pointers to structures-Program Applications, File handling: Defining and opening a file, closing a file, Input/ Output operations on files, Error handling during I/O operations, random access to files and Command Line Arguments-Program Applications.

UNIT-V

Solutions of Algebraic and Transcendental Equations: Bisection Method, Newton Raphson Method. Interpolation: Newton's forward and backward Interpolation, Lagrange's Interpolation in unequal intervals, Trapezoidal rule, Simpson's 1/3 rule. Solutions of OrdinaryFirst Order Differential Equations: Euler's Method, Modified Euler's Method and Runge-Kutta Method.

Text Books:

1. Programming in ANSI C, E Balagurusamy, 6th Edition. McGraw Hill Education (India)Private Limited.
2. Introduction to Numerical Methods, SS Sastry, Prentice Hall.

Reference Books:

1. Let Us C, YashwantKanetkar, BPB Publications, 5th Edition.
2. Computer Science, A structured programming approach using C", B.A.Forouzan andR.F.Gilberg, 3rd Edition, Thomson, 2007.
3. The C –Programming Language' B.W. Kernighan, Dennis M. Ritchie, PHI
4. Scientific Programming: C-Language, Algorithms and Models in Science, Luciano M.Barone (Author), Enzo Marinari (Author), Giovanni Organtini, World cientific.

INTRODUCTION TO CIVIL ENGINEERING		
Instruction: 3 Hours /week		Credits: 3
Internal: 30 Marks	External Exam: 70 Marks	Total: 100 Marks

Course Objective:

Course Outcomes
1. Classify and explain the properties and uses of different building and construction materials.
2. Associate with the stress strain diagrams and the relationship between the elastic constants.
3. Define the types and characteristics of soil and rock formations.
4. Illustrate the knowledge on hydrological aspects and water supply systems.
5. Describe various modes of transport and develop an understanding of construction equipment.

SYLLABUS
UNIT-I
Various disciplines of Civil Engineering; Importance of Civil Engineering, Possible scopes for a career, Development of various materials of construction and methods of construction, Contributions of eminent Civil Engineers.

Bricks:
Sources and qualities of Brick Earth, Classification of Bricks, general qualities of Bricks as per IS code, tests for good bricks as per IS code, special forms of Bricks and their uses.

Cements:
Natural and artificial cements, types of various artificial cements and their uses. Modern renovation materials- Cement bound, polymer cement bound and pure polymer bound materials, their properties &uses.

UNIT-II
Structural Engineering:
Types of buildings, bridges and Water retaining structures.

Simple stresses and strains:
Types of stresses and strains, Hooke's law, working stress, factor of safety, lateral and volumetric strain, Poisson's ratio, elastic constant and relationship between them, bars of varying cross sections, composite bars, temperature stresses.

UNIT-III
Geology
Formation of soil and rocks, types of soils, rocks and minerals.

Geotechnical Engineering:
Soil structure and clay mineralogy, Basics of Soil Mechanics, rock mechanics; types of foundations. Basics of Tunneling and the methods

UNIT-IV
Hydraulics, Hydrology &Water Resources Engineering:
Fundamentals of fluid flow, basics of water supply systems. Historical evolution of Irrigation in India, Importance of irrigation in agriculture. Classification of dams and Reservoirs.

Environmental Engineering:
Importance and necessity of protected water supply systems, Objectives of protected water supply system, Flow chart of public water supply system, Role of an Environmental Engineer. Components of sewage treatment plants and effluent treatment systems. solid waste management

UNIT-V

Transportation:

Importance of transportation. Different modes of transportation, Historical development of road construction in India. Classification and layout of roads, Railway stations, ports, harbours and airports.

Equipment and Construction:

Classification of construction works, Construction stages, Construction Equipment: Scraper, Bulldozer, Mixer, Concrete Vibrator, Safety aspects of construction, Aesthetics and quality aspects of construction.

TEXT BOOKS:
1. Duggal K.N, Elements of Environmental Engineering, Revised Edition, S Chand Publication, 2014.
2. Arora K.R, Soil Mechanics and Foundation Engineering, Standard publisher dist., 2009
3. Rangwala, Engineering materials, 17th edition Charotar Publication, 2017
4. K P Subramanian, Highway railways airport and harbor Engineering. SCITECH publisher,2016.

REFERENCE BOOKS:
1. Timoshenko and Young, Elements of strength of materials, 5th Revised edition,Van Nostrand Reinhold Company publication, 2007.
2. Popov, Introduction to Mechanics of Solids by Popov, 1st edition, Prentice-Hall publication, 1968.
3. Smith R.C, Materials of construction, 4th edition McGraw-Hill Company, NewYork, 1979.
4. Surindra Singh, Engineering Materials, 5th edition, Konark Publishers Pvt. Ltd., NewDelhi, 1989.
5. Anjaneyulu.Y, Introduction to Environmental Science, 1st edition B SPublications, 2004.
6. Suresh K. Dhameja, Environmental Studies, S K Kataria & SonsPublications, 2007.
7. Tchobanoglous, Integrated Solid Waste Management, McGraw-Hill publication, 1993.
8. Rangwala, Building Materials, Charotar publisher, 2012

ENGLISH LANGUAGE LAB

(Common for all branches)
(Effective from 2020-2021 Admitted Batches)

Subject Code	Subject Name/ Title	L	T	P	Allotment of Marks		Total Marks	Credits
					Internal Examination	**External Examination**		
	English Language lab	0	0	2	50	50	100	1.5

Objectives:
- To make students recognize the sounds of English through Audio-Visual aids;
- To help students build their confidence and help them to overcome their inhibitions and self-consciousness while speaking in English;
- To familiarize the students with stress and intonation and enable them to speak English effectively; and
- To give learners exposure to and practice in speaking in both formal and informal contexts.

Outcomes:
- Students will be sensitized towards recognition of English sound patterns and the fluency in their speech will be enhanced;
- Students will be able to participate in group activities like roleplays, group discussions and debates; and
- Students will be able to express themselves fluently and accurately in social as well professional context.

Topics:

Introduction to Phonetics: The Sounds of English (Speech sound – vowels and consonants) - Stress and Intonation - Accent and Rhythm.

Listening Skills: Listening for gist and specific information - listening for Note taking, summarizing and for opinions - Listening to the speeches of eminent personalities.

Speaking Skills: Self-introduction - Conversation Skills (Introducing and taking leave) - Giving and asking for information - Role Play - Just A Minute (JAM) session - Telephone etiquette.

Reading and Writing skills: Reading Comprehension – Précis Writing - E-Mail writing - Punctuation.

Presentation skills: Verbal and non-verbal communication - Body Language - Making a Presentation.

DISTRIBUTION AND WEIGHTAGE OF MARKS
- The practical examinations for the English Language Lab shall be conducted as per the University norms prescribed for the core Engineering practical sessions.
- For the Language lab sessions, there shall be a continuous evaluation during the semester for 50 sessional marks and 50 semester-end Examination marks.
- For the 50 sessional (Internal) marks, 30 marks shall be awarded for day-to-day performance and for completing activities in the lab manual, 20 marks to be awarded by conducting Internal Lab Test(s).

- For the 50 Semester- end (External) marks, 30 marks shall be awarded for written examination (dialogues, the sounds of English and stress) and 20 marks for External Examiner viva-voce.

Reference Books:
- Ashraf Rizvi. *Effective Technical Communication*. Tata McGraw Hill Education Private Limited, New Delhi.
- *Speak Well*. Orient Blackswan Publishers, Hyderabad.
- Allan Pease. *Body Language*. Manjul Publishing House, New Delhi.

ENGINEERING CHEMISTRYLABORATORY

(Common for Civil Engineering, Computer Science and Engineering, Electronics and Communication Engineering and Mechanical Engineering)
(Effective from the admitted batch of 2020-2021)

Description	Subject Teaching Methodology	L	T	P	C
Course Code	**ENGINEERING CHEMISTRY LABORATORY**	**0**	**0**	**3**	**1.5**
	Total Marks : 100	**Int.**		**Ext.**	
		50		**50**	
Prerequisite (s)	Knowledge of theoretical and experimental chemistry from +2 Level.	**Ext. Exam Time 3 Hrs.**			

Course Objectives

1. To develop the fine skills of quantitative determination of various chemical components through titrimetric analysis.

Course Outcomes

At the end of the course student will be able to

CO.1 Quantitatively determine the amount of various chemical species in solutions by titrations.
CO.2 Conduct the quantitative determinations with accuracy.

List of Laboratory Experiments

1. Determination of sodium hydroxide with HCl (with Na_2CO_3 as primary standard)

2. Determination of alkalinity (carbonate and hydroxide) of water sample

3. Determination of Fe (II)/Mohr's salt by permanganometry

4. Determination of oxalic acid by permanganometry

5. Determination of chromium (VI) by Mohr's salt solution

6. Determination of zinc by EDTA method

7. Determination of hardness of water sample by EDTA method

8. Determination of chlorine in water by iodometric titration

Reference Books

- Vogel's Quantitative Chemical Analysis – V Edition – Longman

Experiments in Applied Chemistry (For Engineering Students) – Sinita Rattan – S. K. Kataria & Sons, New Delhi.

COMPUTER PROGRAMMING WITH C & NUMERICAL METHODS LAB - CE		
Instruction: 3 Hours/week		Credits: 1.5
Internal: 50 Marks	External Exam: 50 Marks	Total: 100 Marks

COURSE OBJECTIVES:

1. To provide complete knowledge of C language.
2. To develop logics which will help them to create programs, applications in C.
3. To learn the basic programming constructs they can easily switch over to any other language in future.

COURSE OUTCOMES:

CO1: Ability to implement the programs using control structures & arrays
CO2: Ability to implement the programs using strings & functions
CO3: Ability to implement the programs using user defined datatypes
CO4: Ability to implement the programs using pointers and operations on files
CO5: Ability to implement the programs using numerical & integral methods

1. a) Write a C program to find the roots of a quadratic equation
   b) 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.
   c) Write a C program to find the sum of individual digits of that number and also print and save it in reverse order.
2. Write a program to read x, y coordinates of 3 points and then calculate the area of a triangle formed by them and print the coordinates of the three points and the area of the triangle. What will be the output from your program if the three given points are in a straight line?
3. Write a program which generates 100 random real numbers in the range of 10.0 to 20.0 and sort them in descending order.
4. Write a function for transporting a square matrix in place (in place means that you are not allowed to have full temporary matrix).
5. Write a program to add two matrices with the dimension of the matrix specified by the user at the time of executing the program.
6. Write a program e.g. for getting a sub-string from a given position, copying one string to another, reversing a string and adding one string to another with and without using string manipulation functions.
7. Write a program to read the data of four students, each students has a name (string), roll number (string), age (integer), use an array of structure. Later find the average age of the students.
8. Write a program to demonstrate the difference between pointer to an array and array of pointers.
   b) Store your name, address and phone number in a 2-D character array and display the same using pointer notations.
   c) Use pointer to an array and array of pointers.
9. First use an editor to create a file with some integer numbers. Now write a program, which reads these numbers and determines their mean and standard deviation.

10. Implement bisection method to find the square root of a given number to a given accuracy.

11. Given a table of x and corresponding f(x) values, write a program which will determine f(x) value at an intermediate x value using Lagrange Interpolation.
12. Implement Simpson's $1/3^{rd}$ rule for numerical integration.
13. Write a program to solve a differential equation using Runge-Kutta Method.
14. Write a C Program to compute
        i)   Stress
        ii)   Strain and
        iii)   Elongation of a Steel Rod
        When length, diameter and axial pull (load) is given. Here Young's Modulus E is constant and value of $E=2*10^5$ N/mm^2.

Write a C program to find the elongation of a bar of varying cross sections when length, diameter and axial pull (load) is given.

B. Tech I Year - II Semester

Course code	Category	Course Title	Hours per week			Internal Marks	External Marks	Total Marks	Credits
			L	T	P				
	BSC	Engineering Mathematics – II	3	0	0	30	70	100	3
	BSC	Engineering Physics	3	0	0	30	70	100	3
	ESC	Engineering Graphics	1	0	4	30	70	100	3
	ESC	Civil Engineering Materials	3	0	0	30	70	100	3
	ESC	Engineering Mechanics	3	0	0	30	70	100	3
	ESC	Workshop Lab	0	0	3	50	50	100	1.5
	BSC	Engineering Physics Lab	0	0	3	50	50	100	1.5
	ESC	Engineering Geology Lab	0	0	3	50	50	100	1.5
		Total	13	0	13	300	500	800	19.5

ENGINEERING MATHEMATICS - II

(Common for Civil Engineering, Computer Science and Engineering, Electronics and Communication Engineering and Mechanical Engineering)

(Effective from the admitted batch of 2020-21)

Description	Subject Name	L	T	P	C	Ext. Exam Time 3 Hrs.
Course Code	**ENGINEERING MATHEMATICS -II**	**3**	**0**	**0**	**3**	
	Total Marks : 100	Ses.		Ext.		
		30		70		

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Course Objectives:

- The way of obtaining rank, Eigen values and Eigen vectors of a matrix.
- To know the importance of Cayley-Hamilton theorem and getting canonical form from a given quadratic form.
- To solve the system of equations by using direct and indirect methods.
- To solve first order and higher order differential equations by various methods.
- To obtain the Laplace transforms and inverse Laplace transforms for a given functions and their applications.

Course Outcomes:

- Find rank, Eigen values and Eigen vectors of a matrix and understand the importance of Cayley-Hamilton theorem.
- Reduce quadratic form to canonical forms and solving linear systems by direct and indirect methods.
- Demonstrate solutions to first order differential equations by various methods and solve basic applications problems related to electrical circuits, orthogonal trajectories and Newton's law of cooling
- Discriminate among the structure and procedure of solving higher order differential equations with constant and variable coefficients.
- Understand Laplace transforms and its properties and finding the solution of ordinary differential equations.

SYLLABUS
UNIT-I
(Linear Algebra)

Rank of a matrix- Echelon form, Normal Form - Solution of Linear System of Equations - Consistency of Linear System of Equations - Gauss elimination method, LU Factorization method, Complex Matrices: Hermitian, Skew-Hermitian and Unitary Matrices and their Properties.

UNIT-II
(Eigen Values and Eigen Vectors)

Eigen Values and Eigen Vectors of a Matrix - Cayley-Hamilton theorem - Inverse and Powers of a Matrix using Cayley-Hamilton's theorem and its applications. Diagonalization of a Matrix - Quadratic Forms - Reduction of Quadratic Form to Canonical Form - Nature of a Quadratic Form.

UNIT-III

(Ordinary Differential Equations of First Order and its Applications)

Formation of ordinary differential equations (ODEs) - Solution of an ordinary differential equation - Equations of the first order and first degree - Linear differential equation - Bernoulli's equation - Exact differential equations - Equations reducible to exact equations - Orthogonal Trajectories - Simple Electric (LR & CR) Circuits - Newton's Law of Cooling - Law of Natural growth and decay.

UNIT-IV
(Differential Equations of Higher Order)

Solutions of Linear Ordinary Differential Equations with Constant Coefficients - Rules for finding the complimentary function - Rules for finding the particular integral - Method of variation of parameters - Cauchy's linear equation - Legendre's linear equation - Simultaneous linear differential equations.

UNIT-V
(Laplace Transforms and it's Application to ODE)

Introduction - Existence Conditions - Transforms of Elementary Functions - Properties of Laplace Transforms - Transforms of Derivatives - Transforms of Integrals - Multiplication by t^n - Division by t – Evaluation of integrals by Laplace Transforms - Inverse Laplace Transform - Applications of Laplace Transforms to Ordinary Differential Equations - Simultaneous Linear Differential Equations with Constant Coefficients - Second Shifting Theorem - Laplace Transforms of Unit Step Function, Unit Impulse Function and Laplace Transforms of Periodic Functions.

TEXT BOOK:

    Scope and Treatment as in "Higher Engineering Mathematics", by Dr. B.S. Grewal, 43rd edition, Khanna publishers.

REFERENCE BOOKS:

1. Graduate Engineering Mathematics by V B Kumar Vatti., I.K. International publishing house Pvt. Ltd.
2. Advanced Engineering Mathematics by Erwin Kreyszig.
3. A text book of Engineering Mathematics, by N.P. Bali and Dr. Manish Goyal. Lakshmi Publications.
4. Advanced Engineering Mathematics by H.K. Dass. S. Chand Company.
5. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Graw Hill Company.

*****

ENGINEERING PHYSICS
(Common for CE, CSE, ECE and ME)
(Effective from the admitted batch of 2020-2021)

Description	Subject Teaching Methodology			L	T	P	C
Course Code	**PHYSICS**			3	1	0	4
Teaching	**Total Contact Hours : 60**	**Total Marks : 100**		**Ses.**		**Ext.**	
				30		70	
Prerequisite (s)	Knowledge of theoretical and experimental Physics from +2 Level. Application of Physics theory and calculations to required course			**Ext. Exam Time 3 Hrs.**			

Course Objectives:

The fundamentals of sciences are essential to learn as the application of science in solving problems is technology. The physics curriculum is designed in such a way that all branches of engineering will study the basic fundamentals of technology from where it is originated. The course objectives are

1. To impart knowledge in basic concept of physics of Thermodynamics relevant to engineering applications.
2. To grasp the concepts of physics for electromagnetism and its application to engineering. Learn production of Ultrasonics and their applications in engineering.
3. To Develop understanding of interference, diffraction and polarization: connect it to a few engineering applications.
4. To learn basics of lasers and optical fibers and their use in some applications.
5. To understand concepts and principles in quantum mechanics and Nanopahse Materials. Relate them to some applications.

Course Outcomes:

By the end of this course, student would have

CO.1. Understand the fundamentals of Thermodynamics and Laws of thermodynamics. Understand the working of Carnot cycle and concept of entropy.

CO.2. Gain Knowledge on the basic concepts of electric and magnetic fields. Understand the concept of the nature of magnetic materials. Gain knowledge on electromagnetic induction and its applications.

CO.3. Understand the Theory of Superposition of waves. Understand the formation of Newton's rings and the working of Michelson's interferometer. Remember the basics of diffraction, Evaluate the path difference. Analysis of Fraunhofer Diffraction due to a single slit

CO.4. Understand the interaction of matter with radiation, Characteristics of Lasers, Principle, working schemes of Laser and Principle of Optical Fiber. Realize their role in optical fiber communication.

CO.5. Understand the intuitive ideas of the Quantum physics and understand dual nature of matter. Compute Eigen values, Eigen functions, momentum of Atomic and subatomic particles using Time independent one Dimensional Schrodinger's wave equation.

SYLLABUS

THERMODYNAMICS

Introduction, Heat and Work, First law of thermodynamics and applications, Reversible and Irreversible process, Carnot cycle and Efficiency, Second law of thermodynamics, Carnot's Theorem, Entropy, Second law in terms of entropy, Entropy and disorder, Third law of thermodynamics (statement only).

ELECTROMAGNETISM

Concept of electric flux, Gauss's law - some applications, Magnetic field - Magnetic force on current, torque on current loop, The Biot-Savart's Law, B near a long wire, B for a circular Current loop, Ampere's law, B for a solenoid, Hall effect, Faraday's law of induction, Lenz's law, Induced magnetic fields, Displacement current, Maxwell's equations (no derivation), Magnetic materials: Classification of magnetic materials and properties.

OPTICS

Interference: Principles of superposition – Young's Experiment – Coherence - Interference in thin films (reflected light), Newton's Rings, Michelson Interferometer and its applications.

Diffraction: Introduction, Differences between interference and diffraction, Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit (Qualitative and quantitative treatment).

Polarisation: Polarisation by reflection, refraction and double refraction in uniaxial crystals, Nicol prism, Quarter and Half wave plate, circular and elliptical polarization.

LASERS and FIBRE OPTICS

Introduction, characteristics of a laser beam, spontaneous and stimulated emission of radiation, population inversion, Ruby laser, He-Ne laser, Semiconductor laser, applications of lasers

Introduction to optical fibers, principle of propagation of light in optical fibers, Acceptance Angle and cone of a fibre, Numerical aperture, Modes of propagations, classification of fibers, Fibre optics in communications, Application of optical fibers.

MODERN PHYSICS

Introduction, De Broglie concept of matter waves, Heisenberg uncertainty principle, Schrodinger time independent wave equation, application to a particle in a box. Free electron theory of metals, Kronig - Penney model (qualitative treatment), Origin of energy band formation in solids, Classification of materials into conductors, semiconductors and insulators.

Nanophase Materials : Introduction, properties, Top-down and bottom up approaches, Synthesis - Ball milling, Chemical vapour deposition method , sol-gel methods, Applications of nano materials.

TEXT BOOKS:

1. Physics by David Halliday and Robert Resnick – Part I and Part II **-** Wiley.
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand
3. Engineering Physics by R.K. Gaur and S.L. Gupta –Dhanpat Rai

Reference Books:
1. Modern Engineering Physics by A.S. Vadudeva
2. University Physics by Young and Freedman

ENGINEERING GRAPHICS
(Common for CE, CSE, ECE and ME)
(Effective from the admitted batch of 2020-2021)

Credits	Periods			Total	Sessional Marks	Exam Marks	Total Marks
	Theory	*Tutorial*	*Lab*	*Contact Hrs/Week*			
4	2	-	4	6	30	70	100

COURSE OBJECTIVES

COB 1 The course is aimed at developing Basic Graphic skills.

COB 2 Develop Skills in Preparation of Basic Drawings

COB 3 Skills in Reading and Interpretation of Engineering Drawings

COURSE OUTCOMES

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

CO 1   Graphically construct and understand, the importance of mathematical curves in Engineering applications

CO 2   Graphically visualize and construct orthographic projection of points and lines

CO 3   Visualize and construct different views of planes and solids in different orientations

CO 4   Construct and develop the sectioned surfaces of geometrical solids

CO 5   Interpret and draw the Orthographic and Isometric views of different solids.

SYLLABUS

UNIT-I

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions.

Curves: Construction of Conic sections, cycloids and involutes - Normal and tangent to the curves.

UNIT – II

Projections of Points and Straight Lines: Principal or Reference Planes - Projections of a point lying in any one of the four quadrants. Projections of straight lines parallel to both reference planes - perpendicular to one reference plane and parallel to other reference plane - inclined to one plane and parallel to the other - Projections of straight line inclined to both the reference planes - Traces.

UNIT – III

Projections of Planes: Projection of Perpendicular planes: Perpendicular to both reference planes, perpendicular to one reference plane and parallel to other - perpendicular to one reference plane and inclined to other plane - Projection of Oblique planes. Introduction to Auxiliary Planes.

Projections of Solids: Types of solids: Polyhedral and Solids of revolution. Projections of solids in simple positions: Axis perpendicular to horizontal plane - vertical plane -parallel to both the reference planes - Projection of Solids with axis inclined to one reference plane and parallel to other - inclined to both the reference planes.

UNIT – IV

Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of section - Sections of solids (Prism, Pyramid, Cylinder and Cone) in simple positions only. Development of Surfaces: Methods of Development: Parallel line development and radial line development - Development of a cube, prism, cylinder, pyramid and cone.

UNIT – V

Isometric Views: Isometric projection - Isometric scale and Isometric view. Isometric view of Prisms, Pyramids, cylinder, cone, sphere and their combinations.

TEXT BOOK

Elementary Engineering Drawing by N.D. Bhatt, Charotar Publishing House.

REFERENCE BOOK

Engineering Graphics by K.L. Narayana and P. Kannaiah, Tata Mc-Graw Hill.

CIVIL ENGINEERING MATERIALS

Subject code:	Credits : 3
Instruction : 3 Lecture / week	Sessional Marks : 30
End Exam : 3 Hours	End Exam Marks : 70

Course Objectives
The Objectives of this course are:
1. To introduce students to important building materials, their properties and uses
2. To educate about manufacturing processes of materials and to increase ability to judge quality of materials by IS standards
3. To impart knowledge on basic construction techniques and to encourage exploration of modern material innovations.

Course Outcomes
1. At the end of the course the student should be able to:
2. Identify and recognize characteristics and uses of Timber and wood products
3. Explain manufacturing processes of various materials, their uses, related IS Codes, testing, transport and storage.
4. Describe and compare different types of flooring and roofs
5. Demonstrate knowledge on steel, structural steel and their uses.
6. Develop understanding of modern concepts in Cement concrete technology and mix design

SYLLABUS:

UNIT I

TIMBER
Classification of common Indian trees and their uses, their general and mechanical properties, types of defects in wood and timber, methods of seasoning and their importance, felling and conversion, decay of timber, preservation methods; Classification of wood based products Veneers, types of plywood, merits and demerits of plywood and laminated wood.

UNIT II

MASONRY AND PAINTS
Manufacture of bricks, qualities of Bricks and tests as per IS code, transport and storage of bricks; Different types of Brick bonds and Stone Masonry, Plan, Elevation, Sections of brick and stone masonry; Partition walls.
Constituents and characteristics of paints, types of paint and their uses; constituents of varnishes, types and uses of varnishes and polishes. Interior and exterior wall painting, doors and window painting process. Painting defects, causes and remedies.

UNIT III

FLOORING AND ROOFING MATERIALS
Different types of tiles for roofing and flooring; Manufacturing of tiles, Materials used for flooring (Stone, tiles, terrazzo)
Types of roofs and their uses (Flat RCC, Sloped mangalore tiles, domes), types of materials used in roofing, types of trusses and Steel truss roofs for large spans

UNIT IV

STEEL
Steel Making, Metallurgy of Steel, Heat Treatment of Steel, Chemical Composition of Steel, Types of Structural Steel, Mechanical Properties of Steel, Structural Steel Products, Reinforcing Steel Bars,

Protection of Structural Steel from Corrosion, Stainless Steel, Storage and Handling of Steel, Advantages and Disadvantages of Steel

UNIT V

CONCRETE

Introduction of concrete, Composition of concrete, Concrete grades, properties and relevant tests, storage, batching, mixing & transporting, Process of Concrete laying, Advantages of concrete over other materials, Advances and future trends in concrete, Overview of Sustainability and Concrete development.

Cement: Wet and dry process of manufacturing Ordinary Portland cement (OPC), Hydration and structure of cement, chemical and physical analysis, various field and laboratory tests on OPC as per IS code. Transport and Storage of Cement, special cement and admixtures.

Aggregates: Classification IS specifications, Properties, Grading, Methods of combining aggregates, specified grading, Testing of aggregates.

Water: General requirements & limiting values of impurities.

TEXTBOOKS
1. S.C. Rangwala, "Engineering Materials", Charotar Publishing House, Anand, 1993
2. N. Subramanian, "Building Materials Testing and Sustainability", Oxford University Press, New Delhi, 2019

REFERENCES
1. S.K. Sharma, "Civil Engineering Construction Materials", KBP House, 2019
2. S.K. Duggal, "Building Materials", Fourth Edition, New Age International Publishers, 2008.
3. B.C. Punmia, "Building Construction", Eleventh Edition, Laxmi Publications, 1984.

ENGINEERING MECHANICS

Subject code:	Credits : 3
Instruction : 3 Lecture & 1 Tutorial / week	Sessional Marks : 30
End Exam : 3 Hours	End Exam Marks : 70

Pre-requisites: Engineering Mathematics, Engineering Physics.

Course Objectives:
The objective of this course is to:
1   Study and describe static equilibrium of particles and rigid bodies.
2   Write the appropriate equilibrium equations from the free-body diagram and determine the connection forces in trusses.
3   Analyze effect of friction on equilibrium and compute centroid of given plane areas.
4   Calculate the second moment of an area and study dynamic equilibrium of particles.
5   Learn about the kinetics and kinematics of particle and rigid body, related principles

Course Outcomes:
At the end of this course student will be able to:
1   Determine the resultant forces and moments for a given system of forces.
2   Calculate the motion characteristics of a body subjected to a given force system and analyze planar and spatial systems to determine the forces in members of trusses
3   Analyze problems related to friction and locate the centroid and center of gravity.
4   Calculate moment of inertia and the displacement, velocity and acceleration of a moving particle.
5   Apply the work energy, D'Alembert's Principle to particles and connected systems.

SYLLABUS:

UNIT-I
BASIC CONCEPTS
Basic Concepts : Introduction to Engineering Mechanics – Scalar and Vector quantities – Forces – Characteristics of a force – Definitions and examples of various types of force systems – Definition of resultant – Composition and resolution of forces – Moment of a force – Principles of moments of force – Couples – characteristics of a couple – on Transformations of a couple – Resolution of a force into a force and couple. Resultants of Force Systems, Possible resultants of different types of force systems

UNIT-II
Equilibrium of Bodies
Equilibrium: Free body diagrams – Equations of equilibrium for a concurrent coplanar force system – Equilibrium of Bodies acted on by two or three forces – Equilibrium of bodies acted on by non-concurrent coplanar force system – Equilibrium of bodies acted on by parallel, non-coplanar force system – Equilibrium of non-concurrent, non-coplanar non-parallel force system.
Analysis of statically determinate trusses by (a) Method of joints and (b) Method of sections.

UNIT-III
FRICTION
Friction: Nature of friction – Laws of friction – Coefficient of friction – Angle of friction – Cone of friction – Problems involving frictional forces Method of Virtual Work: Principle of virtual work – Equilibrium of ideal system – Stability of equilibrium.

UNIT-IV

CENTROID AND CENTRE OF GRAVITY: Centre of gravity of parallel forces in a plane – Centre of gravity of parallel forces in space – centroids and centers of gravity of composite bodies – Theorems of Pappus.

MOMENT OF INERTIA

Moments of Inertia, Definition – Parallel axis theorem for areas – Second moments of areas by integration – Radius of gyration of areas – Moments of inertia of composite areas – Parallel axis and parallel plane theorems for masses – Moments of inertia of masses by integration – Radius of gyration of mass – Moments of inertia of composite masses.

UNIT-V

KINEMATICS: Kinematics: Absolute Motion: Introduction – Recapitulation of Basic Terminology of Mechanics – Newton's Laws – Introduction to Kinematics of Absolute Motion – Rectilinear Motion of a Particle – Angular Motion – Curvilinear Motion of a Particle using Rectangular Components.

KINETICS: D'Alembert's Principle. Work and Energy Approach – Work Done by a Force – Work Done by a Couple –Work Done by a Force System – Energy: Potential Energy – Kinetic Energy of a Particle – Kinetic Energy of a Rigid Body – Principle of Work – Energy and Application to Particle and Rigid Body in Planar Motion – Conservation of Energy
Impulse – Momentum Approach – Linear Impulse – Linear Momentum – Principle of Linear
Impulse and Linear Momentum – Conservation of Linear Momentum – Elastic Impact -
Principle of Angular Momentum.

TEXT BOOKS:
1. A.K.Tayal, "Engineering Mechanics Statics and Dynamics", 14th Edition, Umesh Publication.
2. S.Singer,"Engineering Mechanics", 13th Edition, BS Publications,2018.

REFERENCES:
1. S.Timoshenko and D.H.Young,"Engineering Mechanics", 13th Edition, Tata Mcgrawhill, 2010.
2. J.L. Meriam, "Engineering Mechanics", 18th Edition, John Wiley &Sons (Asia) Pvt.Ltd. 2018
3. S.Bhavikatti,"Engineering Mechanics", 2nd Edition, New Age International Publishers.2018.
4. R.C.Hibbler,"Engineering Mechanics",14th Edition, Pearson Publications,2015

WORKSHOP LAB
(Common for CE, CSE, ECE and ME)
(Effective from the admitted batch of 2020-2021)

Course Code	Title of the Course	Contact Periods for delivering the course			Credits	Sessional Marks	External Marks
	WORKSHOP	L 0	T 0	P 3	1.5	50	50

COURSE OUTCOMES

CO 1   Identify and use various tools required for performing operations in Carpentry for making various components

CO 2   Identify and use various tools required for performing operations in Fitting for making various components

CO 3   Identify and use various tools required for performing operations in Tin-smithy for making various components

CO 4   Identify and Usage of House Wiring applications.

LIST OF EXPERIMENTS:

S.No	Trade	Job
1.	Carpentry	(a) Cross Lap Joint (b) Corner Dovetail Joint (c) Mortise and Tenon Joint (d) Bridle Joint
2.	Fitting	(a) V-Fit (b) Square Fit (c) Half Round Fit (d) Dovetail Fit
3.	Tin Smithy	(a) Taper Tray (b) Square Tray (c) 90° Elbow (d) Funnel
4.	House Wiring	(a) Wiring of two bulbs in Parallel (b) Wiring of two bulbs in Series (c) Wiring to control a lamp with two-way switches (d) Wiring to control a fluorescent tube light with one-way switch

REFERENCE

1. Elements of workshop technology, Vol.1 by S. K. and H. K. Choudary.
2. A course in Workshop Technology,Vol.1 by B.S.Raghuwanshi, Danpat Rai

ENGINEERING PHYSICS LABORATORY
(Common for CE, CSE, ECE and ME)
(Effective from the admitted batch of 2020-2021)

Description	Subject Teaching Methodology		L	T	P	C
Course Code	**ENGINEERING PHYSICS LABORATORY**		0	0	3	1.5
Teaching	**Total Contact Hours : 30**	**Total Marks : 100**	Int.		Ext.	
			50		50	
Prerequisite (s)	Knowledge of theoretical and experimental Physics from +2 Level. Application of Physics theory and calculations to required course		**Ext. Exam Time 3 Hrs.**			

Course Objectives:

To train the student in acquiring skills, techniques of using instruments to observe the physical phenomena, to measure certain physical quantities and constants.

Course Outcomes:

By the end of the course

   CO. 1.   Experiment and evaluate basic principles of physics by observing and analyzing the data, plotting graphs and interpreting the results.

List of Laboratory Experiments:

1. Determination of Radius of Curvature of a given Convex Lens By forming Newton's Rings.
2. Determination of Wavelength of Spectral Lines in the Mercury Spectrum by Normal Incidence method.
3. Study the Intensity Variation of the Magnetic Field along axis of Current Carrying Circular Coil.
4. Determination of Cauchy's Constants of a Given Material of the Prism using Spectrometer.
5. Determination of Refractive Index of Ordinary ray μo and Extraordinary μe ray.
6. Determination of Thickness Given Paper Strip by Wedge Method.
7. Calibration of Low Range Voltmeter.
8. Calibration of Low Range Ammeter.
9. Determination of Magnetic Moment and Horizontal Component of Earth's Magnetic Field.
10. Lees Method - Coefficient of thermal Conductivity of a Bad Conductor.
11. Carey Foster's Bridge – Verification of laws of Resistance and Determination of Specific Resistance.
12. Melde's Apparatus – Frequency of electrically maintained Tuning Fork.
13. Photoelectric cell-Characteristics.
14. Planks Constants.
15. Determination of energy band gap of a given semiconductor.

Course Code	**ENGINEERING GEOLOGY LAB**		0	0	3	1.5
Teaching	**Total Contact Hours : 30**	**Total Marks : 100**	**Int.**		**Ext.**	
			50		**50**	

Course Objectives:

1. To enable the students to know different types of soils.
2. To enable the students to know different properties of different soils.
3. To enable the students to know the application of Remote Sensing and Geo Physical Methods.
4. Understand weathering process and mass movement

Course Outcomes:

1. Students will understand the suitable foundation for different structures in different types of soils.
2. Identify subsurface information and groundwater potential sites through geophysical investigations
3. Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels.

SYLLABUS

General geology:

Importance of geology from Civil Engineering point of view. Weathering and soils: soil profile, erosion, and soil formation, types of Indian soils.

Landforms produced by running water, glaciers, wind, sea waves and currents.

Ground water: Origin and Occurrence of ground water. Porosity and permeability. Aquifers and ground water moment and water bearing properties of rocks.

Petrology & Mineralogy:

Petrology: Definitions of rock. Rock classification, structure, texture and mineralogical composition. Types of rocks– ingenious rocks and structures-dykes and sills: granite, dolerite, basalt.

Sedimentary rocks: conglomerate, sandstone, shale, limestone.

Metamorphic rocks: gneiss, khondalite, schist, marble, charnokite, engineering properties of rocks.

Mineralogy: Physical properties: form, colour, lustre, cleavage, fracture, hardness and specific gravity.

Study of important rock forming minerals: fledspar, micas and clays

Stratigraphy and Structural Geology:

Stratigraphy: major geological formations of India. Archaeans. Cuddapahs, vindyana, gondwanas and Deccan traps. Mineral resources of Andhra Pradesh. Structural geology: elements of structural geology– strike and dip, plunge. Clinometers compass and Brunton compass. Classification of folds, faults and joints. Geological methods of investigation: geological formations, preparations of geological maps, structural features and groundwater parameters.

Natural hazards: earthquake origin and distribution. Volcanoes, landslides and mass moment. Tsunamis.

Geological applications to Civil Engineering structures: Role of engineering geologists in planning, design and construction stages in Civil Engineering works. Geological investigations for dams and

reservoir; geological investigations for bridges and multi-storied structures. Geological investigation for highways. Geological investigations for tunnels and coastal structures. (sea walls. groins and bulkheads). Environmental geology.

LIST OF EXPERIMENTS
1. General study of toposheet
2. Physical properties of minerals
3. Physical properties of 3 types of rocks
4. Study of folds, faults and joints (Models)
5. Study of tunnels (models)
6. General observation of satellite data for abstraction of data
7. Integrated approach of Terrain evaluation
8. Demonstration of Geophysical Methods.

Text Books

1. K.V.G.K.Gokhale "Principles of Engineering Geology", B.S. Publications-2005

2. N.Chennakesavalu, "Engineering Geology" Mc-Millan, Indian Ltd-2005

3. P.K.Mukherjee, "A Text Book of Geology" World Press

4. Parbin Singh, "Engineering and General Geology", Katson Publishing House

5. George Jospeh, "Fundamentals of Remote Sensing" University Press (India) Private Ltd.