COURSE STRUCTURE
AND
DETAILED SYLLABUS
for

I Year and II Year

B. Tech CIVIL ENGINEERING (CE)

(Applicable for batches admitted from 2018-19)

DEPARTMENT OF CIVIL ENGINEERING
SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY
(An Autonomous Institution approved by UGC and affiliated to JNTUH)
Yamnampet, Ghatkesar, Hyderabad - 501 301

SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING

B.Tech Course Structure – Autonomous Regulation: 2018-19 (166 Credits)
[6 theory + 3 Lab structure & Professional Electives – 5 & Open Electives – 3]

I Year I Semester

Sr. No	Subject Code	Subject	L	T	P/ D	C	Max Marks	
							CIE	SEE
1	7HC03	Chemistry	3	1	0	4	30	70
2	7FC01	Problem solving using C	3	0	0	3	30	70
3	7HC06	Engineering Mathematics – I	3	1	0	4	30	70
4	7BC01	Workshop / Manufacturing practices	1	0	0	1	30	70
5	7HC01	English (reading, listening, and writing)	1	0	0	1	30	70
6	7HC63	Chemistry lab	0	0	3	1.5	30	70
7	7FC71	Problem solving using C lab	0	0	3	1.5	30	70
8	7HC61	English (reading, listening, and writing) lab	0	0	2	1.0	30	70
9	7BC61	Workshop / Manufacturing practices Lab	0	0	3	1.5	30	70
10	7K261	Technical Seminar – I	0	0	2	1.0	30	70
11	7HC20	(Mandatory) Human Values and professional Ethics in Higher education	3	0	0	0	30	70
							Grade Evaluation	
		Total :	**14**	**2**	**13**	**19.5**	**330**	**770**

I Year II Semester

Sr. No	Subject Code	Subject	L	T	P/ D	C	Max Marks	
							CIE	SEE
1	7HC04	Applied Physics	3	1	0	4	30	70
2	7K201	Engineering Mechanics (civil engineering)	3	1	0	4	30	70
3	7HC08	Engineering Mathematics – II	3	1	0	4	30	70
4	7BC02	Engineering Graphics & Design	1	0	4	3	30	70
5	7HC02	English (Oral communication skills)	1	0	0	1	30	70
6	7HC64	Applied Physics lab	0	0	3	1.5	30	70
7	7HC62	English (Oral communication skills) Lab	0	0	2	1	30	70
8	7K291	Technical Seminar – II	0	0	2	1	30	70
		Total:	**11**	**3**	**11**	**19.5**	**240**	**560**

II Year I Semester

Sr. No	Subject Code	Subject	L	T	P/D	C	Max Marks	
							CIE	SEE
1	7BC04	Elements of Mechanical Engineering	2	0	0	2	30	70
2	7HC12	Engineering Mathematics- III	3	1	0	3	30	70
3	7K301	Introduction to Solid Mechanics	3	1	0	3	30	70
4	7K302	Surveying and Geomatics	3	1	0	3	30	70
5	7K303	Building Materials and Planning	3	0	0	2	30	70
6	7ZC01	Management Science & Financial Accounting	2	0	0	2	30	70
7	7K371	Mechanics of Solids LAB	0	0	3	1.5	30	70
8	7K372	Survey LAB	0	0	3	1.5	30	70
9	7K373	Computer Aided Drafting of Buildings LAB	0	0	3	1.5	30	70
10	7K391	Technical Seminar –III	0	0	2	1	100	-
		Total :	**16**	**3**	**11**	**20.5**	**370**	**630**

II Year II Semester

Sr. No	Subject Code	Subject	L	T	P/D	C	Max Marks	
							CIE	SEE
1	7AC48	Electrical & Electronics Engineering	3	0	0	3	30	70
2	7K404	Mechanics of Materials	3	1	0	3	30	70
3	7K405	Fluid Mechanics	3	1	0	3	30	70
4	7K406	Construction Engineering and Management	3	1	0	3	30	70
5	7K407	Hydrology and Water resources engineering	3	0	0	**2**	30	70
6	7K408	Engineering Geology	3	0	0	2	30	70
7	7AC95	Electrical & Electronics Engineering Lab	0	0	2	1	30	70
8	7K471	Fluid mechanics Lab	0	0	4	2	30	70
9	7K472	Engineering Geology Lab	0	0	3	1.5	30	70
10	7K491	Technical Seminar –IV	0	0	2	1	100	-
11	7K488	Comprehensive Viva voce –I	-	-	-	1	50	50
12	7HC21	(Mandatory) Environmental Science and Technology	2	-	-	-	30	70
							Grade Evaluation	
		Total	**20**	**3**	**11**	**22.5**	**450**	**750**

1	2	3	4	5	6	7	8	9	10	11	12
X					X	X					

7HC03: CHEMISTRY

(Common to CSE, IT , ECM , CE & BT)

B. Tech I Year I Semester

L	T	P	C
3	1	0	4

Course Objectives:

1. To understand microscopic chemistry in terms of atomic and molecular orbitals
2. To learn the preparation and applications of commercial and conducting polymers and lubricant materials
3. To learn the industrial problems caused by water and municipal water treatment
4. To acquire knowledge about different types of batteries and their working mechanism
5. To develop the concepts and types of corrosion and the factors influence corrosion and to understand the control methods and protective coatings for metals
6. To learn the chemical reactions of drugs that are used in the synthesis of drug molecules

UNIT - I

Atomic and molecular structure (6L)

Molecular orbitals of diatomic molecules and plots of the multicentre orbitals. Equations for atomic and molecular orbitals. Energy level diagrams of diatomics. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

UNIT - II

Engineering materials (8L)

Plastics – Thermosetting and Thermoplastics, preparation, properties and engineering applications of plastics: PVC, Teflon, Bakelite. **Fibers:** Nylon 6,6 and Dacron.

Rubbers – natural and artificial rubber, vulcanization of natural rubber, Buna-S, Buna-N and their **engineering applications.**

Lubricants

Definition, classification and function of lubricants, Types of lubrication and mechanisms – Thick Film or Hydrodynamic Lubrication, Thin Film or Boundary Lubrication, Extreme Pressure Lubrication. Classification and properties of lubricants – Viscosity, flash and fire point, cloud and pour point and acid value. **Engineering applications.**

UNIT - III
Water Technology (8L)

(a) **Introduction**:- Hardness of water – types of hardness (temporary and permanent), calculation of hardness- Numerical problems. Estimation of hardness of water by EDTA Method.

(b) **Water for Industrial purpose**: Food, sugar, textile, paper and pharma industries, water for steam making characteristics of boiler feed water, boiler troubles- scale and sludge & Carry over (priming &foaming),boiler corrosion, caustic embrittlement.

(c) **Water Treatment**: Internal conditioning- phosphate, carbonate & calgon conditioning. External Treatment: Ion-exchange process. Desalination-reverse osmosis. Municipal water treatment-sedimentation, coagulation, filtration, disinfection-chlorination, ozonization. **Engineering applications: Methodology and working of mineral water plant for drinking purpose.**

UNIT - IV
Electrochemistry (8L)

Conductance – conductors (metallic and electrolytic), types of conductance – specific, equivalent and molar conductance – effect of dilution on conductance.

Free energy and emf, cell potentials, electrode potential (oxidation and reduction). Types of electrodes - redox electrode (quinhydrode electrode), metal – metal insoluble salt electrode and Ion selective electrode. Cell notation and cell reaction –Nernst equation and applications.
Engineering Applications.

 Batteries : Types of batteries

(a)   Primary batteries – Lechalanche cell (dry cell), Lithium cell

(b)   Secondary batteries(Accumulators) – Lead acid battery, Lithium-ion battery

(c)   Fuel cells- $H_2 – O_2$ fuel cell and MeOH-O_2 fuel cell-advantages and applications.

Engineering applications – future water powered car, Hydrogen production and storage.

UNIT - V
Corrosion and its prevention (7L)

Corrosion – basic concepts –types of corrosion, chemical, electrochemical corrosion (absorption of O_2 and evolution of H_2). Types of electrochemical corrosion – galvanic corrosion, pitting corrosion- factors affecting the rate of corrosion.

Cathodic protection – sacrificial anodic protection and impressed current cathodic protection method. Methods of metallic coatings-hot dipping (**tinning and galvanizing**), metal cladding (**Al cladding**), electroplating (**copper plating**) and electroless plating (**nickel plating**).

UNIT-VI

Organic reactions and drug molecules (5L)

Introduction : reactions involving substitution(S_N1, S_N2) addition to double bond(C=C), elimination(E^1 and E^2), oxidation (using $KMnO_4$, CrO_3), reduction (Hydrogenation by Ni/H_2, Pd/C)

Drugs : Definition, classification structure and applications of commonly used drug molecules-paracetamol, aspirin, ibuprofen and diphenhydramine (Benadryl)

Principles of spectroscopy and selection rules: Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules-**Applications**.

TEXT BOOKS:
1. Engineering Chemistry: by Jain & Jain ,Dhanapathrai Publications (2015)
2. Engineering Chemistry: by Thirumala Chary & Laxminarayana, Scitech Publications (2016)
3. Engineering Chemistry: by & B.Rama Devi, Prsanta Rath & Ch. Venkata Ramana Reddy, Cengage Publications (2016)

REFERENCE BOOKS:
1. Fundamentals of Molecular Spectroscopy by C. N. Banwell
2. Drugs by David Krupadanam- Universities Press
3. University chemistry by B. H. Mahan
4. Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
5. Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Edition http://bcs.whfreeman.com/vollhardtschore5e/default.asp

Course Outcomes

After completion of the course, the student will be able to:
1. Understand and analyse microscopic chemistry in terms of atomic orbitals, molecular orbitals and intermolecular forces.
2. Identify and differentiate conductivity of polymers, thermoplastic, thermosetting plastics and various lubricants.
3. Recognize and select the domestic and industrial problems caused by hard water and also learn about the municipal water treatment using various methods.
4. Understand and interpret the important fundamental concepts of electrochemistry and solve the problems related to batteries.
5. Differentiate the types of corrosion and methods used to prevent the corrosion.
6. Learn and implement synthesis of drug molecules and learn fundamentals of analytical techniques like electronic, vibrational and rotational spectroscopy.

1	2	3	4	5	6	7	8	9	10	11	12
X					X	X					

B. Tech I Year I semester
Problem Solving using C
(Common to All Branches)

Code: 7FC01   **L   T   P   C**
                                                    3   0   0   3
Course Outcomes:
After completion of this course student will learn
1. To formulate simple algorithms for arithmetic, logical problems and to translate the algorithms to programs(in C language)
2. To test and execute the programs and correct syntax and logical errors, to implement conditional branching, iteration and recursion
3. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
4. To use arrays, pointers and structures to formulate algorithms and programs.
5. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
6. To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.

UNIT I
Introduction to Programming: Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.)
Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples.
From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code

UNIT II
 History of C language, Characteristics of C language, Structure of C Language, C Tokens
Arithmetic expressions, Operator Precedence & **Associativity**
Conditional Branching and Loops
Writing and evaluation of conditionals and consequent branching and **Jumping Constructs**
Pretest and Post test, Iteration and loops (3 lectures)

UNIT III
Function: Functions (including using built in libraries), Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference, **Storage Classes**
Recursion: Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc.

UNIT IV
Arrays: Arrays (1-D, 2-D), Character arrays **Ragged Arrays and Dynamic Arrays**

Basic Algorithms Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required) Quick sort or Merge sort.

UNIT V
Pointers Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notation of linked list (no implementation) **Dynamic Memory allocation Functions**.
Strings: String Handling Functions.

UNIT IV
Structure: Structures, Defining structures and Array of Structures,
Nested Structures enum, typedef
File handling (only if time is available, otherwise should be done as part of the lab)
File Handling Functions, File Modes, File Operations

Suggested Text Books
   (i)   Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
   (ii)   E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill Suggested

Reference Books
   (i)   Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

1	2	3	4	5	6	7	8	9	10	11	12
X	X	X								X	

I Year B.Tech, Semester-I   **Engineering Mathematics –I**
(Calculus and Matrix Theory)
(Common to EEE, ECE, ME, CE)

L   T   P/D   C

Code: 7HC06   **3   1   0   4**

Pre Requisites: Mathematics Knowledge at Pre-University Level

Course Objectives: To make the students to understand and expected to learn
1. *Mean value theorems and their applications to the given functions, series expansions of a function.*
2. *Special functions such as Beta & Gamma functions and their properties, evaluation of improper integrals and the applications of definite integrals.*
3. *To test the convergence of a series and expansion of a function in sine and cosine terms.*
4. *Basic concepts of multivariable differential calculus.*
5. *About the linear system and some analytical methods for solution.p*
6. *Concept of Eigen values and Eigen vectors their properties and applications.*

Syllabus

*UNIT-**I:** Calculus-1*
Rolle's Theorem and Mean value theorems (Statements and Geometrical Interpretations if any); Taylor's and Maclaurin's theorems with remainders (without proof); Taylor's and Maclaurin series expansion.

UNIT-II: Calculus-2
Evolutes and involutes; Beta and Gamma functions and their properties; Evaluation of improper integrals, Applications of definite integrals to evaluate surface areas and volumes of revolutions.

UNIT-III: Sequences and series
Convergence of sequence and series, tests for convergence of a series. Fourier series, half range sine and cosine series, Parseval's theorem (without proof).

UNIT-IV: Multivariable Calculus (Differentiation)

Limit, continuity and partial derivatives, total derivative; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, directional derivatives, Tangent plane; Concepts of divergence and curl with physical significance.

(PTO)

UNIT-V: Matrices-1
Inverse of a matrix by Gauss Jordan method, rank of a matrix; System of linear equations- Rank method/Gauss Elimination method. Symmetric, skew-symmetric and orthogonal matrices;

UNIT-VI: Matrices-2
Eigenvalues and Eigenvectors; Cayley - Hamilton Theorem, Hermitian, Skew-Hermitian and Unitary matrices, Diagonalization of matrices and Orthogonal transformation.

Text Books:
- (i)   R K Jain and S R K Iyengar Advanced Engineering Mathematics, Narosa Publications.
- (ii)   Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
- (iii)   Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

Reference Books:

(i) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

(ii) B.S. Grewal, Elementary Engineering Mathematics, Khanna Publishers

(iii) C Sankaraiah, A Text book of Engineering Mathematics – I, VGS Book Links

(iv) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

Course Outcomes: After the course completion the students will be able to

1. *Verify the mean value theorems and also express the given function in series form using Taylor's theorem.*
2. *Solve the problems using special functions; evaluate surface areas and volumes of revolutions.*
3. *Determine the convergence, divergence or oscillating nature of a series and express the function as trigonometric series.*
4. *Compute the extreme values of a function defined with and without constraints.*
5. *Check the consistency or inconsistency of a linear system and ability to solve real time problems.*
6. *Calculate the Eigen values and Eigen vectors of a matrix and their application for orthogonal transformation.*

1	2	3	4	5	6	7	8	9	10	11	12
X		X		X							

WORKSHOP/MANUFACTURING PRACTICES (THEORY)
B.Tech I year I sem (CSE, ECE, IT & CE) II sem (EEE, ECE & ME)

Code: 7BC01

L	T	P	C
1	0	0	1

Course Objectives:
Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

COURSE OUTCOMES:
1) To understand various basic tools to perform simple joints using metal and wood.
2) To understand the principle of various electrical and electronic appliances and their applications.
3) To understand the manufacturing process of welding, casting and tin smithy and their applications.
4) To understand the operation of basic as well as advanced machines used for fabrication of Metals, Plastics and Glass.

Theory: In theory classes the following syllabus is to be covered in 10hrs using PPTS and Videos (Elementary treatment only)

1. Fitting & Power Tools
2. Electrical & Electronics Appliances
3. Carpentry
4. Plastic molding & Glass Cutting
5. Metal Casting
6. Metal Joining: Arc & gas welding and brazing
7. Metal forming
8. Machining
9. Advanced manufacturing methods: (Micro machining, USM,ECM,EDM)
10. CNC machining & Additive Manufacturing

Suggested Text/Reference Books:

1 Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.

2.Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017.

ENGLISH (Reading, Listening and Writing)

Course code: 7HC01

Branches: ECM, CSE, IT and Civil (I Year I Semester)   **L T P Credits**
             ECE, EEE and Mech (I Year Sem-II)   **1 0 0 1**

1	2	3	4	5	6	7	8	9	10	11	12
							X	X	X		X

Course Objectives: The students

- acquire knowledge on various types of listening techniques, barriers and benefits of listening
- recognize the speech sounds and learn the intonation patterns
- learn various vocabulary patterns
- develop the ability to structure and punctuate the sentences
- learn different reading techniques
- learn different writing skills

Unit-I : Listening & Phonology
       1.1 Importance of Listening;

       1.2 Introduction to Speech Sounds

       1.3 Vowels, Diphthongs, Consonant Sounds

Unit-II: Stress & Intonation
       2.1 Significance of word accent

       2.2 Intonation Patterns

Unit-III: Vocabulary
       3.1 Word Roots - Affixes: Prefixes and Suffixes

       3.2 Homophones, Homonyms, Homographs

       3.3 Synonyms – Antonyms

       3.4 One word substitutes

       3.5 Idioms and Phrases

Unit-IV: Basic Writing Skills
       4.1 Sentence Structure

       4.2 Kinds of Sentences

       4.3 Punctuation in Writing

Unit-V : Reading Comprehension

5.1 Skimming and Scanning

5.2 Prediction Techniques and Inferring

5.3 Note Making

Unit-VI: Writing Skills
      6.1 Paragraph Writing

      6.2 Letter Writing

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

- understand and differentiate different types of listening techniques used to interact with real world problems
- differentiate the speech sounds and improve their accent and modulation while speaking
- understand and illustrate different word roots, word derivatives – synonyms, antonyms and word inflections
- discriminate a variety of sentence types, their structure and use punctuations
- get acclimatized to reading strategies and note making.
- develop proficiency in writing and preparing resume

Suggested Readings:

(i) *English grammar just for you* Rajeevan Karal, Oxford publications
(ii) *Practical English Usage.* Michael Swan. OUP. 1995.
(iii) *Remedial English Grammar.* F.T. Wood. Macmillan.2007
(iv) *On Writing Well.* William Zinsser. Harper Resource Book. 2001
(v) *Study Writing.* Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
(vi) *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
(vii) *Learn to Write* by Dr. G. Varalakshmi, Kindle Edition 2016
(viii) *A practical course for developing writing skills in English* by J.K. Gangal, PHI Learning Pvt Ltd.

1	2	3	4	5	6	7	8	9	10	11	12
X					X						

L	T	P	C
0	0	3	1.5

7HC63: CHEMISTRY LABORATORY
B. Tech I Year I Semester
(Common to CSE, IT , ECM , CE & BT)

Course Objectives:

The student will be able to learn:

1. Preparation of coordination complex NiDMG Complex
2. Determination of surface tension
3. Determination of viscosity
4. Saponification /acid value of an oil
5. Ion exchange column for removal of hardness of water / Estimation of Hardness of water by EDTA Method
6. Determination of chloride content of water
7. Determination of cell constant and conductance of solutions (HCl Vs NaOH / Mixture of acid Vs Strong base)
8. Potentiometry - determination of redox potential and emf ($FeSO_4$ Vs $KMNO_4$ / HCl Vs NaOH)
9. Determination of the rate constant of acid catalyzed hydrolysis of methylacetete
10. Synthesis of a polymer- Thiakol rubber / Urea-Farmaldehyde resin
11. Synthesis of a drug- Aspirin
12. Thin layer chromatography

List of Experiments

1. Preparation of coordination complex NiDMG Complex
2. Determination of surface tension
3. Determination of viscosity
4. Saponification/acid value of an oil
5. Ion exchange column for removal of hardness of water / Estimation of Hardness of water by EDTA Method
6. Determination of chloride content of water
7. Determination of cell constant and conductance of solutions (HCl Vs NaOH / Mixture of acid Vs Strong base)
8. Potentiometry - determination of redox potential and emf ($FeSO_4$ Vs $KMNO_4$ / HCl Vs NaOH)
9. Determination of the rate constant of acid catalyzed hydrolysis of methylacetete
10. Synthesis of a polymer- Thiakol rubber / Urea-Farmaldehyde resin
11. Synthesis of a drug- Aspirin
12. Thin layer chromatography

Course Outcomes

After completion of the course, the student will be able to learn:

1. Methods to prepare inorganic complexes.
2. The process to determine surface tension of different liquids using stagnometer
3. The process to determine viscosity of lubricants by using redwood viscometer.
4. How to find acid value of an oil.
5. The principle and determination of Hardness of a water sample.
6. The methods to estimate amount of chlorine in water.
7. To determine unknown concentration of acid by using conductometric method.
8. To determine unknown concentration of acid by using potentiometric method.
9. Estimate rate constants of reactions from concentration of reactants/products as a function of time.
10. Methods to prepare industrially important polymers.
11. The method of preparation for organic compounds.
12. To separate the organic compounds from their mixture by using Thin layer chromatography.

1	2	3	4	5	6	7	8	9	10	11	12
	X			X							

B. Tech I Year I semester
Problem Solving using C LAB
(Common to All Branches)

Code: 7FC71

	L	T	P	C
	0	0	3	1.5

Course Outcomes:
After completion of this course student will learn
1. To formulate the algorithms for simple problems
2. To translate given algorithms to a working and correct program
3. To be able to correct syntax errors as reported by the compilers
4. To be able to identify and correct logical errors encountered at run time
5. To be able to write iterative as well as recursive programs
6. To be able to represent data in arrays, strings and structures and manipulate them through a program
7. To be able to declare pointers of different types and use them in defining self referential structures.
8. To be able to create, read and write to and from simple text files.

[The laboratory should be preceded or followed by a tutorial to explain the approach or algorithm to be implemented for the problem given.]

1. **Unit I (Cycle 1)**
   1. Write an algorithm for converting a given Celsius temperature to its equivalent Fahrenheit temperature and draw a flowchart.
   2. Write an algorithm to find the largest of three given numbers and draw a flowchart.
   3. Write an algorithm and draw a flowchart for finding the roots and nature of roots of a quadratic equation, given its coefficients.
   4. Write an algorithm and flowchart for finding the first n Fibonacci numbers, give n.

2. **Unit II (Cycle 2)**
   1. Write an algorithm, flowchart, and C program for:
   2. Finding the area and circumference of a circle of given radius.
   3. Finding the volume of a sphere of given radius.
   4. Finding the lateral surface area of a right circular cone of given base radius and height.
   5. Finding selling price of an item, given its cost price and profit percent.
   6. Finding the interest on a given principal for a given period of time at a given rate of per year.
   7. Write a C program to display all the sizes of data types in C.
   8. Write a C program to display a given decimal integer into an equivalent octal number and hexadecimal number using %o and %x in printf function.

3. **Unit II (Cycle 3)**
   1. Write a C program to find the roots and nature of the roots of a quadratic equation, given its coefficients.

2. Write a C program for finding the largest of three given numbers.
3. A salesman gets a commission of 5% on the sales he makes if his sales is below Rs.5000/- and a commission of 8% on the sales that exceeds Rs.5000/- together with Rs.250/-. Write an algorithm or a flowchart and develop C program for computing the commission of the salesman, given his sales.

4. **Unit III (Cycle 4)**
   1. Write three C programs to print a multiplication table for a given number using while, do-while, and for loops.
   2. Write a C program to compute the sum of:
   3. $1+x+x^2+x^3+\ldots\ldots\ldots+x^n$, given x and n.
   4. $1! + 2! + 3! + \ldots + n!$, given n.
   5. $1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10! + \ldots$ to n terms where the nth term becomes less than 0.0001.

5. **Unit III (Cycle 5)**
   1. Write a C program in the menu driven style to perform the operations +, -, *, /, % between two given integers.
   2. Write a C program to find the largest and the least of some numbers given by the user.
   3. Write a C program to find the sum of the digits of a positive integer.

6. **Unit III (Cycle 6)**
   1. Write C functions for the following:
      a) A function that takes an integer n as argument and returns 1 if it is a prime number and 0 otherwise.
      b) A function that takes a real number x and a positive integer n as arguments and returns x^n.
      c) A function that takes a positive integer n as an argument and returns the nth Fibonacci number.
   2. Using recursion write C functions for the following:
      a) Factorial of a non-negative integer n.
      b) Number of combinations of n things taken r at a time.
      c) Greatest Common Divisor of two integers.
      d) Least Common Multiple of two integers.

7. **Unit III (Cycle 7)**
   a) Write a menu driven style program to compute the above functions (cycle 6) on the choice of the function given by the user.
   b) Define macros for the following and use them to find sum of the squares of the minimum and maximum of two given numbers.
      1. Larger of two numbers.
      2. Smaller of two numbers.
      3. Sum of the squares of two numbers.
   c) Write a program to generate Pascal's triangle.

d) Write a program to count the number of letters, words, and lines in a given text.

8. **Unit IV (Cycle 8)**
   1. Write a program to store the numbers given by the user in an array, and then to find the mean, deviations of the given values from the mean, and variance.
   2. Write a C program to initially store user given numbers in an array, display them and then to insert a given number at a given location and to delete a number at a given location.
   3. Write a program to store user given numbers in an array and find the locations of minimum and maximum values in the array and swap them and display the resulting array.

9. **Unit IV (Cycle 9)**
   1. Write a C program to implement the operations of matrices – addition, subtraction, multiplication.
   2. Write a program to find whether a given matrix is symmetric, lower triangular, upper triangular, diagonal, scalar, or unit matrix.

10. **Unit V (Cycle 10)**
    1. Write a function to swap two numbers.
    2. Write a function to compute area and circumference of a circle, having area and circumference as pointer arguments and radius as an ordinary argument.

11. **Unit VI (Cycle 11)**
    1. Define a structure for complex number. Write functions on complex numbers (addition, subtraction, absolute value, multiplication, division, complex conjugate) and implement them in a menu driven style.
    2. Define a structure point. Write a program to find the distance between two points.
    3. Define a structure student having members roll no., name, class, section, marks. Create an array of 10 students give the data and find the average marks, section-wise.

12. **Unit VI (Cycle 12)**
    1. Write a program to:
       a) Create a file by the name given by the user or by command line argument and add the text given by the user to that file.
       b) Open the file created above and display the contents of the file.
       c) Copy a file into some other file, file names given by the user or by command line arguments.
       d) Append a user mentioned file to another file.
       e) Reverse the first n characters of a file.

ENGLISH (Reading, Listening and Writing) Lab

Course code: 7HC61
Branches: ECM, CSE, IT and Civil (I Yr Sem-I)   **L T P Credits**
**   ECE, EEE and Mech (I Yr Sem-II)**   **0 0 2 1**

1	2	3	4	5	6	7	8	9	10	11	12
							X	X	X		X

Course Objectives: The students
- acquire knowledge on various types of listening techniques, barriers and benefits of listening
- recognize the speech sounds and learn the intonation patterns
- learn various vocabulary patterns
- develop the ability to structure and punctuate the sentences
- learn different reading techniques
- learn different writing skills

Unit-I : Practice sessions on
Listening to Sounds of English, Vowels, Diphthongs, Consonant
Listening to differentiate minimal pairs, pronunciation patterns

Unit-II: Practice sessions on
word and sentence stress ,stress shift, strong and weak verbs
Intonation Patterns

Unit-III: Exercises on Word Roots
Affixes : Prefixes and Suffixes
Identifying Homophones,
Homonyms, Homographs
Synonyms - Antonyms
One word substitutes
Idioms and Phrases

Unit-IV: Exercises on
Punctuation and Spelling
Error Identification in Sentences
Conversion of Sentences

Unit-V : Practice sessions on
Using passages for skimming and scanning
Note Making using Texts
Reading Comprehension using different techniques

Unit-VI: Exercises on
Paragraph Writing using hints/guided Paragraphs
Writing Letters

Course Outcomes: At the end of the course the students will be able to
- understand and differentiate different types of listening techniques used to interact with real world problems

- differentiate the speech sounds and improve their accent and modulation while speaking
- understand and illustrate different word roots, word derivatives – synonyms, antonyms and word inflections
- discriminate a variety of sentence types, their structure and use punctuations
- get acclimatized to reading strategies and note making.
- develop proficiency in writing and preparing resume

1	2	3	4	5	6	7	8	9	10	11	12
				X				X			

WORKSHOP/MANUFACTURING PRACTICES (LAB)

Code: 7BC61

Course Objectives:
1) To identify various basic tools to perform simple joints using metal and wood.
2) To recognize various electrical and electronic and their applications.
3) To understand the manufacturing process of welding , casting and tinsmithy and apply the processes in making simple products.
4) To understand and operate basic machines for fabrication of Metals, Plastics and Glass.
5) To understand the functions and parts of commonly used domestic appliances.

COURSE OUTCOMES:
1. After completion of the course , the student will be able to fabricate components with their own hands.
2. Assemble different components and produce small devices of their interest.

Work shop and Manufacturing Practices: Minimum of 10 experiments out of twelve given here under are to be completed

LIST OF EXPERIMENTS

S.No	Trades	List of Experiments
1	Fitting Shop	**1**. Preparation of T-Shape Work piece **2.** Preparation of U-Shape Work piece which contains: Filing, Sawing, Drilling, Grinding.
2	Carpentry	3.Practice of Cross Half lap joint 4. Practice of Half lap Dovetail joint
3	Electrical & Electronics	5. One lamp one switch Practice 6. Stair case wiring: Practice
4	Welding shop (Arc & Gas)	Demonstration of Gas and Resistance welding 7. Practice of Lap and Butt joint using Arc welding
5	Casting	8.Preparation of mould by using split pattern 9. Mould preparation and pouring of molten metal.
6	Tin Smithy	...aration of Rectangular Tray & Square box
7	Machine Shop	11. Demonstration of turning , Drilling and Reaming operations
8	Plastic molding & Glass Cutting	12 a) Demonstration of Injection Moulding b) Demonstration of Glass Cutting with hand tools
9	Domestic Appliances	13.Demonstration of Fans, Mixers, Air blower, Iron box, Rice cooker, Emergency light etc
10	Lab project	14. Making various components and / or assembling the components which can be useful in domestic / engineering applications

1	2	3	4	5	6	7	8	9	10	11	12
								x	x		x

Syllabus for B. Tech I Year I Semester
Civil Engineering
TECHNICAL SEMINAR –I

Code: 7K261

L	T	P	C
-	-	2	1

Course Objective :
Develop ability to be a public speaker with the aid of Power Point Presentations. Learn delivering technical seminars demonstrating clarity in thinking and enunciating complex technical concepts. Practice and develop communication skills and interview performance skills.

Course Outcomes:
1. Demonstrate public speaking with the aid of Power Point Presentations
2. Identify current general and specific technological topics of interest and prepare and present the content cogently.
3. Demonstrate communication skills and interview performance skills

Procedure

1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. Progress of the seminars is reviewed by the concerned HOD once in 15 days.
5. The evaluation for technical seminars is informed to students and displayed in the classrooms.
6. The presentation (PPT) must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

Distribution of marks
There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year Second Semester. The evaluation is purely internal and will be conducted as follows:

Literature survey, topic and Content	: 10 marks
Presentation including PPT	: 15 marks
Seminar Notes	: 10 marks
Interaction	: 5 marks
Report	: 10 marks
Attendance in the seminar class	: 10 marks
Punctuality in giving seminar as per schedule time and date	: 10 marks
Mid semester viva (on the seminar topics completed up to the end of 9th week	: 10 marks
End semester Viva	: 20 marks
Total	100 marks

1	2	3	4	5	6	7	8	9	10	11	12
X				X			X				

B.TECH. I YEAR I SEM (Mechanical) & II SEM (Civil)

		L	T	P	C
Code: 7HC04	**APPLIED PHYSICS**	3	1	0	4

Course Objectives

- To understand basic fundamentals of crystallography, crystal structures, their properties
- To understand the various defects of a crystal and X-ray diffraction techniques to analyze a crystal structure.
- To make the students to widen the conceptual understanding of the fundamental principles of interference and diffraction (wave optics)
- To understand the basic concepts of normal light, Laser and its applications and to know about the fundamentals of radioactivity and its applications.
- To know the various types of vibrations like periodic, vibrating strings, ultrasonics, magnetostriction, piezo-electricity, NDT.
- To discuss about the nano-technology, preparation techniques and characterization (XRD, SEM & TEM), CNTs

Unit:1
Crystallography and Crystal structures and their relative properties
Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC
and HCP Structures. Crystal Planes, directions and Miller Indices, Inter Planar Spacing of Orthogonal Crystal Systems.

Unit:2
Crystal Defects and X-ray diffraction
Point Defects - Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects-Calculation of concentrations, Qualitative treatment of line (Edge and Screw Dislocations) Defects, Burger's Vector.
X-ray Diffraction: Bragg's Law, Laue method and Powder Method.

Unit:3
Wave optics and applications
Interference: Introduction, Superposition of waves, Young's double slit experiment, Intensity calculation, fringe width, Interference in thin films due to reflection of light, Newton's rings.
Applications: Calculation of Refractive Index of liquid, Thickness of glass plate.

Diffraction: Introduction, Plane diffraction grating (Qualitative), Theory of plane transmission grating, Resolving power of a grating - Application; calculation of wavelength of spectral light by using grating.

Unit:4
Lasers

Characteristics of LASER, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, pumping, Population Inversion, Lasing Action, Einstein's Coefficients and Relation between them and significance, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers in medicine and engineering.

Nuclear Energy: Radioactivity, Nuclear binding energy, Nuclear fission, Nuclear fusion, $\square$, β, γ rays decay, Geiger-Muller counter and practical applications of nuclear physics.

Unit:5
Vibrations and ultrasonics

Undamped vibrations and its solutions (quantitative), Damped, Forced vibrations (qualitative) and Resonance. Applications: Physical Pendulum, Torsional Pendulum and Compound Pendulum, Vibrating strings. Production and properties of ultrasonics by magnetostriction effect and piezoelectric effect. Applications of ultrasonics, special reference to NDT.

Unit:6
Nanotechnology

Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication, Sol-gel, Precipitation, Chemical vapor Deposition(CVD); Top-down Fabrication; Thermal evaporation, Ball Milling, Characterization of Nano materials (XRD&TEM), carbon nano tubes(CNTs), Applications of Nano Materials.

Text Books:

1.B.K. Pandey & S. Chaturvedi Engineering Physics, Cengage Learning

2.D.K. Bhattacharya and Poonam Tandon, OXFORD university press.

Reference Books:

1. Charles Kittel, Introduction to Solid State Physics, John Wiley Publisher

2. Dekker, Solid State Physics

3. Halliday and Resnick, Physics

4. Engineering Mechanics, 2nd ed. – MK Harbola

5. Theory of Vibrations with Applications – WT Thomson

6. S.O. Pillai, Solid State Physics

7. P K Palanisamy, Engineering Physics, Sitech Publications

8. A. Ghatak – Optics

9. Physical Metallurgy principles 4th edition-Reza Abbaschian Lara Abbaschian
   Robert E. Reed-Hill

Course Outcomes

After completing the course, students will be able to

- Get the knowledge to classify the crystal structures, their parameters and draw the various crystal planes using Miller indices.
- Understand and analyze the defect type, describe the crystal structure using the various X-ray diffraction techniques.
- Analyze the wave nature and its types, superposition principle, differentiation between interference, diffraction and their applications
- Explain about emission, its types, laser principle, types, working and its applications and also to understand the radioactivity, fusion & fission, alpha, beta and gamma rays decay and its applications.
- Understand about the vibrations, periodic motion and apply the knowledge of ultrasonic, non destruction testing, magnetostriction, piezo-electricity.
- Summarize nano & bulk concepts, surface to volume ratio, quantum confinement, CNTs and preparation methods (physical & chemical), analysis the techniques like XRD, SEM, TEM

1	2	3	4	5	6	7	8	9	10	11	12
X								X			X

Syllabus for B. Tech I Year II Semester
Civil Engineering
Engineering Mechanics (For Civil Engineering)

Code: 7K201

	L	T	P	C
	3	1	0	4

Course Objective :
1. To make the students understand the concepts of Force system, Resultant of Force systems, Components of Force, Moments, and Couples in plane and in space and Free body diagrams
2. To introduce the students the concepts of friction, including types of friction, and analysis of simple trusses and frames and give them a foundation on these topics.
3. To make the students understand the concepts of Centroid and Area and Mass Moments of Inertia and make them learn how to calculate the centroid of various geometrical shapes and Area and Mass Moments of Inertia of different shapes and objects.
4. To make the students learn the principles of virtual work and energy method in analyzing and solving equilibrium problems involving rigid bodies acted upon by various forces
5. To make the students learn particle kinematics and kinetics concepts involving rectilinear and curvilinear motions in different coordinate systems
6. To make the students learn rigid body dynamics involving plane motion including rotation and application of work energy principle in plane motion of connected bodies.

Course Outcomes:
After completing the course, students will be able:
1. to analyze a system of forces in plane or in space, sketch free body diagrams and use equations of equilibrium to solve problems dealing with coplanar or spatial forces.
2. to analyze and solve problems involving basic frictional forces.
3. to analyze and solve simple trusses and frames using method of sections and method of joints
4. to determine the centroid, area and mass Moments of Inertia for various geometrical shapes and objects
5. to able use principle of virtual work and energy equation in solving problems involving rigid bodies acted by various forces including friction forces.
6. to apply the equations of rectilinear and curvilinear motions to predict the geometry of motion for a given system of forces
7. to apply the equations of plane motion and rotation involving rigid bodies to problems involving applied forces and ensuing motion of the bodies.

UNIT-I
Introduction to Engineering Mechanics: Force Systems, Basic concepts and axioms, Rigid Body equilibrium, System of Forces, Coplanar Concurrent Forces, Lami's theorem, Components in Space – Resultant of Force System; Moment of Forces and its Application; Varignon's

principle; Couples; Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems; Static Indeterminacy.

UNIT-II
Friction: Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, wedge friction, Belt Friction, screw jack & differential screw jack.
Basic Structural Analysis: Equilibrium in three dimensions; Method of Sections; Method of Joints; Simple Trusses; Frames.

UNIT-III
Centroid and Centre of Gravity: Centroid of simple figures from first principle, centroid of composite sections; Centre of Gravity and its implications;
Moment of Inertia: Area moment of inertia- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections; Mass moment inertia of circular plate, Cylinder, Cone, Sphere, Hook.

UNIT-IV
Virtual Work and Energy Method: Virtual displacements, principle of virtual work for particle and ideal system of rigid bodies, degrees of freedom. Active force diagram, systems with friction, mechanical efficiency. Conservative forces and potential energy (elastic and gravitational), energy equation for equilibrium. Applications of energy method for equilibrium. Stability of equilibrium.

UNIT-V
Particle Dynamics: Rectilinear motion; Plane curvilinear motion (rectangular, path, and polar coordinates). 3-D curvilinear motion; Relative and constrained motion; Newton's Second law (rectangular, path, and polar coordinates). Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular); Impact (Direct and oblique).

UNIT-VI
Introduction to Dynamics of Rigid Bodies: Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D'Alembert's principle and its applications in plane motion and connected bodies; Work energy principle and its application in plane motion of connected bodies; Kinetics of rigid body rotation;

TEXT BOOK
1. K. Vijay Kumar Reddy and J. Suresh Kumar, Singer's Engineering Mechanics, BS Publications, Hyderabad, 2011

REFERENCES
1. Engineering Mechanics by S.P. Timoshenko, D.H.Young & J.V.Rao, Tata McGraw Hill Publishers,4th Edition,2010
2. Engineering Mechanics by S.S. Bhavikatti, Newage International Publishers,2012
3. Engineering Mechanics (Statics) by J.L.Meriam & L.G.Kraige, Wiley Publishers, 6th Edition,2006
4. Engineering Mechanics by A.K.Tayal, Umesh Publications,13th Edition,2010
5. Engineering Mechanics by R.K. Rajput, laxmi Publications,1998

1	2	3	4	5	6	7	8	9	10	11	12
X	X	X								X	

I Year B.Tech, Semester-II

Engineering Mathematics – II
(Advanced Calculus and Complex Analysis)
(Common to EEE, ECE, ME & CE)

	L	T	P/D	C

Code: 7HC08   **3**   1   **0**   **4**

Pre Requisites: Engineering Mathematics-II

Course Objectives: To make the students to understand and expected to learn
1. *Multiple integration and its applications also acquire knowledge on curvilinear coordinate system.*
2. *Various analytical methods to solve first order first degree and also the equations not of first degree ordinary differential equations.*
3. *Methods to solve higher order ordinary differential equations.*
4. *Series solution of second order ordinary differential equations with variable coefficients.*
5. *Basic concepts of Complex Analysis and conformal mapping and their properties.*
6. *Series expansion of a function using Taylor's and Laurent's series. Evaluation of definite integrals and improper integrals.*

Syllabus

UNIT - I: Multivariable Calculus (Integration (12 L)
Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Triple integrals (Cartesian), Applications: areas and volumes. Line integrals, Surface integrals, Volume Integrals, Green, Gauss divergence and Stokes theorems (without proofs).

UNIT - II: First order ordinary differential equations: (10 L)
Exact, equations reduced to exact; linear and Bernoulli's equations; Orthogonal Trajectories, Newton's Law of Cooling, Law of natural Growth/Decay.

UNIT - III: Ordinary differential equations of higher order: (10 L)
Higher order linear differential equations with constant coefficients-Standard types of finding P.I, method of variation of parameters, Cauchy-Euler equation.

(PTO)

UNIT - IV: Series Solutions to Second Order Ordinary Differential Equations: (8 L)
Legendre polynomials, Bessel functions of the first kind and their properties, Recurrence relations (without proof), generating function (without proof), related problems.

UNIT - V: Complex Variable – Differentiation: (8 L)

Differentiation, analytic functions, Cauchy-Riemann equations, harmonic functions, finding harmonic conjugate. <u>Conformal mapping</u>: Translation, Inversion, Rotation and Magnification, Invariance of circles and cross ratio-Determination of bilinear transformation – mapping three given points.

UNIT - VI: Complex Variable – Integration: (12 L)
Cauchy - Integral theorem (without proof), Cauchy Integral formula (without proof), singularities, zeros of analytic functions, Taylor's series, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine.

Text Books:
(i) R K Jain and S R K Iyengar Advanced Engineering Mathematics, Narosa Publications.

(ii) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.

(iii) Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

Reference Books:
(i) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

(ii) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

(iii) Engineering Mathematics, Srimanta Pal, OXFORD university press.

(iv) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

Course Outcomes: After the course completion the students will be able to
1. *Solve the problems of multiple integration and apply these concepts for finding the parameters like surface area, volume, center of mass and centre of gravity.*
2. *Find the solutions of first order first degree and not of first degree differential equations and their applications such as Newton's law of cooling, Natural growth and decay.*
3. *Identify and solve higher order ordinary differential equations with constant coefficients using some standard methods and also their applications in LCR circuits.*
4. *Write the solutions of Legendre and Bessel's equations s series.*
5. *Understand the concept of analyticity of a function; solve the problems on conformal mapping.*
6. *Express the functions of a complex variable in series form also able to evaluate definite and improper integrals using complex integration.*

1	2	3	4	5	6	7	8	9	10	11	12
X				X					X		

ENGINEERING GRAPHICS & DESIGN

B.Tech I year I sem (EEE, ECE & ME) II sem (CSE, ECE, IT & CE)

Code : 7BC02

	L	T	P/D	C
	1	0	4	3

Course objectives:

1: To teach students the basic principles of Engineering graphics and instruments used
2: To introduce the concept of projections in drawing and its applications for simple drawing entities
3: To impart the knowledge of various types of solids and their projections in different position wrt principle planes
4: To teach the concept of sections of solids and their applications
5: To develop a clear understanding of the basic principles involved in three dimensional Engineering drawings.
6: To train the students for the extraction of multiple views from a solid model using AutoCAD

Course outcomes

After completing this course, the student will able to:

1) Get familiar to use the instruments to solve the engineering problem and draw various type of curves used in engineering
2) Understand and Implement Orthographic projections and draw projections of simple drawing entities such as points Lines, and Planes
3) Draw projections of different types of regular solids in various positions wrt principal planes of projection
4) Draw Sections of various Solids including Cylinders, cones, prisms and pyramids and draw the developments of these solids and their sections.
5) Construct Isometric Scale, Isometric Projections and Views and convert 3D views to 2D orthographic views
6) Understand from basic sketching through 2D and 3-D solid modeling using computer aided design (CAD) software

UNIT – I

Introduction to Engineering Drawing: Drawing Instruments and their uses, types of lines, Types and uses of pencils, Lettering, Rules of dimensioning.

Curves used in Engineering Practice and their Constructions:

Conic Sections including Rectangular Hyperbola - General method, Cycloid, Epicyloid, and Involutes of circles.

UNIT – II

Orthographic Projection: Principles of Orthographic Projections – Conventions – First angle and third angle projections (however all drawing exercises must be in first angle only) - Projection of Points, Lines - Inclined to both planes, Projections of regular Plane, inclined planes - Auxiliary views.

UNIT –III

Projections of Regular Solids: Projections of Regular Solids: Prisms, Cylinders, Pyramids, Cones – Axis inclined to both planes, Auxiliary views.

UNIT –IV

Sections and sectional views of Solids: Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

Development of Surfaces: Development of Surfaces of Right Regular Solids – Prisms, Cylinders, Pyramids, Cones and their sections.

UNIT – V

Isometric Projections/views: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane, Simple Solids. Conversion of isometric views to orthographic views.

UNIT –VI

Overview of Computer Graphics : Demonstrating features of the CAD software - The Menu System, Toolbars, , Dialog boxes and windows, Drawing entities - lines, circles, arcs etc and editing commands, Dimensioning of objects,2D drawings-simple exercises , 3D wire-frame and shaded solids- Commands, Boolean operations.

Text/Reference Books:

(i)   Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House

(ii)   Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education

(iii)   Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication

(iv)   Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers

(v)   AUTOCAD Software Theory and User Manuals

ENGLISH (Oral Communication Skills)

Course code: 7HC02

Branches: ECE, EEE and Mech (Sem-I)	**L T P Credits**
ECM, CSE, IT and Civil (Sem-II)	**1 0 0 1**

1	2	3	4	5	6	7	8	9	10	11	12
							X	X	X		X

Course Objectives: The course will develop the students' ability to

- integrate listening and speaking skills
- communicate effectively
- speak effectively on a given topic
- master the art of presentation
- interact with peers in a group discussion

Unit-I : Listening Skills

1.1 Importance of Listening;

1.2 Types of listening

1.3 Barriers to Listening

1.4 Benefits of Listening

Unit-II: Oral Communication Skills -I

2.1 Types of Sentences – Assertive, Interrogative, Imperative and Exclamatory

2.2 Difference between Pauses, Gaps

2.3 Question Tags

Unit-III: Inter personal Communication

3.1. Self introduction , introducing others and Greetings

3.2 Asking and Giving Directions

3.3 Role Plays & Situational Dialogues

Unit-IV: Oral Communication Skills -II

4.1 Speaking on a particular topic - JAM

4.2 Use of cohesive devices in speaking

4.3 Common Errors in Spoken English

Unit-V: Presentation skills

5.1 Presentation Skills

5.2 Information Transfer

Unit-VI: Group Discussion

      6.1 Importance of Group Discussion

      6.2 Do's and Don'ts of Group Discussion

Course Outcomes: After completing the course students will be able to

- understand, analyze and respond to the audience by listening effectively
- acquire the articulation of different types of sentences by practicing pause patterns and question tags.
- translate and demonstrate self, participate effectively in activities like JAM, extempore
- express and deliver a presentation on the given topic through role plays and situational dialogues
- implement English language to meet the standards of corporate and real world in a group.

Suggested Readings:

(i) *Step by step learning language and life skills* by Niruparani, Jayasree Mohanraj, Indira, Sailakshmi Pearson Publishers

(ii) *Communication skills for technical students* by TM Farhathullah, Orient Black swan Publications

(iii) *English for technical Communication* by K.R. Lakshmi Narayan , Scitech Publications

(iv) *Practical English Usage.* Michael Swan. OUP. 1995.

(v) *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.

Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

1	2	3	4	5	6	7	8	9	10	11	12
X		X									

B.TECH. I YEAR I SEM (Mechanical) & II SEM (Civil)

		L	T	P	C
Code: 7HC64	**APPLIED PHYSICS LAB**	-	-	3	1.5

Course Objectives

- To explain about magnetic induction, Biot-Savart principle - Magnetism
- Explain about the acceleration due to gravity and radius of gyration and periodic vibrations-Compound Pendulum - Vibrations
- To understand the rigidity modulus-Torsional pendulum - Vibrations
- To understand about the ionizing radiation by using the Geiger–Muller counter – Nuclear energy.
- To understand the transverse laws of vibrations-Sonometer - Resonance
- To explain the electrically vibrating the tuning fork by using Melde's experiments – Electromagnetism.
- Discuss the dispersive power of prism-minimum deviation method - Light
- Explain the formation of Newton's rings-interference - Light
- Discussion of diffraction pattern using the grating - LASER
- To study the LED characteristics and forward resistance – Semiconductor devices.
- Explaining about the electrical resonance by using the LCR circuit – Electrical / Semiconductor devices.
- To know the time constant of RC circuit - Electrical / Semiconductor devices.

List of Experiments

1. Determination of magnetic induction flux density along the axis of a current carrying circular coil using Stewart and Gee's experiment.
2. Determination of acceleration due to gravity and radius of gyration using compound pendulum.
3. Determination of rigidity modulus of a given wire material using the Torsional pendulum.
4. Studying the characteristics of Geiger–Muller counter and verifying the inverse square law.
5. Verification the transverse laws of stretched strings by using the Sonometer.
6. Determination of frequency of an electrically vibrating tuning fork using the Melde's experiment
7. Calculation of dispersive power of a given material of prism by using

Spectrometer in minimum deviation method.

8. Determination of wavelength of a monochromatic light source by using Newton's rings experiment.
9. Determination of wavelength of a given laser source of light by using diffraction grating in normal incidence method.
10. Studying the characteristics and calculating the forward resistance of a LED.
11. Study of series and parallel resonance of an LCR circuit
12. Determination of time constant of an RC-circuit

NOTE: Any **TEN** of the above experiments are to be conducted.
Course Outcomes

After completing the experiment, students will be able to

- Understand and search to apply the fundamentals of magnetic induction, Ampere's law, Oersted's law and the Biot-Savart law.
- Analyze the concept and application parts of radius of gyration and periodic vibrations.
- Summarize the fundamentals of modulus-types, stress, strain, elasticity, plasticity and Hook's law.
- Understand the concept of radiation, ionizing radiation, radiological protection and inverse square law.
- Demonstrate the resonance phenomenon and verify the transverse laws of stretched strings by using Sonometer.
- Describe the types of waves like longitudinal, transverse, stationary and progressive waves. Electromagnetic induction and its applications.
- Know about the light properties-dispersion, prism, spectrometer and minimum deviation arrangement.
- Understand the concepts of interference, conditions, formation of Newton's rings-reason.
- Recognize the difference between the interference and diffraction, grating, laser characteristics.
- Analyze the difference between normal diode, LED, forward bias, reverse bias, I-V characteristics, direct and indirect band gap semiconductors.
- Analyze the LCR circuit combination, parallel, series electrical resonance, inductance, reactance, capacitance and electrical and electronic fundamentals.
- Characterize the RC network, time constant, capacitor functioning and its application.

ENGLISH (Oral Communication Skills) Lab

Course code: 7HC62

Branches: ECE, EEE and Mech (Sem-I)

ECM, CSE, IT and Civil (Sem-II)

L T P Credits

0 0 2 1

1	2	3	4	5	6	7	8	9	10	11	12
							X	X	X		X

Course Objectives: The course will develop the students' ability to
- integrate listening and speaking skills
- communicate effectively
- speak effectively on a given topic
- master the art of presentation
- interact with peers in a group discussion

Unit-I :   Practice sessions on
Listening for General Information
Listen for specific information
Listening Comprehension

Unit-II: Practice sessions on
Types of Sentences
Question Tags

Unit-III: Practice sessions on
Self introduction, introducing others and greetings
Asking for and Giving Directions
Role Plays & Situational Dialogues

Unit-IV: Practice sessions on
JAM/Extempore/ Impromptu
Prepared talk on given topics

Unit-V : Practice sessions on
Formal Presentation
Information Transfer

Unit-VI: Practice sessions on
Group Discussion

Course Outcomes: After completing the course students will be able to
- understand, analyze and respond to the audience by listening effectively
- acquire the articulation of different types of sentences by practicing pause patterns and question tags.
- translate and demonstrate self, participate effectively in activities like JAM, extempore
- express and deliver a presentation on the given topic through role plays and situational dialogues
- implement English language to meet the standards of corporate and real world in a group.

1	2	3	4	5	6	7	8	9	10	11	12
								x	x		x

Syllabus for B. Tech I Year II Semester
TECHNICAL SEMINAR –II

Code: 7K291

L	T	P	C
-	-	2	1

Course Objective :
Develop ability to be a public speaker with the aid of Power Point Presentations. Learn delivering technical seminars demonstrating clarity in thinking and enunciating complex technical concepts. Practice and develop communication skills and interview performance skills.

Course Outcomes:
4. Demonstrate public speaking with the aid of Power Point Presentations
5. Identify current general and specific technological topics of interest and prepare and present the content cogently.
6. Demonstrate communication skills and interview performance skills

Procedure
1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. Progress of the seminars is reviewed by the concerned HOD once in 15 days.
5. The evaluation for technical seminars is informed to students and displayed in the classrooms.
6. The presentation (PPT) must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

Distribution of marks
There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year Second Semester. The evaluation is purely internal and will be conducted as follows:

Literature survey, topic and Content	: 10 marks
Presentation including PPT	: 15 marks
Seminar Notes	: 10 marks
Interaction	: 5 marks
Report	: 10 marks
Attendance in the seminar class	: 10 marks
Punctuality in giving seminar as per schedule time and date	: 10 marks
Mid semester viva (on the seminar topics completed up to the end of 9th week	: 10 marks
End semester Viva	: 20 marks
Total	100 marks

1	2	3	4	5	6	7	8	9	10	11	12
X		X									

ELEMENTS OF MECHANICAL ENGINEERING
(Common to All Branches Except Mechanical Engineering)

Code : 7BC04

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L   T  P/D   C
2   -  --    2
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Course Objectives:

The main objective of the course is to offer the students fundamental knowledge of First Law of Thermodynamics. *Working of SI and CI engines, working principle of different types of Turbines&pumps.*

properties of material and engineering application. Working principles of various types of power transmission systems

COURSE OUTCOMES:

At the end of basic mechanical engineering a student should be able to

1. To acquire the knowledge of basic concepts of thermodynamics and analyze the p-v & t-s diagrams of the different cycles.
2. To acquire the knowledge two and four stroke engines,the function of components used in the steam power plant
3. To identify & understand the function of components used in VCR & VAR system, & about the working of hydraulic pumps & hydraulic turbines.
4. *To identify & understand properties of material and engineering application*
5. To acquire the knowledge *of various types of power transmission systems*
6. To acquire the knowledge the different NC and CNC machine.

UNIT - I

Energy Resources and Conversion, Basic concepts of Thermodynamics – general classification of heat engines, Property and state, System, Boundary and surroundings , Zeroth Law, First Law of Thermodynamics and its applications-Joule's experiment, reversible non-flow processes-Constant volume, constant pressure, constant temperature process, polytropic process, Second Law of Thermodynamics – Statements, Heat engines, Carnot cycle, Air standard cycles – Otto, Diesel Cycles.

UNIT-II

Internal combustion engines: Internal combustion engines, definition, classification, components, working of four stroke cycle engines, SI and CI Engines, Performance parameters, Need for cooling, and lubrication of IC engines.

Steam Power plant, Boiler, Steam Turbines: Layout of steam power plant, Water tube and Fire tube Boilers :- Simple cross-tube boiler, Cochran, Babcock and Wilcox Boiler and High Pressure Boilers. (Benson & La-mount only).

UNIT- III

a) **Hydraulic pumps & turbines:-** Centrifugal Pumps, Pelton wheel, Francis turbine and Kaplan Turbine -- Layout of Hydro electric power plant

b) **Refrigeration & Air conditioning systems:-** Description of Vapour Compression and Vapour Absorption systems

UNIT-IV

Engineering Materials – Classification, mechanical properties, Ferrous Materials – Constituents of Cast Iron & types of Cast Iron, Steels – manufacture by Bessemer converter, Arc furnace, types of steel, effect of alloying elements on steel, Stainless steel, Non- Ferrous Materials: Properties and applications of Aluminum & alloys, Copper and alloys, composite materials – types, fabrication methods, Ceramics – Properties and applications

.

UNIT-V

Transmission of Motion and Power – Shafting, Belt drive, types of belt drive, types of belts, chain drives, types of chain drive, Pulleys, parts, types of pulleys, gear drive- classification, Terminology of spur gear, Gear trains – simple and compound, Clutches – purpose and basic principle of contact clutch, brakes - purpose and basic principle of block brake

UNIT-VI

Robot and sensors – Introduction, definition, Robot component, **CNC Machine tools** – Introduction, Machine control, Vertical and Horizontal spindles, CNC drill, mill, boring and tapping, Adaptive control, NC and CNC turning centers

TEXT BOOKS :

Mathur, M.L., Mehta, F.S. and Tiwari, R.P., Elements of Mechanical Engineering, Jain Brothers, New Delhi, 2005.
R.K. Rajput, "Elements of Mechanical Engineering", Laxmi Publications, 1994.

a	b	c	d	e	f	g	h	i	j	k	l
X	X	X								X	

Engineering Mathematics–III
(Partial differential equations, Probability and Statistics)

Code: 7HC12 (Common to ME & CE)

L	T	P/D	C
3	1	0	3

Pre Requisites: Engineering Mathematics-II

Course Objectives: To make the students to understand and expected to learn
1. *Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations.*
2. *Applications of PDE.*
3. *Concepts of the probability, types of random variables and probability distributions.*
4. *Sampling distributions and their properties, concepts on estimation.*
5. *Concepts on testing the hypothesis concerning to large samples.*
6. *Different kinds of tests related to small samples and tests concerned to small size samples and goodness of fit and independence of attributes using chi-square distribution.*

Syllabus

UNIT– I: First Order Partial Differential Equations: (10L)
Formation of Partial Differential Equations by Elimination of Arbitrary Constants and Arbitrary Functions. Solutions to First order Linear and Non-linear Equations-Standard Forms, Equations Reducible to Standard Forms.

UNIT-II: Higher Order Partial Differential Equations: (10L)
Classification of partial differential equations. Method of Separation of Variables. Initial and Boundary conditions, Solutions of One dimensional wave, Heat equations and Laplacian equation in Cartesian form.

UNIT-III: Random Variables and Probability Distributions: (12L)
Conditional probability, Multiplication theorem, Baye's theorem (without Proof). Random variables – Discrete and Continuous, Probability Mass and Density Functions, Expectation and Variance. Probability Distributions: Binomial, Poisson and Normal Distributions.

UNIT-IV: Sampling Distributions and Estimation: (8L)

Populations and Samples, Sampling distribution of the Mean (σ - known and Unknown), Sums and Differences, Central limit theorem.Estimation: Point Estimation and Interval Estimation concerning Means for Large Samples.

UNIT-V: Tests of Hypothesis for Large Samples: (10 L)
Tests of Hypothesis, Type–I and Type-II Errors, Hypothesis testing concerning one mean and two means and Test of Hypothesis concerning one Proportion and difference of proportions.

UNIT-VI: **Tests of Hypothesis for Small Samples**: **(10 L)**
Student t-test, Hypothesis testing concerning one mean and two means, F-test and χ^2 test-Goodness of fit, Independence of Attributes.

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S. Grewal, Khanna Publications, New Delhi.
2. Ronald E. Walpole,Raymond H. Myers,Sharon L. Myers,Keying Ye, Probability & Statistics For Engineers & Scientists, 9th Ed. Pearson Publishers.
3. Probability and Statistics for Engineers: Miller and John E. Freund, PHI Publishers, 9th Edition

REFERENCE BOOKS:

1. Advanced Engineering Mathematics, S.R.K. Iyengar and R.K.Jain, Narosa Publication.
2. Probability and Statistics, T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham, M.V.S.S.N. Prasad, S. Chand Publications.
3. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, pearson Educations.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

Course Outcomes:
Students will able to

1. *Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations.*
2. *Applications of PDE.*
3. *Learn basic concepts of probability and able to evaluate probability.*
4. *Will able to solve problems on discrete and continuous probability distributions.*
5. *Learn basic concepts of sampling distribution and able solve problems on estimation.*
6. *Learn basic concepts of test of hypothesis and able solve problems.*

1	2	3	4	5	6	7	8	9	10	11	12
X	X		X								

7K301: Introduction to Solid Mechanics

B.Tech II Year I Sem.

L	T	P/D	C
3	1	-	3

Course Objectives:
1. To understand the basic concept of the stress and strain for different materials.
2. To know the mechanism of the development of shear force and bending moments in beams.
3. To analyze and understand flexural stress, direct and bending stresses.
4. To study deflection of beams, in different types of loadings and support conditions.
5. To understand the basic concepts of Principal Stresses and Strains
6. To study about Shear Stresses and Theories of Failure

Course Outcomes:
At the end of the course the student should have learnt,
1. To evaluate the strength of concept of the stress and strain for different materials
2. To evaluate the behavior of different beams for Shear Force and Bending Moment diagrams
3. To evaluate the behavior and strength of flexural stress, direct and bending stresses
4. To evaluate the deflection of beams subjected to various loads.
5. To determine the Principal Stresses and Strains in the members subjected to stresses
6. To evaluate the Shear Stresses and Theories of Failure.

UNIT – I
Simple Stresses and Strains: Elasticity and plasticity – Types of stresses and strains – Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Elastic constants.

UNIT – II
Shear Force and Bending Moment: Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III
Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: $M/I = f/y = E/R$ - Neutral axis – Determination of bending stresses – Section modulus of

rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections – Design of simple beam sections.

Direct and Bending Stresses: Stresses under the combined action of direct loading and bending moment, core of a section**.**

UNIT – IV
Deflection of Beams:

Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L, Uniformly varying load-Mohr's theorems – Moment area method – application to simple cases including overhanging beams.

UNIT – V

Principal Stresses and Strains : Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear– Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions.

UNIT – VI

Shear Stresses: Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

Theories of Failure: Introduction – Various theories of failure - Maximum Principal Stress Theory, Maximum Principal Strain Theory, Maximum shear stress theory- Strain Energy and Shear Strain Energy Theory (Von Mises Theory).

TEXT BOOKS:
1. Strength of Materials by Subramanian, Third Edition 2016, Oxford University Press, ISBN:0-19-946473-
2. Strength of materials by B.C. PUNMIA, Laxmi publishers TENTH EDITION JUNE 2013, ISBN 978-81-318-0925-9. [15 copies]

REFERENCES:
1. Mechanics of materials by Egor P Popov, Second Edition, Pearson, ISBN 978-93-325-5954
2. Strength of Materials by W.A Nash, MC Graw Hills 2014 6th edition.
3. Mechanics of Materials by James M Gere and Barry J Goodno Cengage Learning India Pvt. Ltd Eight edition.
4. Mechanics of Structures Vol –I by H. J. Shah and S. B. Junnarkar, Charotar Publishing House Pvt. Ltd.
5. Strength of Materials by S. S. Rattan, McGraw Hill Education Pvt. Ltd.
6. Fundamentals of Solid Mechanics by M. L. Gambhir, PHI Learning Pvt. Ltd.

1	2	3	4	5	6	7	8	9	10	11	12
x	x			x							

7K302: SURVEYING AND GEOMATICS

B.Tech II Year I Sem.

	L	T	P/D	C
	3	1	---	3

Course objectives:

The student is being exposed to the subject with following Objectives:

1. Study the basic concepts and principles of surveying
2. Know the importance of compass, levelling survey and its practical applications
3. To understand the concept of Trigonometric levelling and applying the same for finding the elevations of object by various methods
4. To understand the importance of various curves and the methods of setting them.
5. Get acquainted with the principles and methods of Remote sensing and GIS/GPS surveying
6. Understand the theory of Aerial mapping

Course outcomes:

After studying this course, the students will be able to:

1. Calculate angles, distances using chain and tape
2. Identify data collection methods using a compass and enhance knowledge of the various field applications of levelling
3. Apply the concepts of Trigonometric levelling
4. Set out curves on the field and overcome obstructions in curve ranging
5. To apply the concepts of Remote sensing and GIS/GPS to Civil Engineering problems
6. Read Aerial maps and perform necessary calculations

UNIT – I

Introduction to Surveying, principles, linear, angular and graphical methods, Survey stations, Survey lines - Ranging, Calculation of Areas - Mid Ordinate, Average Ordinate, Trapezoidal and Simpsons methods

Applications: To calculate areas by measuring distances of ground features using various accessories

UNIT – II

Compass Surveying - Bearing of survey lines, Local Attraction, Declination, Dip

Leveling - Principles of leveling - Booking and reducing levels; Types of leveling, Digital and Auto Level, Errors in leveling

Contouring - Characteristics, methods, uses, areas and volumes

Applications: To measure distances and inclinations between different physical features on the ground.

UNIT – III

Theodolite survey - Instruments, Measurement of horizontal and vertical angle; Horizontal and vertical control - methods - Intervisibility of height and distances - Trigonometric leveling (Single and Double plane)

Triangulation **-** Network - Signals and Towers. Baseline - choices - instruments and accessories - extension of base lines - corrections - Satellite station - reduction to centre

Traversing - Methods of traversing, traverse computations and adjustments, Gale's traverse table, Omitted measurements

Applications: To estimate topographic and elevation details necessary for major construction sites such as highways, bridges, tunnels, and dams.

UNIT – IV

Tacheometric Surveying - Principle of Tacheometry, Distance measurement for horizontal Line of Sight

Curves - Types of curves and their necessity, Horizontal Curves - Elements of simple and compound curves - Method of setting them

Modern Field Survey Systems - Principle of Electronic Distance Measurement, Modulation, Types of EDM instruments - Total Station - Parts of a Total Station - Accessories - Advantages and Applications, Field Procedure for total station survey, Errors in Total Station Survey

Applications: Used for planning and design of transportation systems such as highways and railways.

UNIT – V

Global Positioning Systems - Segments, GPS measurements, errors and biases, Surveying with GPS, Co-ordinate transformation, accuracy considerations

Remote Sensing - Introduction - Electromagnetic Spectrum, interaction of electromagnetic radiation with the atmosphere and earth surface, remote sensing data acquisition - platforms and sensors; visual image interpretation; Introduction to digital image processing

Applications: To precisely mark the boundaries of properties such as in Cadastral Surveying

UNIT – VI

Photogrammetric Surveying - Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, methods

Applications: To mark the national and state boundaries, chart coastlines, navigable streams and lakes

TEXT BOOKS:
1. Surveying and Leveling by R. Subramanian, Second Edition Oxford University Press - 2012
2. Anji Reddy, M., Remote sensing and Geographical information system, B.S. Publications, 2001.

REFERENCES:
1. Surveying Theory and Practice Seventh edition by James M. and Anderson Edward M. Mikhail TATA McGraw Hill
2. Duggal S K, "Surveying (Vol – 1 & 2), Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2004.
3. Arthur R Benton and Philip J Taety, Elements of Plane Surveying, McGraw Hill – 2000
4. "Advanced Surveying Total Station GIS and Remote Sensing by Satheesh Gopi, R. Sathi Kumar and N. Madhu.

1	2	3	4	5	6	7	8	9	10	11	12
						x				x	x

7K303: BUILDING MATERIALS AND PLANNING

B.Tech II Year I Sem.   L   T   P/D   C
                                                                3   -   -   2

Course Objectives:
To introduce the students to,
1. To study about the basic building materials, properties and their applications.
2. The manufacturing process of cement, its basic composition and its testing specifications.
3. The types of masonry, mortars and finishes provided in a building.
4. The types of timber, paints and the emerging building materials.
5. To understand the different types of arches, roofs and floors.
6. The principles of planning and construction bye-laws.

Course Outcomes:
At the end of the course, the student will be able to,
1. Identify the different materials and use them appropriately.
2. Test the various properties of cement and to use the appropriate admixtures.
3. Identify the various mortars and check for its suitability in various jobs.
4. To effectively use new building materials and appropriate paints for the various works undertaken.
5. Appropriately suggest the different roof and floor types for different construction practices.
6. Plan construction activities in adherence with the bye-laws.

UNIT- I:
Stones: Uses of stones as building materials. Characteristics of good building stones. Classification of stones. Quarrying -Various methods. Dressing and polishing of stones.
Bricks: Composition of brick clay. Methods of manufacturing bricks. Preparation of brick earth, Tempering, Pugmill. Various steps of moulding. Drying and method of burning of bricks-clamps. Intermittent and continuous kilns. Bull's trench kiln, Holfman's kiln. Characteristics of good building bricks. Classification of bricks
Building Blocks: Hollow building blocks for walls and roofing. Load bearing and non-load bearing blocks. Provisions of IS2572.Fly ash bricks and their manufacture.

UNIT- II:
Cement: Chemical composition of the ingredients for manufacturing cement. Outline of manufacturing process, flow diagram. Tests of cement.I.S.269 specifications for Ordinary Portland Cement.Various types of cements.
Blended Cements: Various types and their uses.
Fine aggregates: Characteristics of good mortar sand, availability of sand and its classifications. Alternatives to natural sand. Bulking of sand.

Coarse Aggregates: Characteristics of good coarse aggregates for manufacture of concrete. Tests on aggregate. Light weight aggregates.

UNIT - III
Mortar: Different types of mortars, preparation, setting and curing. Manufacturing methods of mortar.
Concrete: Batching, mixing, transporting, compacting and curing. Ready mix concrete.
Reinforced steel: Types of reinforcement, specifications, storage and handling.
Plastering, pointing and white/colour washing: Types of Plastering, preparation of surfaces and defects. Types of pointing, preparation of surfaces.
Forms work and scaffolding: Requirements, types, materials, accessories, reuses and maintenance.

UNIT - IV
Timber: Timber as a building material and its uses. Various types of timber. Seasoning and its importance. Preservation of wood. Laminates and their uses.
Paints, Varnish and Distemper: Constituents, characteristics of good paints. Bases, vehicles, thinners and colouring pigments. Painting of different types of surfaces; types of varnish, and application. Types of distemper and application.
Emerging Building Materials: Energy conservation in buildings. Recycled materials, local materials and industrial waste products as a means of sustainable development, Glass, FRPs, composites and smart materials, Aluminum composite paneling, Structural
Glazing , UPVC door frames.

UNIT - V
Lintels and Arches:
Definition, function and classification of lintels, balconies, chejja and canopy, Arches; Elements and Stability of an Arch.
Floors and roofs:
Floors: Requirements of good floor, Components of ground floor, Selection of flooring material, Laying of Concrete, Mosaic, Marble, Granite, Tile flooring, Cladding of tiles.
Roof: Requirement of good roof, Types of roof, Elements of a pitched roof, trussed roof, King post Truss, Queen Post Truss, Steel Truss, Different roofing materials, R.C.C.Roof.

UNIT - VI
Building Planning: Principles of Building Planning; General Building regulations and Bye laws for Residential Buildings; Climate and its influence on planning- Elements of climate: Solar radiation, Wind, Relative Humidity, Temperature, precipitation, topography.

TEXT BOOKS:
1. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) Ltd., New Delhi.
2. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications.

REFERENCE BOOKS:
1. Building Materials and Construction by G C Sahu, Joygopal Jena McGraw hill Pvt Ltd 2015.
2. Building Materials by Duggal, New Age International.
3. Building Materials by P. C. Varghese, PHI.
4. Building Construction by PC Varghese PHI.
5. Construction Technology – Vol – I & II by R. Chubby, Longman UK.

1	2	3	4	5	6	7	8	9	10	11	12
								x		x	

7ZC01: MANAGEMENT SCIENCE AND FINANCIAL ACCOUNTING
(MSFA)

	L	T	P	Cr
	2	0	0	2

Course Objective: To make students understand the basics of management and Financial Accounting, its principles, practices and latest concepts for increasing the performance of engineering graduates in their respective fields, which facilitate them in making better planning and decisions

Course Outcomes:

1. Outlines the significance of management, defines the basic concepts and applicability of management principles in changing paradigms.
2. Helps in understanding organization behavior, personality determinants and other key aspects
3. Infers the need to understand the importance of Strategic management and Business environment in particular
4. Enrich students with basic concepts of Financial Accounting.
5. Understand basic concepts of Depreciation and need for preparing trial balance.
6. Helps in preparation of Financial Statements (final accounts).

UNIT I
INTRODUCTION TO MANAGEMENT: Management- Definitions, Levels of Management, Functions of management- Planning: types of planning, planning process; Organizing: Organizational Design and Structure, Staffing; Directing; Controlling: Basic control process- Fayol's principles of Management - Taylor's principles of scientific management- Maslow's Motivational theory.

UNIT II
INTRODUCTION TO ORGANIZATIONAL BEHAVIOR: Definition, Nature and Scope of OB, Personality-determinants of Personality – Perception- Attitudes- Attribution theory- Johari Window and Transactional Analysis, Stress Management- factors and remedies

UNIT III
STRATEGIC MANAGEMENT: Introduction to Strategic Management, Vision, Mission, Goals, Objectives, Environmental Scanning- PESTEL, SWOT Analysis, Competitive Advantage, Concept of Core Competence, PORTER's five force model, types of strategies, Strategic formulation and Implementation.

UNIT IV
FUNDAMENTALS OF FINANCIAL ACCOUNTING: Definition of Accounting, Accounting Concepts and conventions, principles of Double-Entry system, Book Keeping, Overview of books of original records Journal, Ledger and Subsidiary books

UNIT V
TRIAL BALANCE AND DEPRECIATION OF FIXED ASSETS: Significance of Trial balance, Preparation of trial balance Definition of Depreciation, Depreciation of fixed assets, Methods of Depreciation – Straight line method and Diminishing Balance method

UNIT VI
CLASSIFICATION OF REVENUE AND CAPITAL EXPENSES, AND PREPARATION OF FINAL ACCOUNTS: Revenue expenditure, Capital expenditure, Preparation of Final Accounts - Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments

References:

- A R Aryasri: Management Science, Tata Mc Graw Hill
- Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi
- A R Aryasri: Managerial Economics and Financial Analysis, Tata Mc Graw Hill

1	2	3	4	5	6	7	8	9	10	11	12
	x	x									x

7K371: MECHANICS OF SOLIDS LABORATORY

B.Tech II Year I Sem.

L	T	P/D	C
-	-	3	1.5

Course Objectives:
The objective of the course is to make the student understand the behavior of materials under different types of loading for different types structures

Course Outcomes: At the end of the course, the student will be able to:
1. Conduct tension test on Materials like steel etc.
2. Conduct compression tests on spring, wood and concrete
3. Conduct flexural and torsion test to determine elastic constants
4. Determine hardness of metals

List of Experiments:
1. Tension test
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of electrical resistance strain gauges
12. Continuous beam – deflection test.

List of Major Equipment:
1. UTM for conducting tension test on rods
2. Steel beam for flexure test
3. Wooden beam for flexure test
4. Torsion testing machine
5. Brinnell's / Rock well's hardness testing machine
6. Spring testing machine
7. Compression testing machine
8. Izod Impact machine
9. Shear testing machine
10. Beam setup for Maxwell's theorem verification.
11. Continuous beam setup
12. Electrical Resistance gauges.

1	2	3	4	5	6	7	8	9	10	11	12
	x		x								x

7K372: SURVEYING LABORATORY

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

                                                              -   -   3   1.5

Course Objectives:

The student is being exposed to the course with the following purpose.
1. Gain hands on experience with the working principles of various instruments such as Total Station.
2. Be able to set out any Civil Engineering work in the field.
3. Learn about the various automation processes being used in surveying works

Course Outcomes:

At the end of the course, the student is expected to have learnt the following.
1. Stake out/Lay out different types of curves in the field.
2. Use modern instruments such as Total Station and GPS for locating and plotting any/all ground features.
3. Develop contour maps for vast swathes of lands at ease and with minimum supervision

List of Experiments
1. To determine the distance between two points using Direct Ranging
2. Calculate the area of a given piece of land/tract using compass surveying (Traversing or Radiation method)
3. To determine the Reduced Levels of different points using principle of leveling
4. Introduction to Theodolite / Using a Theodolite, Measuring the Horizontal angle between two given points using Repetition method
5. Using a Theodolite, Measuring the Horizontal angle between given points using Reiteration method and calculating the area of given tract of land
6. Plotting a Simple Curve using Angular Method – Rankines Method
7. Introduction to Total Station / Determination of area of a given tract of land using Total Station
8. Contouring using Total Station
9. Determining the Remote Height using Total Station
10. Setting out a Curve Setting using Total Station
11. Calculating the Distance, gradient, differential height between two inaccessible points using Total Station
12. With the help of Total Station, Stake out / Setting layouts for Buildings, Pipelines, etc

Miscellaneous Experiments (Demonstration Only)
1. Plotting a Simple Curve using Linear Method – Offsets from Long Chord
2. Resection using Total Station
3. Traversing using Total Station
4. Introduction to GPS – locating ground Features

Textbooks

1. Surveying and Levelling by NN Basak, McGraw Hill – 2014
2. Laboratory Manual

1	2	3	4	5	6	7	8	9	10	11	12
				x				x			x

7K373: COMPUTER AIDED DRAFTING OF BUILDINGS LABORATORY

B.Tech II Year I Sem.   **L   T   P/D   C**
                                                              -   -   3   1.5

Course Objectives:
        The objective of this lab is to teach the student basic drawing fundamentals in various civil engineering applications, especially in building drawing, 3d modeling of building, interior designing etc using Auto CAD, Sketch up and 3ds Max.

Course Outcomes:
At the end of the course, the student will be able to:
1. Master the usage of AutoCAD commands for drawing 2D & 3D building drawings;
2. Get basic knowledge on Sketch up and 3ds Max for architectural work required for different civil engineering applications.

List of Experiments
1. Introduction to computer aided drafting.
2. Practice exercises on CAD software.
3. Theoretical study on buildings and Drawing Plans of
       a) Single storied buildings b) Multi storied buildings
4. Developing sections and elevations for
       a) Single storied buildings b) Multi storied buildings
5. Detailing of building components like Doors, Windows, Roof Trusses etc., using CAD software.
6. Exercises on development of working drawings of buildings.
7. Introduction to Sketch up.
8. Preparing working model of simple single story, multi storey and duplex house etc. using Sketch up.
9. Introduction to 3ds Max.
10. Preparing working model of simple single storey, multi storey and duplex house etc. using 3ds Max

TEXT BOOKS:
1. Computer Aided Design Laboratory by M. N. Sesha Praksh & Dr. G. S. Servesh – Laxmi Publications.
2. Engineering Graphics by P. J. Sha – S. Chand & Co.

1	2	3	4	5	6	7	8	9	10	11	12
								X	X		X

Syllabus for B. Tech II Year I Semester
Civil Engineering
TECHNICAL SEMINAR –III

Code: 7K391   L   T   P   C
                                                                   -    -   2   1

Course Objective :
Develop ability to be a public speaker with the aid of Power Point Presentations. Learn delivering technical seminars demonstrating clarity in thinking and enunciating complex technical concepts. Practice and develop communication skills and interview performance skills.

Course Outcomes:
1. Demonstrate public speaking with the aid of Power Point Presentations
2. Identify current general and specific technological topics of interest and prepare and present the content cogently.
3. Demonstrate communication skills and interview performance skills

Procedure
1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. Progress of the seminars is reviewed by the concerned HOD once in 15 days.
5. The evaluation for technical seminars is informed to students and displayed in the classrooms.
6. The presentation (PPT) must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

Distribution of marks
There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year Second Semester. The evaluation is purely internal and will be conducted as follows:

Literature survey, topic and Content	: 10 marks
Presentation including PPT	: 15 marks
Seminar Notes	: 10 marks
Interaction	: 5 marks
Report	: 10 marks
Attendance in the seminar class	: 10 marks
Punctuality in giving seminar as per schedule time and date	: 10 marks
Mid semester viva (on the seminar topics completed up to the end of 9th week	: 10 marks
End semester Viva	: 20 marks
Total	100 marks

1	2	3	4	5	6	7	8	9	10	11	12
x	x										x

7AC48: ELECTRICAL & ELECTRONICS ENGINEERING

L	T	P/D	C
2	---	---	2

Course Outcomes:

CO's: after studying this course, the student will be able to

1. Understand the fundamentals of electrical engineering and DC machines.
2. Understand the principles of AC circuits.
3. Understand the principle and operation of three phase induction motor and measuring instruments.
4. Understand the principle and operation of diode.
5. Understand the principle and operation of transistor.
6. Understand the principles of digital electronics.

Unit – I: Fundamentals of Electrical Engineering and DC Machines:
Ohm's Law, Kirchhoff's Laws, types of sources, passive elements. Series parallel circuits, mesh and nodal analysis. Superposition, Reciprocity theorem.
DC Machines: Principle of operation of D.C generators, types, E.M.F equation. Principle of operation of D.C motors, Types motors, Torque equation, Losses and efficiency, simple problems on D.C Generators and motors.

Unit – II: Fundamentals of AC circuits:
AC voltage wave form and basic definitions: Peak Value, R.M.S. value, Average values, Form factor and Peak factor, 'j' operator, Analysis of single phase AC circuits series and parallel (Simple circuits). Three phase circuits – Star - delta connection, Relation between line and phase voltages / currents in a 3-phase Star-Delta balanced system.

Unit – III: Induction Motors and Instruments:
Concept of Faraday's laws, 3- phase induction motor working principle, operation and construction details.
Instruments: Introduction, classification of instruments, operating principles, essential features of measuring instruments, permanent magnet moving coil (PMMC) instruments, moving iron (MI) instruments.

UNIT IV-DIODE: Overview of Semiconductors, PN junction diode and Zener diode –Diode circuits: rectifiers (bridge type only), filters, clippers and clampers.

UNIT V- TRANSISTOR: BJT construction, operation, characteristics (CB, CE and CC configurations) and uses – JFET and MOSFET construction, operation, characteristics (CS configuration) and uses.

UNIT VI-DIGITAL ELECTRONICS :Number systems – binary codes –binary arithmetic - Boolean algebra, laws & theorems - simplification of Boolean expression using K maps - logic gates - implementation of Boolean expressions using logic gates - standard forms of Boolean expression.

Text Books:

1. Basic Electrical Engineering –T.K. Nagesarkar and M.S. Sukhja, Oxford University Press.2nd edition.
2. Basic electrical Engineering – M.S. Naidu and S. Kamakshiah – TataMcGraw-Hill, 2005 edition.
3. Basic Electrical & Electronics Engineering –T.K. Nagesarkar and M.S. Sukhja, Oxford University Press.2nd edition.
4. Principles of Electronics - V.K.Mehta, S.Chand Publications, 2nd edition.

References:
1. Theory and problems of Basic electrical Engineering- D.P.Kotahari & I.J.Nagrath PHI.
   Electronic Devices and Circuits, Millman & Halkias, TMH publications.

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x	x		x								

7K404: Mechanics of Materials

B.Tech II Year II Sem.

L T P C
3 1 0 3

Course Objectives:
- Understand the deformation and strains under different load action and response in terms of forces and moments.
- Understand the behavior under different loading actions.
- Comprehend the deformation of structures under load actions.
- Understand the force-stress equilibrium relationship in Multiaxial load condition.
- Understand the displacement-strain relationship in Multiaxial load condition.
- Understand the stress behavior in the thin cylinders and sphere.

Course Outcomes:
- Able to evaluate the deformation of structures.
- Describe the stability of structures under certain loading conditions.
- To assess the deformation for structures under load actions.
- To evaluate the force-stress equilibrium relationship in Multiaxial load condition.
- To evaluate the displacement-strain relationship in Multiaxial load condition.
- To solve the stress behavior pattern in thin cylinder and sphere.

UNIT I:
Deformation and Strain covering description of finite deformation, Infinitesimal deformation; Analysis of statically determinate trusses; Stress analysis of thin, thick and compound cylinder;

UNIT II:
Generalized state of stress and strain: Stress and strain tensor, Yield criteria and theories of failure; Tresca, Von-Mises, Hill criteria, Heigh-Westerguard's stress space.

UNIT III:
Momentum Balance and Stresses covering Forces and Moments Transmitted by Slender Members, Shear Force and Bending Moment Diagrams, Momentum Balance, Stress States / Failure Criterion.

UNIT IV:
Mechanics of Deformable Bodies covering Force-deformation Relationships and Static Indeterminacy, Uniaxial Loading and Material Properties, Trusses and Their Deformations, Statically Determinate and Indeterminate Trusses.

UNIT V:
Bending: Stress and Strains; Deflections and Torsion covering Pure Bending, Moment-curvature Relationship, Beam Deflection, Symmetry, Superposition, and Statically Indeterminate Beams, Shear and Torsion, Torsion and Twisting, General energy theorems, Castigliano's theorem, Maxwell Bettie's reciprocal theorem; Virtual work and unit load method for deflection, Application to problems of beams and frames.

UNIT VI:
Structural stability; Stability of columns, Euler's formula, end conditions and effective length factor, Columns with eccentric and lateral load; Plasticity and Yield Design covering 1D-Plasticity – An Energy Approach, Plasticity Models, Limit Analysis and Yield Design

Text Books:
1.   Timoshenko, S. and Young, D. H., "Elements of Strength of Materials", DVNC, New York, USA.
2.   Hibbeler, R. C. Mechanics of Materials. 6th ed. East Rutherford, NJ: Pearson Prentice Hall, 2004

Reference Books:
1.   Crandall, S. H., N. C. Dahl, and T. J. Lardner. An Introduction to the Mechanics of Solids. 2nd ed. New York, NY: McGraw Hill, 1979

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x	x		x								

7K405: Fluid Mechanics

B.Tech II Year II Sem.

	L	T	P/D	C
	3	1	-	3

Course Objectives:
1. Understand fluid properties of Newtonian fluids.
2. Study analytical solutions to a variety of simplified problems.
3. Understand the dynamics of fluid flows and the governing equations.
4. Apply concepts of mass, momentum and energy conservation to flows.
5. Grasp the basic ideas of turbulence and energy loss in fluid flows.
6. Study the influence of boundaries of a body under fluid flow.

Course Outcomes:
1. Apply conservation laws to derive governing equations of fluid flows.
2. Compute hydrostatic and hydrodynamic forces.
3. Analyze and design simple pipe systems.
4. Apply principles of dimensional analysis to design experiments.
5. Compute drag and lift coefficients.
6. Applying boundary influences on a body moving within fluid

UNIT-I:
Fluid Properties: Basic Concepts and Definitions – Distinction between a fluid and a solid; Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; variation of viscosity with temperature, Newton law of viscosity; vapour pressure, boiling point, cavitation; surface tension, capillarity, Bulk modulus of elasticity, compressibility.

UNIT-II:
Fluid Statics - Fluid Pressure: Pressure at a point, Pascals law, hydrostatic law, pressure variation with temperature, density and altitude. Piezometer, U-Tube Manometer, Single Column Manometer, U-Tube Differential Manometer, Micromanometers. pressure gauges, Hydrostatic force on submerged horizontal, vertical, and inclined surfaces. Buoyancy and stability of floating bodies.

UNIT – III:
Fluid Kinematics: Description of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows : Steady, unsteady, uniform, non uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two , three dimensional flows– stream and velocity potential functions, circulation and vortices, flow net analysis.

UNIT – IV:

Fluid Dynamics: Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, Navier – Stokes equations (Explanatory), Momentum equation and its application – forces on pipe bend.

Pitot tube, Venturi meter, and orifice meter – classification of orifices, flow over rectangular, Triangular and trapezoidal and stepped notches - Broad crested weirs.

Dimensional Analysis and Dynamic Similitude - Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number; Buckingham's π-Theorem.(Added)

UNIT – V:

Closed Conduit Flow: Reynolds's experiment – Characteristics of Laminar & Turbulent flows. Laws of Fluid friction – Darcy's equation, variation of friction factor with Reynolds's number – Moody's Chart, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic gradient line. Pipe network problems Flow between parallel plates, Flow through long tubes, flow through inclined tubes, water hammer (no derivations).

UNIT – VI:

Boundary Layer Theory: Approximate Solutions of Navier Stokes Equations – Boundary layer – concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Von-karmen momentum integral equation, laminar and turbulent Boundary layers (no derivations) BL in transition, separation of BL, control of BL, flow around submerged objects-Drag and Lift- Magnus effect .

TEXT BOOKS:

1. Fluid Mechanics by RC Hibbeler, SI Units ISBN 978-93-325-4701-8, Pearson Publications.
2. Bansal. R. K, "Fluid Mechanics and Hydraulics Machines", 5th edition, Laxmi publications (P) Ltd., New Delhi, Ninth Edition, 2006.

REFERENCE BOOKS:

1. Fluid Mechanics and Machinery by CSP. Ojha, R Berndtsson, PN. Chandramouli, Oxford University Press.
2. Fluid Mechanics 8th Edition in SI units By Frank M White, McGraw-Hill, ISBN 978-93-85965-49-4.
3. Fluid Mechanics and Machinery By Mohd. Kaleem Khan, Oxford University Press, ISBN 978-0-19-945677-2.
4. Fluid Mechanics by Piyush Kundu.
5. Rajput.R.K, "A text book of Fluid Mechanics and Hydraulic Machines", S. Chand & Company Ltd., New Delhi, Fourth edition, 2010.

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								x	x	x	

7K406: CONSTRCUTION ENGINEERING AND MANAGEMENT

B.Tech II Year II Sem.

L	T	P/D	C
3	1	-	3

Course Objectives:
1. Understand construction planning.
2. Study and understand different construction methods.
3. Understand and familiarize with various construction equipment.
4. Understand basics of construction planning.
5. Grasp the basic ideas of construction monitoring and control.
6. Study and grasp importance of contracts management.

Course Outcomes:
1. Apply construction planning to actual construction works;
2. Able to differentiate different construction methods and their suitability;
3. Understand conventional and mechanized construction methods.
4. Able to apply construction planning to construction projects;
5. Able to apply the knowledge of construction monitoring and control to construction projects;
6. Able to apply the knowledge of contracts management and cost management to construction projects;

Unit I

Basics of Construction- Unique features of construction, construction projects types and features, phases of a project, agencies involved and their methods of execution;

Construction project planning- Stages of project planning: pre-tender planning, pre-construction planning, detailed construction planning, role of client and contractor, level of detail. Process of development of plans and schedules, work break-down structure, activity lists, assessment of work content, concept of productivities, estimating durations, sequence of activities, activity utility data; Techniques of planning- Bar charts, Gantt Charts. Networks: basic terminology, types of precedence relationships, preparation of CPM networks: activity on link and activity on node representation, computation of float values, critical and semi critical paths, calendaring networks.PERT- Assumptions underlying PERT analysis, determining three time estimates, analysis, slack computations, calculation of probability of completion.

Unit II

Construction Methods basics: Types of foundations and construction methods; Basics of Formwork and Staging; Common building construction methods (conventional walls and slabs; conventional framed structure with block work walls; Modular construction methods for repetitive works; Precast concrete construction methods; Basics of Slip forming for tall structures; Basic construction methods for steel structures; Basics of construction methods for Bridges.

Unit III:

Construction Equipment basics*:* Conventional construction methods Vs Mechanized methods and advantages of latter; Equipment for Earthmoving, Dewatering; Concrete mixing, transporting & placing; Cranes, Hoists and other equipment for lifting; Equipment for transportation of materials. Equipment Productivities.

Unit IV:
Planning and organizing construction site and resources- Site: site layout including enabling structures, developing site organization, Documentation at site; Manpower: planning, organizing, staffing, motivation; Materials: concepts of planning, procurement and inventory control; Equipment: basic concepts of planning and organizing; Funds: cash flow, sources of funds; Histograms and S-Curves. Earned Value; Resource Scheduling- Bar chart, line of balance technique, resource constraints and conflicts; resource aggregation, allocation, smoothening and leveling. Common Good Practices in Construction

Unit V:
Project Monitoring & Control- Supervision, record keeping, periodic progress reports, periodical progress meetings. Updating of plans: purpose, frequency and methods of updating. Common causes of time and cost overruns and corrective measures. Basics of Modern Project management systems such as Lean Construction; Use of Building Information Modelling (BIM) in project management; Quality control: concept of quality, quality of constructed structure, use of manuals and checklists for quality control, role of inspection, basics of statistical quality control. Safety, Health and Environment on project sites: accidents; their causes, effects and preventive measures, costs of accidents, occupational health problems in construction, organizing for safety and health.

Unit VI:
Contracts Management basics*: Importance of contracts; Types of Contracts, parties to a contract; Common contract clauses (Notice to proceed, rights and duties of various parties, notices to be given, Contract Duration and Price. Performance parameters; Delays, penalties and liquidated damages; Force Majeure, Suspension and Termination. Changes & variations, Dispute Resolution methods.
Construction Costs: Make-up of construction costs; Classification of costs, time cost trade-off in construction projects, compression and decompression.

Text/Reference Books:
1. Varghese, P.C., "*Building Construction*", Prentice Hall India, 2007.
2. *National Building Code,* Bureau of Indian Standards, New Delhi, 2017.
3. Chudley, R., *Construction Technology*, ELBS Publishers, 2007.
4. Peurifoy, R.L. Construction Planning, Methods and Equipment, McGraw Hill, 2011
5. Nunnally, S.W. Construction Methods and Management, Prentice Hall, 2006
6. Jha, Kumar Neeraj., Construction Project management, Theory & Practice, Pearson Education India, 2015
7. Punmia, B.C., Khandelwal, K.K., Project Planning with PERT and CPM, Laxmi Publications, 2016.

7K407: Hydrology and Water Resources Engineering

B. Tech II Year II Sem.

	L	T	P/D	C
	3	-	-	2

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Course objectives:

To enable the students,

1. Get comprehensive knowledge about occurrence, quantification of precipitaion;
2. understand abstractions of precipitation;
3. understand runoff calculation
4. know about various water withdrawals and uses;
5. understand different water distribution systems;
6. study various types of dams and spillways.

Course outcomes:

At the End of the course the student will be able to,

1. quantify precipitation;
2. estimate various abstractions of precipitation;
3. estimate runoffs from given data;
4. grasp and apply the knowledge of various water withdrawals and uses to practical problems;
5. able to apply design basic water distribution systems;
6. able to arrive at hydrologic design of spillways.

Unit I: Introduction

Hydrologic cycle, water-budget equation, history of hydrology, world water balance, applications in engineering, sources of data. Precipitation - forms of precipitation, characteristics of precipitation in India, measurement of precipitation, rain gauge network, mean precipitation over an area, depth area-duration relationships, maximum intensity/depth-duration-frequency relationship, Probable Maximum Precipitation (PMP), rainfall data in India.

Unit II: Abstractions from precipitation

Evaporation process, evaporimeters, analytical methods of evaporation estimation, reservoir evaporation and methods for its reduction, evapotranspiration, measurement of evapotranspiration, evapotranspiration equations, potential evapotranspiration over India, actual evapotranspiration, interception, depression storage, infiltration, infiltration capacity, measurement of infiltration, modelling infiltration capacity, classification of infiltration capacities, infiltration indices.

Unit III: Runoff

Runoff volume, SCS-CN method of estimating runoff volume, flowduration curve, flow-mass curve, hydrograph, factors affecting runoff hydrograph, components of hydrograph, base flow separation, effective rainfall, unit hydrograph surface water resources of India, environmental flows.

Unit IV: Water withdrawals and Uses
Water for energy production, water for agriculture, water for hydroelectric generation; flood control. Analysis of surface water supply, Water requirement of crops-Crops and crop seasons in India, cropping pattern, duty and delta; Quality of irrigation water; Soil-water relationships, root zone soil water, infiltration, consumptive use, irrigation requirement, frequency of irrigation; Methods of applying water to the fields: surface, sub-surface, sprinkler and trickle / drip irrigation.

Unit V: Distribution systems
Canal systems, alignment of canals, canal losses, estimation of design discharge. Design of channels- rigid boundary channels, alluvial channels, Kennedy's and Lacey's theory of regime channels. Canal outlets: non-modular, semi-modular and modular outlets. Water logging: causes, effects and remedial measures. Lining of canals, types of lining, drainage of irrigated lands: necessity, methods.

Unit VI: Dams and Spillways
Embankment dams: Classification, design considerations, estimation and control of seepage, slope protection. Gravity dams: forces on gravity dams, causes of failure, stress analysis, elementary and practical profile. Arch and buttress dams.
Spillways: components of spillways, types of gates for spillway crests; Reservoirs- Types, capacity of reservoirs, yield of reservoir, reservoir regulation, sedimentation, economic height of dam, selection of suitable site.

Text/Reference Books:
1. K Subramanya, Engineering Hydrology, Mc-Graw Hill.
2. K N Muthreja, Applied Hydrology, Tata Mc-Graw Hill.
3. K Subramanya, Water Resources Engineering through Objective Questions, Tata McGraw Hill.
4. G L Asawa, Irrigation Engineering, Wiley Eastern
5. L W Mays, Water Resources Engineering, Wiley.
6. J D Zimmerman, Irrigation, John Wiley & Sons
7. C S P Ojha, R Berndtsson and P Bhunya, Engineering Hydrology, Oxford.

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			X		X						X

7K408: ENGINEERING GEOLOGY

B.Tech II Year II Sem.

L	T	P/D	C
3	0	-	2

Course Objectives
Student shall be able,
1. To definebasic geological concepts from civil engineering point of view
2. To identifythe various physical properties of minerals and rocks
3. To understand the concept of structural geology
4. To understandthe significance of Geology as applied to Civil Engineering
5. To applythis knowledge in Civil Engineering projects such as dams, roads, tunnels and slopes
6. To acquire proper knowledge about natural geological hazards

Course Outcomes
After the completion of the course student should be able to,
1. Describe different concepts and terms used in Engineering Geology
2. Identify and explain various types of minerals and rocks
3. Apply the various concepts of Engineering Geology to civil engineering field
4. Examine and select the sites related to dams, roads, tunnels and slopes
5. Identify the hazards prior and able to take the necessary precautions
6. Knowledgeable about geological hazards

UNIT – I
Introduction
Definition of Geology, Engineering Geology. Importance of geology from Civil Engineering point of view. Importance of physical geology, petrology and structural geology. Case studies of failures of few civil engineering constructions, weathering of rocks and its effect on the properties of rocks, importance of weathering with reference to dams, reservoirs and tunnels. Earth structure- Lithosphere- Internal structure of the earthquake, Plate Tectonics.
Applications: For selection of sites and design for major structures such as dams, reservoirs, bridges, deep foundations for high-rise buildings, etc.

UNIT – II
Mineralogy
Definition of mineral, mineralogy, Importance of study of minerals: rock forming and ore forming minerals. Different methods of study of minerals.Study of minerals by physical identification method and their physical properties. Determination of Physical properties of following minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of ore forming minerals such as Pyrite, Hematite, Magnetite, Amethyst, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite, Coral reefs.
Applications: To Identify the various minerals useful in design of foundations

UNIT – III
Petrology
Definition of a rock, petrology. Classification of rocks-Geological classification of rocks. Rock Cycle. Classification of igneous Forms, structures and textures of igneous rocks. Classification of sedimentary rocks, and its structures and textures. Classification of metamorphic rocks, its structures and textures.
Megascopic Study of Granite, Dolerite, Basalt, Pegmatite, Charnockite, Sandstone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.
Applications: To Identify various rocks useful for design of foundations.

UNIT – IV
Structural Geology
Out Crop, Study of geological structures associated with rocks such as folds, faults, joints, unconformities-their important types. Significance of Strike and dip in geological structures, shield areas and seismic belts, seismic waves, Richter scale, Precautions to be taken for building construction in seismic areas, Ground Water, water table, common types of ground water, springs, geological controls of ground water movement, ground water exploration.
Applications: In selection of site for major structures such as dam, reservoir, bridges, and high-rise buildings

UNIT – V
Importance of Geophysical investigations, Principles of geophysical methods. Importance of Electrical resistivity method and seismic refraction method from civil engineering point of view.
Geology of Dams, Reservoirs, Tunnels
Types of Dams, Importance of geological considerations in the site selection of dams, reservoirs and tunnels. Case histories of dams, geological factors affecting the water tightness and life of a reservoir. Purpose of tunneling, types of tunnels, over break, lining of tunnels.
Applications: Site selection for dams, life of reservoirs, planning of tunnels

UNIT-VI
Geological Hazards: Geographical aspects of earthquake, tsunamis and landslides. Disaster prevention mitigation and management.
Applications: Taking necessary measures when the disasters occur

TEXT BOOKS:
1. Engineering Geology By N. Chennakesavulu, McMillan India Ltd.
2. Engineering Geology by S K Duggal, H K Pandey Mc Graw Hill Education Pvt Ltd 2014.

REFERENCES:
1. Geology for Engineers and Environmental Scientists, Pearson.
2. Krynine & Judd, Principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution.

1	2	3	4	5	6	7	8	9	10	11	12
			X	X							X

7AC95: Electrical and Electronics Engineering Lab

B.Tech II Year II Sem

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L    T   P/D   C
-    -    2    1
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OBJECTIVES: To Understand the fundamentals of electrical and applications of these in electrical appliances.

COURSE OUTCOMES:

1. Understand the performance of three phase induction motor.
2. Understand the different speed control methods of DC motor.
3. Understand the performance of DC motor with and without loading.
4. Understand the no-load characteristics of Dc shunt generator.
5. Understand the applications of superposition and reciprocity theorems in circuit analysis.
6. Understand the characteristics of PN-junction, Zener diodes, bipolar junction transistor and MOSFET.
7. Understand the applications of half wave and full wave rectifier.
8. Understand the applications of digital electronics.

Electrical Experiments

1. Brake test on 3-phase induction motor (performance characteristics).

2. Speed control of DC shunt motor by

   a)   Armature Voltage Control   .

   b)   Field flux control method.

3. Brake test on DC shunt motor.

4. Swinburne's test on DC shunt machine.

5. OCC characteristics of DC shunt generator.

6. Verification of superposition and Reciprocity Theorems.

Electronics Experiments

1. V-I Characteristics of PN –junction diode.
2. V-I Characteristics of Zener –junction diode.
3. Half wave and full wave rectifier.
4. V-I Characteristics of Bipolar junction Transistor.
5. V-I Characteristics of MOSFET.

1	2	3	4	5	6	7	8	9	10	11	12
			X		X						X

7K471: FLUID MECHANICS LABORATORY

B.Tech II Year II Sem.

L	T	P/D	C
-	-	4	2

Pre Requisites: FM Theory

Course Objectives:
To give the student an exposure to various hydraulic devices and Pipe Flow.

Course Outcomes:
At the end of the course, the student will be able to:
1. Determine coefficient of discharge for orifice and mouthpiece.
2. Calibrate notches, venturimeter, orifice meters
3. Determine major and miner losses in pipes

List of Experiments:

1. Verification of the Bernoulli's theorem;
2. Calibration of Venturimeter and Orifice meter;
3. Determination of Friction Factor of Pipe line: Major Losses;
4. Determination of Losses due to Sudden Expansion and Sudden Contraction: Minor Losses;
5. Determination of Coefficients of Discharge for Rectangular, Trapezoidal and V-Notch;
6. Determination of Coefficient of Discharge, Coefficient of Contraction and Coefficient of Velocity Mouthpiece setup;
7. Determination of Coefficient of Discharge, Coefficient of Contraction and Coefficient of Velocity Orifice setup;
8. Calibration of Rotameter and Flow Nozzle meter;
9. Conduct Heleshaw Experiment;
10. Conduct Reynolds's Experiment to determine the Reynolds's number and type of flow.
11. Verification of Water Hammer Condition for Sudden Closure of Valve;

1	2	3	4	5	6	7	8	9	10	11	12
			X			X					X

7K472: ENGINEERING GEOLOGY LABORATORY

B.Tech II Year II Sem.   **L   T   P/D   C**
                                                                  -   -   3   1.5

Pre Requisites: Engineering Geology Theory

Course Objectives:

The object of this lab is that to provide practical knowledge about physical properties of minerals, rocks, drawing of geological maps, showing faults, uniformities etc.

Course Outcomes:

At the end of the course, the student will be able to identify the various rocks and minerals depending on geological classifications

List of Experiments:

1. Study of physical properties and identification of minerals.
2. Study of physical properties and identification Rock forming minerals.
3. Megascopic description and identification of Rocks.
4. Megascopic description and identification of igneous rocks.
5. Megascopic description and identification of sedimentary rocks.
6. Megascopic description and identification of metamorphic rocks.
7. Structural geology problems simple strike
8. Structural geology problems dip problems   (calculation of amount of true dip and direction).
9. Interpretation and drawing of sections for geological maps showing normal beds.
10. Interpretation and drawing of sections for geological maps showing tilted beds.
11. Interpretation and drawing of sections for geological maps showing fault beds.
12. Interpretation and drawing of sections for geological maps showing folded beds.

1	2	3	4	5	6	7	8	9	10	11	12
								X	X		X

B. Tech II Year II Semester
TECHNICAL SEMINAR –IV

Code: 7K491

	L	T	P	C
	-	-	2	1

Course Objective :
1. Develop ability to be a public speaker with the aid of Power Point Presentations.
2. Learn delivering technical seminars demonstrating clarity in thinking and enunciating complex technical concepts.
3. Practice and develop communication skills and interview performance skills.

Course Outcomes:
1. Demonstrate public speaking with the aid of Power Point Presentations
2. Identify current general and specific technological topics of interest and prepare and present the content cogently.
3. Demonstrate communication skills and interview performance skills

Procedure
1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. Progress of the seminars is reviewed by the concerned HOD once in 15 days.
5. The evaluation for technical seminars is informed to students and displayed in the classrooms.
6. The presentation (PPT) must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

Distribution of marks
There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year Second Semester. The evaluation is purely internal and will be conducted as follows:

Content	: 20 marks
Presentation including PPT	: 20 marks
Seminar Notes	: 10 marks
Interaction	: 10 marks
Report	: 25 marks
Attendance	: 10 marks
Punctuality	: 5 marks
Total	**100 marks**

7K488: COMPREHENSIVE VIVA VOCE –I

B. Tech II Year II Sem.   L   T   P/D   C
                                                               -    -   -   1

Course Objectives :
Evaluate, comprehend and assess the concepts and the knowledge gained in the core courses of the first and the second year.

Course Outcomes :
At the end of this course, the student will be able to
   1. Comprehend the concepts in the core and elective courses.
   2. Exhibit technical knowledge to face interviews.
   3. Exhibit lifelong Learning skills for higher education and to pursue Professional practice.

There will be 100 marks in total with 30 marks of internal evaluation and 70 marks of external evaluation.

Internal:
Comprehensive Viva Voce is Conducted twice in a semester and evaluated for 15 marks each.

End examination   :   70 Marks.

The end examination will be carried out by a committee consisting of an external examiner, head of the department, a senior faculty member and the supervisor.

ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABUS

for

III Year and IV Year

B. Tech CIVIL ENGINEERING (CE)

(Applicable for batches admitted from 2018)

SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY
(An Autonomous Institution approved by UGC and affiliated to JNTUH)
Yamnampet, Ghatkesar, Hyderabad - 501 301

JUNE, 2020

B. Tech (Civil Engineering)

Program objective:

B. Tech in Civil Engineering program prepares the graduates with necessary knowledge, skills, and tools to analyze, plan and design solutions for basic Civil Engineering problems covering the domains of structures, transportation, surveying, and water resources and hydraulic systems with awareness to environmental preservation and sustainable development.

The first two years of this program have a set of introductory courses, such as Mathematics, Physics, English, Computer Languages (C, C++, Java), Technical Seminars, providing the students with a firm foundation in mathematics, physical sciences, computer languages, and communication skills. These courses include weekly labs in which students use state-of-the art equipment and software tools to analyze and solve practical engineering problems.

The last two years of the program focus on the core civil engineering subjects covering the concepts and techniques used in the analysis, design and development of practical civil engineering problems including investigative and solution tools.

In addition, students can choose from a set of professional elective streams covering various specialized domains in civil engineering. These advanced courses give broad opening for research and help students when they pursue higher studies in that stream. A generous allotment of open elective streams allows students to learn in-demand skills such as data base management systems, advanced managerial techniques, foreign languages etc.

Having completed the course, the student is well prepared to perform independently within a structured professional framework or pursue higher studies.

DEPARTMENT OF CIVIL ENGINEERING

Vision
- To become a reputed department for Civil Engineering education and applied research in the country with focus on producing professionally competent and highly recognized engineers.

Mission
1. To prepare and provide conductive environment for Civil Engineering graduates to become competent and quick learners of the latest emerging technologies on the engineering horizon.
2. To become a hub of technical know-how in Civil Engineering and allied domains for the service of industry bodies, governmental bodies, and society at large.
3. To ensure our students are confident with latest and emerging technologies, that affect the traditional roles of civil engineers, so that they could push the envelope to be relevant in the fast changing technical field as practicing engineers, entrepreneurs, or research personnel.

4. Also, the Department aims to train socially and environmentally sensitive professionals as Civil Engineering profession has high contact and visibility with the public.

Programme Educational Objectives:

I. Graduates will have a strong foundation in fundamentals of mathematics, natural and environmental sciences, and basic engineering skills with abilities of problem analysis, design and development of optimal solutions to engineering problems.

II. Graduates can apply the knowledge of theory, tools of investigation, and use of modern tools to solve complex problems and become professionally competent and globally employable engineers to assess health, safety, legal, societal, and environmental and sustainable issues maintaining ethical principles.

III. Graduates will have ability to work effectively as an individual, a team member, a leader or an entrepreneur with awareness of gender sensitiveness apart from having good communication, project and finance management skills.

IV. Encouraging the graduates to pursue higher studies in internationally reputed institutes or research and development activities thus making them life-long learners.

Programme Outcomes

The Programme Outcomes (**POs**) of the B.Tech (Civil Engineering) programme are listed below:

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and specialization of Civil Engineering to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods in the area of Civil Engineering including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools useful for Civil Engineering and related areas including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex Civil Engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to finalize technical and financial aspects of a project and to manage in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological changes through individual/group assignments such as technical seminars, lab projects, group projects, mini and main projects in the area of Civil Engineering or in multi disciplinary areas.

Correlation between the POs and the PEOs

PEOs	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
I	✓	✓	✓	✓								
II			✓	✓	✓	✓	✓	✓				
III								✓	✓	✓	✓	
IV							✓					✓

Program Specific Objectives (PSOs):

1. Develop a strong foundation of basic sciences and its applications for Civil Engineering Problems, apply the concepts of analysis and investigation using modern tools to design and solve Civil Engineering problems. *[CORE]*
2. Possess professional skills to investigate, analyze, and design practical solutions to Civil Engineering problems such as basic structures design, basic water conveyance and treatment systems design, basic transportation systems design, and basic survey maps and building drawings development, etc. [*Practical*]
3. Comprehend and apply technological advancements for real life engineering problems using modern instruments and modern analytical and software tools to analyze, plan, design, and implement solutions. [*Tools*]
4. *Possess skills to communicate, be a team member, demonstrate professional ethics and exhibit concern for societal and environmental wellbeing for sustainable professional development. [ENV, Team, Society and Lifelong learning, professional]*

ACADEMIC REGULATIONS
FOR B.TECH. REGULAR STUDENTS
WITH EFFECT FROM
THE ACADEMIC YEAR 2018-19
(A-18)

1.0   **Under-Graduate Degree Programme in Engineering & Technology (E&T)**

1.1   SNIST offers a 4-year (8 semesters) **Bachelor of Technology** (B.Tech.) degree programme, under Choice Based Credit System (CBCS) with effect from the academic year 2018-19 in the following branches of Engineering.

Sl. No.	Branch
1.	Civil Engineering
2.	Electrical and Electronics Engineering
3.	Mechanical Engineering
4.	Electronics and Communication Engineering
5.	Computer Science and Engineering
6.	Information Technology
7.	Electronics and Computer Engineering

1.2.   **Credits (Semester system for B.Tech year)**

The existing credit system of giving one credit for a lecture hour/ tutorial hour per week and giving 0.5 credit for every hour of practical and drawing shall be continued in these regulations also.

2.0   **Eligibility for admission**

2.1   Admission to the Under graduate courses merit rank obtained by graduate programs shall be made either on the basis of the rank of the candidate in entrance test conducted by the Telangana State Government (EAMCET) or on the basis of any other order of merit approved by the University, subject to reservations as prescribed by the government from time to time. However admissions under Management / NRI Category shall be made on the relevant orders issued by Govt. of Telangana from time to time.

2.2   The medium of instruction for the entire under graduate programme of study in E&T will be **English** only.

3.0   **B.Tech. Programme structure**

3.1   A student after securing admission shall pursue the under graduate programme in B.Tech. in a minimum period of **four** academic years (8 semesters), and a maximum period of **eight** academic years (16 semesters) starting from the date of commencement of first year first semester, failing which student shall forfeit seat in B.Tech course. However, the student can take two more years for appearing the examinations to clear the backlog subjects.

In the First year it is structured to provide 39 credits and the credits in II , III and IV years should not exceed 127 credits as per AICTE model curriculum for the B.Tech. programme. Each student shall secure 166 credits (with CGPA ≥ 5) required for the completion of the undergraduate programme and Award of B.Tech Degree.

Each student shall secure 166 total credits (with CGPA ≥ 5) for the completion of the under graduate programme for the award of the B.Tech. degree. However, any revision made in this regard and approved by the Academic Council of the college by Parent University shall be implemented from the date of the revision.

3.2 **UGC/AICTE** specified definitions/ descriptions are adopted appropriately for various terms and abbreviations stated below.

3.2.1 Semester scheme

Each under graduate programme is of 4 academic years (8 semesters) with the academic year being divided into two semesters of 22 weeks (90 instructional days) each, each semester having - 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'.

Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as indicated curriculum / course structure as suggested by AICTE are followed.

3.2.2 Credit courses
- A student in a semester has to earn credits which shall be assigned to each subject/ course in an L: T: P: C (lecture periods: tutorial periods: practical periods: credits) structure based on the following general pattern.
- One credit for one hour/ week offered in the entire semester for theory lecture (L) / Tutorial (T) courses.
- One credit for two hours/ week offered in the entire semester for laboratory/ practical (P) courses.
- The orientation program recommended by AICTE in the model curriculum consisting of courses like **Mandatory Induction program** for 3 weeks i.e. Human Values and Ethics in higher education.
- However there will be an end examination and will also reflect in the Memo of Marks. The grading will be as follows.

% of Marks Secured in a Subject/Course	Letter Grade
Greater than or equal to 90%	O (Outstanding)
80 and less than 90%	A_+ (Excellent)
70 and less than 80%	A (Very Good)
60 and less than 70%	B_+ (Good)
50 and less than 60%	B (Average)
40 and less than 50%	C (Pass)
Below 40%	F (FAIL)
Absent	Ab

- Other mandatory courses i.e ., Environmental Science and Ecology, Indian standards in concerned branch also will not have credits but evaluation will be done as per the above table. A student can not obtain degree unless he / she completes all the mandatory courses.

3.2.3 Subject Course Classification

All subjects / courses offered for the under graduate programme in E&T (B.Tech. Degree programmes) are broadly classified as follows. The Institution has followed almost all the guidelines issued by AICTE/UGC.

The groups of the subjects shall be as given in the table given hereunder along with the credits suggested by AICTE

Sl. No.	Category	Suggested Breakup of Credits (Total 160)
1	Humanities and social sciences including Management courses	12*
2	Basic Science courses	25*
3	Engineering Science courses including workshop, drawing, basics of electrical / mechanical / computer etc	24*
4	Professional core courses	48*
5	Professional Elective courses relevant to chosen specialization / branch	18*
6	Open Electives from other technical and / or emerging subjects	18*
7	Project work, seminar and internship in industry or elsewhere	15*
8	Mandatory courses (Environmental Sciences, Induction training, Indian constitution, Essence of Indian Traditional Knowledge)	(Non-credit)
	Total	160*

The Academic council of the institution has approved the total number of credits to be 166. The various groups of subjects mentioned above shall have credits suggested above with minor variations.

4.0 Course registration

4.1 A 'faculty advisor or counselor' shall be assigned to a group of 20 students, who will advise student about the under graduate programme, its course structure and curriculum, choice/option for Professional and open Electives based on their employment potential / further studies.

4.2 The student will progress semester after semester as the Institute is following cohort system to satisfying the conditions of promotion to the next semester.

4.3 **In the present system there shall be five subjects in each professional elective stream and three subjects in open elective stream.** A student can opt for a stream of professional/ open electives which should be submitted to the faculty advisor/ Councilor and copy of it to the Examination section through the Head of the department. A copy of it will be retained with the Head of the department/ faculty advisor / councilor and the student.

4.4. **The student can take one extra subject in each semester and can complete the program in 3 ½ years but original degree will be issued along with his / her batch mates after 4 years.**

4.5. **If a student acquires 20 credits extra than the required credits as per the regulations he will be awarded honors.**

4.6 The purpose of offering Elective Streams in both Professional and Open Electives is to facilitate the students to have a minor specialization based on their interest, so that they will have multi disciplinary exposure. Hence , a student is to take a stream of Electives in either in Professional / Open Elective. He shall not be permitted to opt for other elective subjects in other streams in subsequent semesters.

4.7 Dropping of Electives may be permitted, only after obtaining prior approval from the faculty advisor / counselor, '**within a period of 15 days** from the beginning of the current semester.

5.0 Subjects / courses to be offered

5.1 A typical section (or class) nominal strength for each semester shall be 60.

5.2 A subject / course may be offered to the students, **only if** a minimum of 30 students opt for it. The maximum strength of a section is limited to 80.

6.0 Attendance requirements:

6.1 A student shall be eligible to appear for the semester end examinations, if student acquires a minimum of 75% of attendance in aggregate of all the subjects / courses (excluding attendance in mandatory courses, Internship during II year, NCC / NSO and NSS) for that semester.

6.2 Shortage of attendance in aggregate upto 10% (65% and above and below 75%) in each semester may be condoned by the college academic committee on genuine and valid grounds, based on the student's representation with supporting evidence.

6.3 A stipulated fee shall be payable towards condoning of shortage of attendance as decided by finance committee of SNIST from time to time.

6.4 Shortage of attendance below 65% in aggregate shall **NO CASE** be condoned.

6.5 **Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examinations of that semester.**

They get detained and their admission for that semester shall stand cancelled.

They will not be promoted to the next semester. They may seek re-admission for all those subjects registered in that semester in which student was detained, by seeking re-admission into that semester as and when offered; in case if there are any professional electives and / or open electives, the same may also be re-registered if offered. However, if those electives are not offered in later semesters, then alternate electives may be chosen from the **same** set of elective subjects offered under that category.

6.6 A student fulfilling the attendance requirement in the present semester shall not be eligible for readmission into the same semester.

7.0 Academic requirements
The following academic requirements have to be satisfied, in addition to the attendance requirements mentioned in item no.6.

7.1 **A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject / course, if student secures not less than 35% marks (24 out of 70 marks) in the semester end examination, and a minimum of 40% of marks in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of letter grades, this implies securing 'C' grade or above in that subject / course.**

7.2 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to UG mini-project and seminar, if student secures not less than 40% marks (i.e. 40 out of 100 allotted marks) in each of them. The student would be treated as failed, if student

    (i)   does not complete all the mandatory courses offered during the course
    (ii)   does not submit a report on internship mini-project, or does not make a presentation of the same before the evaluation committee as per schedule, or
    (iii)   does not present the seminar as required in the I year to IV year or
    (iv)   secures less than 40% marks in UG mini-project/ seminar evaluations.

Student may reappear once for each of the above evaluations, when they are scheduled again; if student fails in such 'one reappearance' evaluation also, student has to reappear for the same in the next subsequent semester, as and when it is scheduled.

7.3   **Promotion Rules based upon credits**

S. No.	Promotion	Conditions to be fulfilled
1	First year First Semester to Second Semester	Regular course of study of first year first semester and should have satisfied the minimum requirement of attendance to appear I year I semester.
2	First year to second year first semester	i. Regular course of study of first year First and second semesters. ii. Must have secured at least 50% of credits (19) upto first year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3.	II Year I Semester to II Semester	Regular course of study of second year first semester.
4	Second year to third year first semester	i. Regular course of study of First and second semesters of second year. ii. Must have secured at least 60% of credits (49) upto second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Third year first semester to second semester	Regular course of study of third year first semester.
6	Third year second semester to fourth year first semester	i. Regular course of study of third year second semester. ii. Must have secured 60% of credits (79) up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
7	Fourth year first semester to fourth year second semester	Regular course of study of fourth year first semester.

7.4 A student (i) shall attend for all courses / subjecs covering 166 credits as specified and listed in the course structure, (ii) fulfils all the attendance and academic requirements for 166 credits, (iii) earn all 166 credits by securing SGPA $\geq$ 5.0 (in each semester), and CGPA (at the end of each successive semester) $\geq$ 5.0, (iv) **passes all the mandatory courses,** to successfully complete the under graduate programme. The performance of the student in these 166 credits shall be taken into account for the calculation of 'the final CGPA (at the end of under graduate programme), and shall be indicated in the grade card of IV year II semester.

7.5   If a student registers for some more '**extra subjects**' (in the parent department or other departments / branches of Engg.) other than those listed subjects as specified in the course structure of his Department, the performances in those ' **extra subjects**' will not be taken into account while calculating the SGPA and CGPA. For such '**extra subjects**' registered, Percentage % of marks and letter grade alone will be indicated in the grade card as a performance measure, subject to completion of the attendance and academic requirements as stated in regulations 6 and 7.1 to 7.4 above.

7.6   A student eligible to appear in the semester end examination for any subject / course, but absent from it or failed (thereby failing to secure **'C'** grade or above) may reappear for that subject/ course in the supplementary examination as and when conducted. In such cases, CIE assessed earlier for that subject / course will be carried over, and added to the marks obtained in the supplementary examination for evaluating performance in that subject.

7.7   A student **detained in a semester due to shortage of attendance, may be re-admitted when the same semester is offered in the subsequent academic years for the fulfillment of academic requirements**.

The academic regulations under which student has been readmitted shall be applicable. However, no grade allotments or SGPA / CGPA calculations will be done for the entire semester in which student has been detained.

7.8   A student detained **due to lack of credits, shall be promoted to the next academic year only after acquiring the required academic credits.**

The academic regulations under which student has been readmitted shall be applicable to him / her.

8.0   Evaluation - Distribution and weightage of marks

8.1   The performance of a student in each semester shall be evaluated subject-wise for a maximum of 100 marks for a theory and 100 marks for a practical subject with 30 marks Continuous Internal Evaluations (CIE) and 70 marks for Semester End Examinatins (SEE)

In addition, Internship industry-oriented mini-project, group project, Project – I will also be evaluated for 100 marks, Project – II for 100 marks, Technical Seminar and comprehensive viva for 100 marks each.

The continuous internal evaluation for Project – I in IV year I semester shall consist of :

Sl.No	Description	Marks
1	Literature survey and presenting seminar at the end of 6 weeks	10 marks
2	Report	10 marks
3	Demonstration/presentation at the end of 14 weeks	10 marks
	Total sessional marks	**30 marks**

Semester end examination   -   70 marks

Pattern of external evaluation for Project – I in IV year I semester.

Sl.No	Description	Marks
1	Final report	10 marks
2	Presentation	10 marks
3	Demonstration/defence of project	50 marks
	Total sessional marks	**70 marks**

The continuous internal evaluation for Project – II in IV year II semester shall consist of :
Division of marks for External Evaluation for project II – 30 Marks

Sl.No	Description	Marks
1	Progress of Project work and the corresponding interim report as evaluated by Project Review Committee at the end of 6 weeks	5 marks
2	Seminar at the end of 6 weeks	5 marks
3	Progress of Project work as evaluated by Project Review Committee at the end of 11 weeks	5 marks
4	Seminar at the end of 11 weeks	5 marks
5	Evaluation by Project Review Committee at the end of 15 weeks and Final Project Report	5 marks
6	Final presentation and defence of project	5 marks
	Total	**30 marks**

Division of marks for External Evaluation for project II – 70 Marks

Sl.No	Description	Marks
1	Final Project Report	10 marks
2	Presentation	20 marks
3	Demonstration / Defense of Project	40 marks
4	**TOTAL**	**70 marks**

8.2   For all the other theory and lab subjects the distribution of marks shall be 30 for Continuous Internal Evaluation (CIE) and 70 for the Semester End-Examination (SEE).

8.3   Theory Subjects

8.3.1   Pattern for Continuous Internal Evaluation (CIE) 30 marks

The following procedure is to be adopted for awarding internal marks of 30 for all the B. Tech. students from the Academic Year 2018-19

The distribution of marks for continuous internal evaluation (30 marks) is shown below. Average of two Mid Tests will be taken for final award of marks.

a) Part – A of Mid Test will have 10 questions   : 5 marks

b) Part – B of Mid Test will have 4 questions (1 from each unit and 4th question from any one unit or combination) and student has to answer 3 questions   : 15 marks

c)   Part – C Mid Test Question Paper Will have 3 questions – One from each unit taken from assignment questions. Student has to answer

| | | 1 question out of 3 questions | : 3 marks |

d)   Assignment – I three questions from each unit – total of 9 questions
to be submitted before first mid test   : 2 marks

Similarly assignment – II will be given to be Submitted before Mid Test II
and average of two assignments will be considered.

e)   Attendance   : 3 marks
f)   Class notes   : 2 marks

                              Total   **:30 marks**

Three marks are assigned for each theory course for those students who put in attendance in a graded manner as given below:

S.No.	Attendance Range	Marks Awarded
1.	65 % and above but less than 75%	1
2.	75% and above and less than 85%	2
3.	85% and above	3

Marks for attendance shall be added to each subject based on average of attendance of all subjects put together.

If any candidate is absent in any subject or mid-term examination, and he/she wishes to improve performance, a **third mid-test** will be conducted for that student by the Institution in the entire syllabus, on the same day of Semester End Examination (SEE) for $2^1/_2$ hours. That result will be treated as III mid test and average of better two will be considered. III mid test will have Part-A (compulsory) and Part-B with essay type questions and three out of four questions are to be answered.

b)   **Pattern for External Examinations - (70 marks)**

•   There shall be external examination in every theory course and consists of two parts (Part-A & Part-B). The total time duration for this semester end examination will be 3 hours.

•   **Part-A** shall have 20 marks, which is compulsory. It will have 10 short questions set with 2 marks each. There shall be atleast one question to each of the six units and the number of questions from any unit shall not exceed two.

•   **Part-B** of the question paper shall have essay type questions for 50 marks and shall have 8 questions out of which any 5 are to be answered. At least one question must appear from each Unit. . Seventh question must have 2 to 3 bits taken from 1st, 2nd, and 3rd units and 8th question also with 2 to 3 bits taken from 4th, 5th and 6th units, such that not more than 2 questions shall be from any one unit. All the questions carry equal marks.

8.4   **Pattern of Evaluation for Lab subjects** - **(100 marks)**

8.4.1   For practical subjects there shall be a continuous evaluation during the semester for 30 sessional marks and 70 marks for semester end examination. Out of the 30 marks for Continuous Internal Evaluation, the distribution of marks is as follows

S. No	Item	Marks
1.	Day to Day work	05 marks
2.	Final Record and viva	09 marks

3.	Average of two tests including viva	05 marks
4.	Lab Based Project Report viva and demo	08 marks
5.	Attendance	03 marks
Total		**30 marks**

8.4.2   The semester end examination for 70 marks for the lab subjects shall be conducted by an external examiner and an internal examiner appointed by the Chief Superintendent of Examinations of the college. The marks are distributed as follows:

S. No	Item	Marks
1.	Procedure to experiment and Tabulation	10 marks
2.	Conduct of experiment, observation, Calculation	30 marks
3.	Results including graphs, discussions and conclusion	20 marks
4.	Viva voce and Record	10 marks
	Total	70 marks

8.4.3 In case computer based examinations

S. No	Item	Marks
1.	Flow chart and algorithms	10 marks
2.	Program writing and execution	30 marks
3.	Result and conclusions	20 marks
4.	Viva voce and Record	10 marks
	Total	70 marks

8.5   **For the subject having design and / or drawing, (such as Engineering Drawing and Machine Drawing), the distribution shall be 30 marks for internal evaluation (10 marks for day-to-day work including drawing,3 marks for home assignment work, 12 marks for average of two internal tests and 2 marks for class notes 3 marks for attendance) and 70 marks for end semester examination.**

There shall be two internal tests in a Semester and the average of the two shall be considered for the award of marks for internal tests.

Third test facility can be availed as mentioned above (8.3.1 (i) (a) and (b)

8.6.   Technical Seminar (100 marks)

There shall be a technical seminar evaluated for 100 marks from I year to III year I Seemester. The evaluation is purely internal and will be conducted as follows:

Sl.No	Description	Marks
1	Literature survey, topic and content	10
2	Presentation including PPT	15
3	Seminar Notes	10
4	Interaction	05
5	Report	10
6	Attendance in the seminar class	10
7	Punctuality in giving seminar as per Scheduled time and date	10
8	Mid Semester Viva (on the seminar topics completed up to the end of 9th week	10

9	End Semester Viva	20
	Total	100 Marks

Student must secure 40% i.e. 40 marks to be successful

* According to the syllabus approved by the Academic Council as per Board of studies recommendations

8.7   Comprehensive Viva-voce (II-II, III-II and IV-II*)

There shall be comprehensive viva voce as stated above which will be evaluated for 100 marks. Out of 100 marks, 30 marks are internal and 70 marks are external.

S.No.	Description	marks
1	First mid-sessional viva at the end of 5 weeks (Internal)	15 marks
2	Second mid-sessional viva at the end of 10 weeks (Internal)	15 marks
3	Final viva during practical examinations (External)	70 marks
4	Total	100 Marks

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* According to the syllabus approved by the Academic Council as per Board of Studies recommendations

8.7.2   The evaluation of comprehensive viva-voce has to be carried out by two teachers independently and average be taken.

The sessional marks awarded by the Department are not final.
They are subject to scrutiny by a committee constituted by the college and scaling is done wherever necessary.

The recommendations of the Committee are final and binding.

8.8   The laboratory records and internal test papers shall be preserved in the respective departments as per the college norms and shall be produced to the Committee of the college or any external agency like AICTE, NAAC, JNTUH, NBA etc., as and when the same are called for.

8.9.   There shall be an industrial oriented Mini Project / Summer Internship, in collaboration with an industry of their specialization. Students will register for this immediately after III year II semester examinations and pursue it during summer vacation. Industrial Oriented Mini Project / Summer Internship shall be submitted in a report form and presented before the committee in IV year I semester similarly summer internship in an Industry of their specialization will be given for B.Tech II year II semester students and pursue it in the summer vacation. A report on summer internship shall be submitted and presented before the committee in III year I semester and IV year I semester. It shall be evaluated for 30 internal marks and 70 external marks. The committee consists of an external examiner, Head of the Department, supervisor of the Industrial Oriented mini project / Summer Internship and a senior faculty member of the department.

8.10   The laboratory marks and the internal marks awarded by the college are subject to scrutiny and scaling by the Departmental committees wherever necessary. In such cases, the internal and laboratory marks awarded by the department will be referred to a committee. The committee will arrive at a scaling factor and the marks will be scaled accordingly. The recommendation of the committee is final and binding. The laboratory records and internal test papers shall be preserved in the respective departments as per the college rules and produced before the visiting committee as and when asked for.

8.11.   For mandatory courses of Induction Programme (Human values, and Ethics in Higher Education), Environmental Science and Ecology, Indian Standards a student has to secure 40 marks out of 100 marks (i.e. 40% of the marks allotted) in the continuous internal evaluation and external examination for passing the subject / course. These marks should also be uploaded along with the internal marks of other subjects.

9.0   Grading procedure

9.1   Marks will be awarded to indicate the performance of student in each theory subject, laboratory / practicals, seminar, UG mini project and UG major project.

Based on the percentage of marks obtained (Continuous Internal Evaluation plus Semester End Examination, both taken together) as specified in item 8 above, a corresponding letter grade shall be given.

9.2   As a measure of the performance of student, a 10-point absolute grading system using the following letter grades (as per UGC / AICTE guidelines) and corresponding percentage of marks shall be followed:

% of Marks Secured in a Subject / Course (Class Intervals)	Letter Grade (UGC Guidelines)	Grade Points (GP)
Greater than or equal to 90%	O (Outstanding)	10
80% and less than 90%	A+ (Excellent)	9
70% and less than 80%	A (Very Good)	8
60% and less than 70%	B+ (Good)	7
50% and less than 60%	B (Average)	6
40% and less than 50%	C (Pass)	5
Below 40%	F (FAIL)	0
Absent	Ab	0

9.3   A student obtaining '**F**' grade in any subject shall be deemed to have '**failed**' and is required to reappear as a 'supplementary student' in the semester end examination, as and when offered. In such cases, internal marks in those subjects will remain the same as those obtained earlier.

9.4 A student who has not appeared for examination in any subject, '**Ab**' grade will be allocated in that subject, and student shall be considered '**failed**'. Student will be required to reappear as a 'supplementary student' in the semester end examination, as and when offered.

9.5 A letter grade does not indicate any specific percentage of marks secured by the student, but it indicates only the range of percentage of marks.

9.6 A student earns grade point (GP) in each subject / course, on the basis of the letter grade secured in that subject / course. The corresponding 'credit points' (CP) are computed by multiplying the grade point with credits for that particular subject/ course.

Credit points (CP) = grade point (GP) x credits …. For a course

9.7 The student passes the subject / course only when **GP is not less than 5 (i.e. 'C' grade or above)**

9.8 The semester grade point average (SGPA) is calculated by dividing the sum of credit points (CP) secured from all subjects / courses registered in a semester, by the total number of credits registered during that semester. SGPA is rounded off to two decimal places. SGPA is thus computed as

$$SGPA = \{ \sum_{i=1}^{N} C_i G_i \} / \{ \sum_{i=1}^{N} C_i \} \text{ …. For each semester}$$
(i.e., upto and inclusive of S semesters, S 2),

where '**N**' is the **total** number of subjects (as specifically required and listed under the course structure of the parent department) the student has '**registered**' i.e., from the 1st semester onwards upto and inclusive of the 8th semester, 'j' is the subject indicator index (takes into account the subjects from 1 to 8 semesters), C_J is the number of credits allotted to the Jth subjects and G_j represents the grade points (GP) corresponding to the letter grade awarded for that Jth subject.

After registration and completion of the first year first semester, SGPA of that semester itself may be taken as the CGPA, as there are no cumulative effects.

Illustration of calculation of SGPA

Course / Subject	Credits	Letter Grade	Grade Points	Credit Points
Course 1	4	A	8	4 x 8 = 32
Course 2	4	O	10	4 x 10 = 40
Course 3	4	C	5	4 x 5 = 20
Course 4	3	B	6	3 x 6 = 18
Course 5	3	A+	9	3 x 9 = 27
Course 6	3	C	5	3 x 5 = 15
	21			152

SGPA = 152/21 = 7.24

Illustration of calculation of CGPA:

Course / Subject	Credits	Letter Grade	Grade Points	Credit points Points
I Year I Semester				
Course 1	4	A	8	4 x 8 = 32
Course 2	4	A	9	4 x 9 = 36
Course 3	4	B	6	4 x 6 = 24
Course 4	3	O	10	3 x 10 = 30
Course 5	3	B	7	3 x 7 = 21
Course 6	3	A	8	3 x 8 = 24
I Year II Semester				
Course 7	4	B	7	4 x 7 = 28
Course 8	4	O	10	4 x 10 = 40
Course 9	4	A	8	4 x 8 = 32
Course 10	3	B	6	3 x 6 = 18
Course 11	3	C	5	3 x 5 = 15
Course 12	3	A	9	3 x 9 = 27
Total Credits	= 42			Total Credit Points =327

CGPA = 327/42 = 7.79

9.9 For merit ranking or comparison purposes or any other listing, **only** the '**rounded off**' values of the CGPAs will be used.

9.10 For calculations listed in regulations 9.6 to 9.9, performance in failed subjects/ courses (securing **F** grade) will also be taken into account, and the credits of such subjects/courses will also be included in the multiplications and summations.
After passing the failed subject(s) newly secured letter grades will be taken into account for calculation of SGPA and CGPA.
However, mandatory courses will not be taken into consideration.

10.0 Passing standards

10.1 A student shall be declared successful or 'passed' in a semester, if student secures a GP ≥ 5 ('C' grade or above) in every subject/course in that semester (i.e. when student gets an SGPA 5.00 at the end of that particular semester); and a student shall be declared successful or 'passed' in the entire under graduate programme, only when gets a CGPA 5.00 for the award of the degree as required.

10.2 After the completion of each semester, a grade card or grade sheet (or transcript) shall be issued to all the registered students of that semester, indicating the letter grades and credits earned. It will show the details of the courses registered (course code, title, no. of credits, and grade earned etc.), credits earned, SGPA, and CGPA.

11.0 Declaration of results

11.1 Computation of SGPA and CGPA are done using the procedure listed in 9.6 to 9.9.

11.2 For final percentage of formula may be used.

12.0 **Award of degree** marks equivalent to the computed final CGPA, the following
% of Marks = (final CGPA – 0.5) x 10

12.1 A student who registers for all the specified subjects/ courses as listed in the course structure and secures the total number of credits (with CGPA ≥ 5.0), within 8 academic years from the date of commencement of the first academic year, shall be declared to have '**qualified'** for the award of the B.Tech. degree in the chosen branch of Engineering as selected at the time of admission.

12.2 A student who qualifies for the award of the degree as listed in item 12.1 shall be placed in the following classes.

12.3 Students with final CGPA (at the end of the under graduate programme) 8.00 and above, and fulfilling the following conditions -

(i) Should have passed all the subjects/courses in '**first appearance'** within the first 4 academic years (or 8 sequential semesters) from the date of commencement of first year first semester.

(ii) Should have secured a CGPA ≥ 8.00, at the end of each of semesters, starting from first year first semester onwards.

(iii) Should not have been detained or prevented from writing the end semester examinations in any semester due to shortage of attendance or any other reason, shall be placed in **'FIRST CLASS WITH DISTINCTION'**, otherwise **FIRST CLASS** only.

12.4 Students with final CGPA (at the end of the under graduate programme) ≥ 6.5 but < 8.00, shall be placed in '**FIRST CLASS'**.

12.5 Students with final CGPA (at the end of the under graduate programme) ≥ 5.5 but < 6.5, shall be placed in '**SECOND CLASS'**.

12.6 All other students who qualify for the award of the degree (as per item 12.1), with final CGPA (at the end of the under graduate programme) ≥ 5 but < 5.5, shall be placed in '**pass class'**.

12.7 A student with final CGPA (at the end of the under graduate programme) < 5.00 will not be eligible for the award of the degree.

12.8 Students fulfilling the conditions listed under item 12.3 alone will be eligible for award of '**university rank'** and '**gold medal'**.

13.0 **Withholding of results**

13.1 If the student has not paid the fees to the university / college at any stage, or has dues pending due to any reason whatsoever, or if any case of indiscipline is pending, the result of the student may be withheld, and student will not be allowed to go into the next higher semester. The award or issue of the degree may also be withheld in such cases.

14.0 **Transitory regulations**

14.1 A student who has discontinued for any reason, or has been detained for want of attendance or lack of required credits as specified, or who has failed after having undergone the degree programme, may be considered eligible for readmission to the same subjects / courses (or equivalent subjects/ courses, as the case may be), and same professional electives

/ open electives (or from set/category of electives or equivalents suggested, as the case may be) as and when they are offered (within the time-frame of 8 years from the date of commencement of student's first year first semester).

A student admitted in one academic regulation and he is getting readmission in some other academic regulations , the college has to offer substitute / additional subjects based on the comparison of two academic regulations. The details of substitute / additional subjects offered with the recommendations of board of studies of the concerned branch has to be given from time to time.

15.0   Student transfers

15.1   There shall be no branch transfers after the completion of admission process.

15.2   The students seeking transfer to Sreenidhi Institute of Science and Technology (SNIST) from various other Universities / institutions have to pass the failed subjects which are equivalent to the subjects of SNIST, and also pass the subjects of SNIST which the students have not studied at the earlier institution.

Further, though the students have passed some of the subjects at the earlier semesters of SNIST, the students have to study substitute subjects in SNIST and get sessional marks by attending 3rd mid test and paying requisite fee as per the rules.

15.3   The transferred students from other Universities/ institutions to SNIST who are on rolls to be provide one chance to write the CEE (internal marks) in the failed subjects and /or subjects not studied as per the clearance letter issued by the Institution.

15.4   The autonomous affiliated colleges have to provide one chance to write the internal examinations in the failed subjects and /or subjects not studied, to the students transferred from other universities / institutions to SNIST who are on rolls, as per the clearance (equivalence) letter issued by the University.

16.0   **Scope**

16.1   The academic regulations should be read as a whole, for the purpose of any interpretation.

16.2   In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic Council is final and binding.

16.3   The Institution may change or amend the academic regulations, course structure or syllabi at any time, and the changes or amendments made shall be applicable to all students with effect from the date notified by the Institution.

Academic Regulations for B.Tech.
(LATERAL ENTRY SCHEME)
w.e.f the AY 2019-20

1. **Eligibility for award of B. Tech. Degree (LES)**
   The Lateral Entry Scheme (LES) students after securing admission shall pursue a course of study for not less than three academic years and not more than six academic years failing which he will forfeit the seat.

2. The student shall register and secure for all the credits with CGPA ≥ 5 from II year to IV year B.Tech. programme (LES) as per the regulations for the award of B.Tech. degree. **Out of the total credits secured, the student can avail exemption up to 6 credits**, that is, one open elective subject and one professional elective subject or two professional elective subjects resulting in 160 credits for B.Tech programme performance evaluation**.**

3. The students, who fail to fulfil the requirement for the award of the degree in six academic years from the year of admission, shall forfeit their seat in B.Tech.

4. The attendance requirements of B. Tech. (Regular) shall be applicable to B.Tech. (LES).

5. **Promotion rules based on credits**

S.	Promotion	Conditions to be fulfilled
1	Second year first semester to second year second semester	Regular course of study of second year first semester.
2	Second year second semester to third year first semester	(i) Regular course of study of second year second semester. (ii) Must have secured at least 29 credits out of 48 credits i.e., 60% of credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Third year first semester to third year second semester	Regular course of study of third year first semester.
4	Third year second semester to fourth year first semester	(i) Regular course of study of third year second semester. (ii) Must have secured at least 58 credits out of 96 credits i.e., 60% of credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Fourth year first semester to fourth year second semester	Regular course of study of fourth year first semester.

6. All the other regulations as applicable to B. Tech. 4-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractice/Improper conduct	Punishment
	If the student:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which student is appearing but has not made use of (material shall include any marks on the body of the student which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other student orally or by any other body language methods or communicates through cell phones with any student or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the students involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the student is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The hall ticket of the student is to be cancelled and sent to the university.
3.	Impersonates any other student in connection with the examination.	The student who has impersonated shall be expelled from examination hall. The student is also debarred and forfeits the seat. The performance of the original student who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and UG major project) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The student is also debarred for two consecutive semesters from class work and all university examinations. The continuation

		of the course by the student is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the chief superintendent/assistant – superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the college campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the student(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The students also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred and forfeits the seat.
9.	If student of the college, who is not a student for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred and forfeits the seat.

Person(s) who do not belong to the college will be handed over to police and, a police case will be registered against them. |
| 10. | Comes in a drunken condition to the examination hall. | Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. |
| 11. | Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny. | Cancellation of the performance in that subject and all other subjects the student has appeared including practical examinations and UG major project of that semester/year examinations. |

12. If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the university for further   action   to punishment. award   suitable

Malpractices identified by squad or special invigilators

1.   Punishments to the students as per the above guidelines.

2.   Punishment for institutions: (if the squad reports that the college is encouraging malpractices)

a.   A show cause notice shall be issued to the college. b. Impose a suitable fine on the college.
c.   Shifting the examination centre from the college to another college for a specific period of not less than one year.

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SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING

B.Tech Course Structure – Autonomous Regulation: 2018-19 (166 Credits)
[5 theory (III/IV) + 3 Lab structure & Professional Electives – 5 & Open Electives – 3]
Nov2019 BoS & Sep 2020 BoS (CS&AI courses)

I Year I Semester

Sr. No	Subject Code	Subject	L	T	P/D	C	Max Marks CIE	Max Marks SEE
1	7HC03	Chemistry	3	1	0	4	30	70
2	7FC01	Problem solving using C	3	0	0	3	30	70
3	7HC06	Engineering Mathematics – I	3	1	0	4	30	70
4	7BC01	Workshop / Manufacturing practices	1	0	0	1	30	70
5	7HC01	English (reading, listening, and writing)	1	0	0	1	30	70
6	7HC63	Chemistry Laboratory	0	0	3	1.5	30	70
7	7FC71	Problem solving using C Laboratory	0	0	3	1.5	30	70
8	7HC61	English (reading, listening, and writing) Laboratory	0	0	2	1.0	30	70
9	7BC61	Workshop / Manufacturing practices Laboratory	0	0	3	1.5	30	70
10	7K261	Technical Seminar – I	0	0	2	1.0	30	70
		Total :	11	2	13	19.5	300	700

I Year II Semester

Sr. No	Subject Code	Subject	L	T	P/D	C	Max Marks CIE	Max Marks SEE
1	7HC04	Applied Physics	3	1	0	4	30	70
2	7K201	Engineering Mechanics (Civil Engineering)	3	1	0	4	30	70
3	7HC08	Engineering Mathematics – II	3	1	0	4	30	70
4	7BC02	Engineering Graphics & Design	1	0	4	3	30	70
5	7HC02	English (Oral communication skills)	1	0	0	1	30	70
6	7HC64	Applied Physics Laboratory	0	0	3	1.5	30	70
7	7HC62	English (Oral communication skills) Laboratory	0	0	2	1	30	70
8	7K291	Technical Seminar – II	0	0	2	1	30	70
		Total:	11	3	11	19.5	240	560

II Year I Semester

Sr. No	Subject Code	Subject	L	T	P/D	C	Max Marks CIE	Max Marks SEE
1	7BC04	Elements of Mechanical Engineering	2	1	0	2	30	70
2	7HC12	Engineering Mathematics- III	3	1	0	3	30	70
3	7K301	Introduction to Solid Mechanics	3	1	0	3	30	70
4	7K302	Surveying and Geomatics	3	1	0	3	30	70
5	7K303	Building Materials and Planning	3	0	0	2	30	70
6	7ZC01	Management Science & Financial Accounting	2	0	0	2	30	70
7	7K371	Mechanics of Solids Laboratory	0	0	3	1.5	30	70
8	7K372	Survey Laboratory	0	0	3	1.5	30	70
9	7K373	Computer Aided Drafting of Building Laboratory	0	0	3	1.5	30	70
10	7K391	Technical Seminar –III	0	0	2	1	100	-
		Total :	16	4	11	20.5	370	630

II Year II Semester

Sr. No	Subject Code	Subject	L	T	P/D	C	Max Marks CIE	Max Marks SEE
1	7AC48	Electrical & Electronics Engineering	3	0	0	3	30	70
2	7K404	Mechanics of Materials	3	1	0	3	30	70
3	7K405	Fluid Mechanics	3	1	0	3	30	70
4	7K406	Construction Engineering and Management	3	1	0	3	30	70
5	7K407	Hydrology and Water resources engineering	3	0	0	**2**	30	70
6	7K408	Engineering Geology	3	0	0	2	30	70
7	7AC95	Electrical & Electronics Engineering Laboratory	0	0	2	1	30	70
8	7K471	Fluid mechanics Laboratory	0	0	4	2	30	70
9	7K472	Engineering Geology Laboratory	0	0	3	1.5	30	70
10	7K491	Technical Seminar –IV	0	0	2	1	100	-
11	7K488	Comprehensive Viva voce –I	-	-	-	1	50	50
		Total	18	3	11	22.5	420	680

III Year I Semester

Sr. No	Subject Code	Subject	L	T	P/D	C	Max Marks CIE	Max Marks SEE
1	7K510	Hydraulic Engineering	3	1	0	4	30	70
2	7K511	Geotechnical Engineering	3	0	0	3	30	70
3	7K512	Transportation Engineering	3	0	0	3	30	70
4		Professional Elective – I	3	1	0	3	30	70
5		Open Elective – I	3	0	0	3	30	70
6	7K571	Hydraulics Engineering Lab	0	0	3	1.5	30	70
7	7K572	Geotechnical Engineering lab	0	0	3	1.5	30	70
8	7K573	Transportation Engineering Lab	0	0	3	1.5	30	70
9	7H518	Quantitative Aptitude	1	1	-	2	30	70
10	7K591	Technical Seminar –V				1	100	-
11	7K585	Summer Internship –I (Done after II_II)				1	100	-
			16	3	9	24.5	470	630

Professional Elective – I: List of Subjects (III-I)

Sr. No	Name of Stream	Subject Code	Subject Name
1	Structural Engineering	7KC51	Reinforced Concrete Design
2	Water Resources and Environmental Engineering Stream	7KC52	Pipe Line Engineering
3	Transportation Engineering Stream	7KC53	Railway Engineering
4	Geotechnical Engineering Stream	7KC54	Soil Mechanics - I

Open Elective – I: List of Subjects (III-I)

Sr. No	Name of Stream	Subject Code	Subject Name
1	Computer Science Stream	7EC01	Data Structures
2	Entrepreneurship Stream	7ZC22	Basics of Entrepreneurship
3	Finance Stream	7ZC05	Banking, Insurance, and Risk Management.
4	Social Sciences Stream	7ZC25	Basics of Indian Economy

III Year II Semester

Sr. No	Subject Code	Subject	L	T	P/D	C	Max Marks CIE	Max Marks SEE
1	7K613	Geographic Information System	**3**	0	0	**3**	30	70
2	7K614	Environmental Engineering	**3**	0	0	**3**	30	70
3	7K615	Concrete Technology	**3**	0	0	**3**	30	70
4		Professional Elective –II	**3**	1	0	**3**	30	70
5		Open Elective – II	**3**	0	0	**3**	30	70
6	7K671	Geographical Information Systems Lab	0	0	3	1.5	30	70
7	7K672	Environmental engineering Lab	0	0	3	1.5	30	70
8	7K673	Computer Applications in Civil Engineering Lab	0	0	3	1.5	30	70
9	7HC74	Soft Skills (English-3)	**0**	0	2	1	30	70
10	7H619	Logical Reasoning	**1**	1	**0**	**2**	30	70
11	7K680	Group Project	**0**	**0**	4	**2**	30	70
12	7K689	Comprehensive Viva voce –II	**-**	**-**	**-**	**1**	30	70
13		Cyber Security – Mandatory course	**2**			**0**	Grade Evaluation	
			18	**2**	**15**	**25.5**	**380**	**820**

Professional Elective – II: List of Subjects (III-II)

Sr. No	Name of Stream	Subject Code	Subject Name
1	Structural Engineering	7KC61	Design of Steel Structures
2	Water Resources and Environmental Engineering Stream	7KC62	Climate Change and Sustainable Development
3	Transportation Engineering Stream	7KC63	Airport Planning & Design
4	Geotechnical Engineering Stream	7KC64	Soil Mechanics - II

Open Elective – II: List of Subjects (III-II)

Sr. No	Name of Stream	Subject Code	Subject Name
1	Computer Science Stream	7FC03	Python Programming
2	Entrepreneurship Stream	7ZC23	Advanced Entrepreneurship
3	Finance Stream	7ZC19	Entrepreneurship Project Management and Structured Finance
4	Social Sciences Stream	7ZC26	Basics of Polity and Ecology

IV Year I Semester

Sr. No	Subject Code	Subject	L	T	P/D	C	Max Marks	
							CIE	SEE
1	7K717	Finite Element Method for Civil Engineers	3	1	0	3.5	30	70
2	7K718	Design and Detailing of Hydraulics Structures	3	0	0	3	30	70
3	7K719	Estimation, costing and valuation	3	0	0	3	30	70
4		Professional Elective – III	3	1	0	3	30	70
5		Open Elective – III	3	0	0	3	30	70
6	7K771	Concrete Technology Lab	0	0	3	1.5	30	70
7	7K772	Revit Laboratory	0	0	3	1.5	30	70
8	7K773	Estimation & Quantity Surveying Laboratory	0	0	3	1.5	30	70
9	7K780	Project – I	-	1	3	2	100	-
10	7K785	Summer Internship – II (Done after III_II)				1	100	
11		Artificial Intelligence – Mandatory course	2			0	Grade Evaluation	
			17	3	12	23	440	560

Professional Elective – III :List of Subjects (IV-I)

Sr. No	Name of Stream	Subject Code	Subject Name
1	Structural Engineering	7KC71	Disaster Mitigation and Management
2	Water Resources and Environmental Engineering Stream	7KC72	Surface Water Hydrology
3	Transportation Engineering Stream	7KC73	Pavement Design
4	Geotechnical Engineering Stream	7KC74	Ground Improvement Techniques

Open Elective – III: List of Subjects (IV-I)

Sr. No	Name of Stream	Subject Code	Subject Name
1	Computer Science Stream	7DC55	Internet of Things (IOT)
2	Entrepreneurship Stream	7ZC24	Innovation and Design Thinking
3	Finance Stream	7ZC15	Financial Institutions, Markets and Services
4	Social Sciences Stream	7ZC27	Indian History, Culture, and Geography

Sr. No	Subject Code	Subject	L	T	P/D	C	Max Marks	
							CIE	SEE
1		Professional Elective – IV	**3**	1	0	**3**	30	70
2		Professional Elective – V	**3**	1	0	**3**	30	70
3	7K880	Project – II	**-**	-	20	**5**	60	140
4								
		Total	**6**	**2**	**20**	**11**	**120**	**280**

Professional Elective – IV**: List of Subjects (IV-II)**

Sr. No	Name of Stream	Subject Code	Subject Name
1	Structural Engineering	7KC81	Structural Engineering
2	Water Resources and Environmental Engineering Stream	7KC82	Ground water Hydrology
3	Transportation Engineering Stream	7KC83	Urban Transportation Planning
4	Geotechnical Engineering Stream	7KC84	Landfill Engineering

Professional Elective – V **:List of Subjects (IV-II)**

Sr. No	Name of Stream	Subject Code	Subject Name
1	Structural Engineering	7KC86	Foundation Analysis and Design
2	Water Resources and Environmental Engineering Stream	7KC87	Water Quality Engineering
3	Transportation Engineering Stream	7KC88	Intelligent Transportation Systems
4	Geotechnical Engineering Stream	7KC89	Environmental Geo technology

L: Lecture   T: Tutorial   P/D: Practical / Drawing   C: Credits
CIE: Continuous Internal Evaluation SEE: Semester End Examination

7K510: HYDRAULIC ENGINEERING

B.Tech III Year I Sem.

		L	T	P/D	C
		3	1	-	4

1	2	3	4	5	6	7	8	9	10	11	12
x	x		x								

Course Objectives: To enable the student:
1. Understand fluid flow parameters in Laminar and Turbulent flows.
2. Study uniform flow in open channels, computation of uniform flow parameters including most economical sections.
3. Study gradually varied flow in open channels, various profiles of gradually varied flow.
4. Study hydraulic jumps in open channels including conditions required and energy dissipation.
5. Understand the basic concepts on which turbo machinery (turbines and pumps) works.
6. Study working of various hydraulic turbines and pumps.

Course Outcomes: At the end of the course, the student is able to:
1. Analyze laminar & turbulent flows and arrive at resistance / energy loss in these flows.
2. Analyze uniform flows through open channels and work out resistance to the flow and most economical sections.
3. Analyze gradually varied flows through open channels and able to classify different profiles and compute profile lengths.
4. Workout sequent depths and energy dissipation of hydraulic jumps open channels
5. Arrive at the force generated on vanes and work done by vanes due to impact of jet on the vanes.
6. Arrive at work done by the turbines and pumps and design the hydraulic working proportions of the turbines and pumps.

UNIT-I: Laminar & Turbulent Flows
Laminar Flow- Laminar flow through circular pipes, annulus and parallel plates, Hagen Poiseuille equation. Turbulent flow, Reynolds experiment; Causes and mechanism of turbulence, effect of turbulent flow in pipes. Reynolds stresses, Prandtl mixing length theory, universal velocity distribution equation, Resistance to flow of fluid in smooth and rough pipes, Moody's diagram.
Applications:Design of Water supply, sewage pipe lines.

UNIT-II: Open Channel Flow:
Introduction to Open Channel Flow-Comparison between open channel flow and pipe flow, geometrical parameters of a channel, classification of open channel flow, Velocity

Distribution of channel section.**Uniform Flow in Open Channels**–Uniform Flow-Continuity Equation, Energy Equation and Momentum Equation, Characteristics of uniform flow, Chezy's formula, Manning's formula. Factors affecting Manning's Roughness Coefficient. Most economical section of channel. Computation of Uniform flow, Normal depth.
Applications: Design of Irrigation canals

UNIT – III:Non-Uniform Flow in Open Channels - Gradually Varied Flow:
Specific energy, Specific energy curve, critical flow, discharge curve Specific force Specific depth, and Critical depth. Channel Transitions. **Gradually Varied Flow** – Dynamic Equation of Gradually Varied Flow, Classification of channel bottom slopes, Classification of surface profile, Characteristics of surface profile. Computation of water surface profile by direct Step method.
Applications:Design of canal regulation works

UNIT – IV:Non-Uniform Flow in Open Channels - Rapidly Varied Flow:
Hydraulic jump; Momentum equation for a jump in horizontal rectangular channel, energy dissipation in hydraulic jumps;types of hydraulic jump – applications of hydraulic jump;surges in open channels, elementary surge analysis.
Applications:Design of, energy dissipating structures downstream of in-take channels, spillways, etc

UNIT - V:Basics of Turbo Machinery:
Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes; jet striking normally and tangentially, velocity triangles at inlet and outlet, expressions for work done and efficiency; Angular momentum principle, Applications to radial flow turbines.
Applications:Design of Hydropower plant layout, optimization of hydro power production, etc

UNIT - VI: Hydraulic Turbines and Pumps:
Hydraulic Turbines: Layout of a typical Hydropower installation – Heads and efficiencies, classification of turbines-pelton wheel-Francis turbine-Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and function. cavitations and preventive measures.
Centrifugal Pump: Manometric head; work done - minimum starting speed-losses and efficiencies-specific speed-multistage pumps-pumps in parallel - Maximum suction head - NPSH(Net positive suction head) - Cavitation. **Reciprocating pumps:** Basics, single and double acting reciprocating pumps, work done, slip, negative slip.
Applications:Hydraulic Design of turbines and selection of pumps.

TEXT BOOKS:
1. Hydraulics and Fluid Mechanics, P.M. Modi and S.M. Seth, Standard Book House
2. Theory and Applications of Fluid Mechanics, K. Subramanya, Tata McGraw Hill.
3. Bansal. R. K, "Fluid Mechanics and Hydraulics Machines", 5th edition, Laxmi publications (P) Ltd., New Delhi, Ninth Edition, 2006.

REFERENCE BOOKS:

1. Open Channel flow by R Subramanian, Mc Graw hills 2011 Edition.
2. Fluid Mechanics and Machinery by CSP. Ojha, R Berndtsson, PN. Chandramouli, Oxford University Press.
3. Fluid Mechanics 8th Edition in SI units By Frank M White, McGraw-Hill, ISBN 978-93-85965-49-4.
4. Fluid Mechanics and Machinery By Mohd. Kaleem Khan, Oxford University Press, ISBN 978-0-19-945677-2.
5. Fluid Mechanics by Piyush Kundu.
6. Rajput.R.K, "A text book of Fluid Mechanics and Hydraulic Machines", S. Chand & Company Ltd., New Delhi, Fourth edition, 2010.

7K511: GEOTECHNICAL ENGINEERING

B.Tech III Year I Sem.   **L   T   P/DC**

                                                             3   0 -3

1	2	3	4	5	6	7	8	9	10	11	12
x	x	x				x					

Course Objectives: To enable the student to

1. Understand the importance of formation and basic properties of soil
2. To learn about index properties of soil and available soli classification methods
3. Understand flow process through porous media.
4. Understand concepts of Stress distribution in soil and Effective stress of soil
5. Get an idea of Compaction and consolidation of soil
6. Understand the concepts of shear strength of soil

Course Outcomes: At the end of the course, the student

1. Can depict the various phases and fabric of soil
2. Can able to determine the index properties and classify the soil
3. Is able to apply the concepts of water flow through soil in the context of design and construction of embankments, canals etc.
4. Is able to Apply stress distribution and effective stress in soil for designing the foundation.
5. Can compute the compressibility of different types of soil.
6. Is able to draw the Mohr's circle and find out shear strength parameters of soil

UNIT - I

Introduction: Origin and formation of soil, History of soil mechanics, Phase diagrams, Basic Definitions-Voids ratio, Porosity, Degree of saturation, Moisture content, Specific gravity, Bulk density, Dry density, Saturated density, Submerged density - inter relationships.

Structure of soil: Clay mineralogy, Flocculated and dispersed structure, single grained and honey comb structures, Double diffuse layer

UNIT-II:

Index Properties of Soils: Definitions and importance of Index properties, particle size distribution, sedimentation analysis (Hydrometer analysis only) Importance of consistency limits, Classifications of Soils: Necessity, IS classification of soils, plasticity chart and its importance, field identification of soils.

UNIT-III:

Flow of Water Through Soil: Darcy's law - Assumptions and validity, seepage velocity, superficial velocity and their relationships, coefficient of percolation Coefficient of

permeability and its determination (excluding field method). Factors affecting permeability – Permeability of stratified soils.

UNIT-IV:

Effective stress in Soils - Total pressure and effective stress and its importance, Quick sand phenomenon, Soil moisture and modes of occurrence, capillary phenomenon.

Stresses in Soil: Boussinesq's and Westergaard's theories for concentrated, circular, rectangular loads, strip load - Newmark's chart. Pressure bulb. Contact pressure.

UNIT - V

Compaction of Soils: Definition; objects, concept of compaction, factors affecting compaction, Effect of compaction on soil properties. Field compaction methods -Rollers and vibrators; Field compaction control - Procter's needle.

Compressibility of Soils: Meaning, fundamental definition, Mass-spring analogy - Terzaghi's one dimensional consolidation theory - Assumptions, limitations and applications (Derivation and mathematical solution not required) – Normal, under and over consolidated soils, Pre-consolidation pressure, coefficient of consolidation and their importance.

UNIT - VI

Shear Strength of Soil: Concept of shear strength - Mohr's strength theory, Mohr - Coulomb theory. Shear strength tests under different drainage conditions. Shear strength parameters, factors affecting shear strength of soils.

TEXT BOOKS:

1.Murthy, V.N.S., " Principles of Soil Mechanics and Foundation Engineering", 5th Revised Ed., UBS Publishers and Distributors ltd, New Delhi, 2001

2.Punmia, B.C. Ashok Kumar Jain & Arun Kumar Jain, "Soil Mechanics and Foundations", Laxmi Publishing Co., New Delhi. 2003

REFERENCES:

1.Bowles, J.E, "Foundation Analysis and Designs" 5th Ed. Mc Graw Hill Publishing, New York – 2008.

2.Venkatramaiah, C.,"Geotechnical Engineering", revised third Ed., New Age International publishers, 2006.

7K512 :TRANSPORTATION ENGINEERING

B Tech III Year I Sem

	L	T	P/D	C
	3	0	---	3

a	b	c	d	e	f	g	h	i	j	k	L
X				X							

Course Objectives:
The student is being exposed to the subject with following Objectives:
1. Understand the design concepts of highways, the quality of the materials required for the construction of highways
2. To learn about the different techniques used in construction of flexible and rigid pavements.
3. Know how to collect the field data for the evaluation of traffic patterns.
4. Know the requirements for designing the railway tracks and the material required for the construction of permanent way.
5. Get an idea for the planning of airports and fixing of run way orientation.
6. Applying the various corrections while constructing Airports and runway lighting.

Course Outcomes:
On successful completion of the course, the student shall:
1. Applies the Pavement design concepts to different types of pavements
2. Takes precautions required for the execution of construction of pavements and applies relevant IRC standards.
3. Analyze the collected field data and design suitable traffic management system
4. Is able to apply the design concepts of super elevation of railway curves.
5. Knows how to select a site for airport construction and have working knowledge of run way orientation methods,
6. Apply the corrections to the run way length and understands the circumstances in which they are to be applied.

Unit – I:
Highway Development and Planning: Development in India, necessity for highway planning, different road development plans, classification of roads, road network patterns, highway alignment, factors affecting highway alignment, engineering surveys, drawings and reports, highway project - Importance of geometric design, design controls and criteria, highway cross section elements, sight distance elements, stopping sight distance, overtaking sight distance and intermediate sight distance.

Unit – II:
Design of horizontal alignment, design of super elevation and extra widening, design of transition curves, design of vertical alignment, gradient, vertical curves. Traffic Engineering and Regulations: Basic parameters of traffic, volume, speed and density, traffic volume studies, data collection and presentation, speed studies, data collection and presentation, origin and destination studies, parking studies, on street and off street parking,

Unit – III:
Road accidents, causes and preventive measures, accident data recording, condition diagram and collision diagram, traffic signs, types and specifications, road markings, need for road markings, types of road markings, design of traffic signals – Webster method.

Introduction to different highway materials and construction procedures - Highway material characterization, sub grade soil, stone aggregates, bitumen material, construction of gravel roads, construction of water bound macadam roads, construction of bituminous pavements, surface dressing, bitumen bound macadam, bituminous concrete, construction of cement concrete pavements.

Unit – IV:
Railway Engineering: Permanent way components, cross section of permanent way, functions of various components like rails, sleepers, and ballast, gauge, creep of rails, theories related to creep, sleeper density- Geometric design of railway track: Gradients, grade compensations, cant and negative super elevation

Unit – V:
Cant deficiency, degree of curve, points and crossings, rail joints and welding of joints railway stations and yards, signalizing and interlocking.

Airport Engineering: Airport site selection, runway orientation, basic runaway length.

Unit – VI:
Corrections for elevation, temperature, airport classification, runway geometric design, wind rose diagram, factors controlling taxiway layout - Terminal area, apron, hangar, blast consideration, typical airport layouts, wind rose diagram, runway lighting system and marking.

TEXTBOOKS
1. Khanna, S. K. and Justo, C. E. G (1994), "Highway Engineering", Nemchand & Bros, New Delhi. India.
2. Chandra, S and Agarwal, M. M. (2007) "Railway Engineering" Oxford Higher Education, University Press New Delhi
3. Khanna. S. K. Arora, M. G. and Jain. S. S. (1994) "Airport Planning and Design" Fifth edition. Nem Chand & Bros, Roorkee, India.

REFERENCES
1. Saxena S.C and Arora, S, "Text book of railway Engineering" Dhanpat Rai and Sons., 1988.
2. Yang, H. and Huang., "Pavement Analysis and Design", Prentice Hall India Ltd-2004.
3. McShane, W.R., Roess, R.P. and Prassas, E.S., Traffic Engineering. Prentice Hall. Englewood Cliffs, 1997.

7KC51: REINFORCED CONCRETE DESIGN
(PROFESSIONAL ELECTIVE – I)

B.Tech III Year I Sem.

			L	**T**	**P/D**	**C**
			3	**1**	**-**	**3**

1	2	3	4	5	6	7	8	9	10	11	12
X	X	X	X		X						

Course Objectives:

To enable the student

1. Understand the applications of concrete, basic requirements of concrete structures and learn the fundamentals of design philosophies.
2. Familiarize with relevant codes of practice (IS 456:2000), professional approaches, working stress method, ultimate load method, limit state method and field problems.
3. Is able to learn Design of flexure failures in beams and deflections in beams.
4. Understand the Design of Reinforced concrete Slabs with different types support conditions.
5. Understand the Design of RC Columns, Footing and Stair cases.
6. Acquire ability to draw, understand and interpret the structural drawings for various RC elements such as beams, slabs, columns and footings, including aspects of detailing.

Course Outcomes:

At the end of the course the student

1. Is able to use and suggest concrete for various practical applications.
2. Is able to interpret various specifications of relevant standards, to field problems and professional practices.
3. Is able to design beams in singly reinforced, doubly reinforced rectangular and flanged beams.
4. Is able to design slabs with different conditions and different supports.
5. Is able to design axial loading, Uni-axial and biaxial bending of columns and Design of isolated square, rectangular and circular footings.
6. Interprets and communicates the design and detailing of rc beams, slabs, columns, stair cases and footings, through appropriate structural drawings.

UNIT-I:

Introduction to Reinforced Cement Concrete:

Applications of Concrete, Need for Reinforcement in Concrete ,Types and Properties of Concrete and Steel, Tests on concrete and steel, RCC as a material, Basic requirements of an RCC Structure ,stability, strength, serviceability and durability.

Principles of Limit state design and Ultimate strength of R.C. Section: Development of design philosophies-Working stress method (WSM), Ultimate load method, and Limit state method (LSM) relative merits and demerits. Basic concepts and characteristics loads and strengths, Partial safely factors. Stress strain relationship for concrete and steel.

UNIT –II:

Working stress method: Theory of bending in RCC beams, balanced, under-reinforced and over reinforced sections; Analysis and design of singly and doubly reinforced rectangular.

Limit state of collapse (flexure): Limit State analysis of rectangular RCC beams, balanced, under-reinforced and over reinforced sections; Analysis and design of singly and doubly reinforced rectangular sections.

UNIT-III:
Limit state of collapse(Shear & Torsion): Limit State analysis of section for shear and torsion. Assumptions, Analysis and design of flanged beams. Anchorage and development length, Curtailment of reinforcement in beams.

Limit states of serviceability: Short term, long term and total deflections, check for deflection and cracking.

UNIT-IV:
Analysis and design of slabs: Definition of a Slab, Types of Slabs, one way, two way simply supported slabs subjected to only uniformly distributed loads. IS Code method - Design of solid rectangular slabs as per IS 456:2000, Detailing of reinforcement in slabs.

Design of staircases: Types of stair case, loads on stair cases, effective span as per IS code provisions, distribution of loading on stairs, with waist slabs.

UNIT-V:
Analysis and design of columns: Assumptions, axially loaded circular, square and Rectangular columns, Uniaxial and biaxial bending of columns- subjected to a axial load & bending. Design as per IS 456:2000 code and Interaction diagrams.

UNIT-VI:
Analysis and Design of Footings: Design of isolated square, rectangular and circular footings, sloped footings as per IS code 456:2000.

TEXT BOOKS:
1. N.Subramanian "Design of Reinforced Concrete Structures" Oxford University Press. First Published in 2013, Second impression 2014.
2. Unni Krishnan Pillai and DevadassMenon,"Reinforced Concrete Design" ,Tata McGraw-Hill Publishing Co Ltd,1998.

REFERENCES:
1. IS 456 (2000): Plain and Reinforced Concrete - Code of. Practice

2. SP16: "Design Aids For Reinforced Concrete related to IS : 456".

3. V.L.Shah&S.R.Karve, "Limit State Theory and Design of Reinforced Concrete", Structures Publications, 7th Edition, 2014.
4. Limit State Design of Reinforced concrete-by P.C. Varghese, PHI Learning Private Limited 2008-2009.
5. Fundamentals of Reinforced concrete Design-by M.L.Gambhir, PHI Learning Private Limited 2008-2009.
6. Reinforced concrete Design-by Pallai and Menon, TMH Education Private Limited.

7KC52: PIPELINE ENGINEERING
(PROFESSIONAL ELECTIVE – I)

B.Tech III Year I Sem.

	L	T	P/D	C
	3	1	-	3

1	2	3	4	5	6	7	8	9	10	11	12
x	x		x								

Course Objectives:
1. Operations and maintenance of flow lines or trunk pipe lines.
2. Understanding of well fluids for proper designing of flow lines/trunk pipe lines.
3. Obtaining the permissions to laying of pipe line as per the State/DGMS regulations.
4. Operation and maintenance of gas compressors.
5. Handling of flammable fluids like gas, oil condensate to check the accident free operation.
6. Protection from internal/external corrosion of pipe lines by suitable methods.

Course Outcomes:
The students will be able to:
1. Become a specialist in pipeline designing and pipe line maintenance.
2. Repair and maintenance of pipeline in short time to avoid production loss.
3. Plan for suitable corrosion protection methods to improve the life of the pipeline.
4. Be a good public relations officer to deal with public in acquiring the land & also during repair & maintenance operations.
5. Be able to understand the different types of liquid flow
6. Be able to understand Pipeline mechanical design

UNIT-I: Elements of pipeline design: Fluid properties – Environment - Effects of pressure and temperature - Supply/Demand scenario - Route selection - Codes and standards - Environmental and hydrological considerations – Economics - Materials/Construction – Operation - Pipeline protection - Pipeline integrity monitoring.

UNIT - II: Pipeline route selection, survey and geotechnical guidelines: Introduction - Preliminary route selection - Key factors for route selection - Engineering survey - Legal survey - Construction / As-built survey - Geotechnical design.

UNIT-III: Natural gas transmission: General flow equation – Steady state - Impact of gas molecular weight and compressibility factor on flow capacity - Flow regimes - Widely used steady-state flow equations – Summary of the impact of different gas and pipeline parameters on the gas flow efficiency –

UNIT - IV: Pressure drop calculation for pipeline in series and parallel – Pipeline gas velocity – Erosional velocity – Optimum pressure drop for design purposes – Pipeline packing – Determining gas leakage using pressure drop method – Wall thickness/pipe grade – Temperature profile – Optimization process – Gas transmission solved problems.

UNIT-V: Liquid flow and pumps: Fully developed laminar flow in a pipe – Turbulent flow – Centrifugal pumps – Retrofitting for centrifugal pumps (Radial-flow) – Pump station control – Pump station piping design. Transient flow in liquid and gas pipelines: Purpose of transient analysis – Theoretical fundamentals and transient solution technique – Applications – Computer applications.

UNIT-VI: Pipeline mechanical design: Codes and standards – Location classification – Pipeline design formula – Expansion and flexibility – Joint design for pipes of unequal wall thickness – Value assemblies – Scraper traps – Buoyancy control – Crossings – Depth of cover – Aerial markings – Warning signs. Pipeline construction: Construction – Commissioning.

Text Books:

1. Pipeline Design and Construction: A Practical Approach, M. Mahitpour, H. Golshan and M.A. Murray, 2 nd Edition, ASME Press, 2007.

2. Pipeline Engineering, Henry Liu, Lewis Publishers (CRC Press), 2003.

Reference Books:

1. Piping Calculation Manual, E. ShashiMenon, McGraw-Hill, 2004.

2. Piping and Pipeline Engineering: Design, Construction, Maintenance Integrity and Repair, George A. Antaki, CRC Press, 2003.

3. Pipeline Planning and Construction Field Manual, E. ShashiMenon, Gulf Professional Publishing, 2011.

4. Pipeline Rules of Thumb Handbook, E. W. McAllister, 7th Edition, 2009.

5. Liquid Pipeline Hydraulics, E. ShashiMenon, Mareel Dekker, Inc., 2004.

6. Gas Pipeline Hydraulics, E. ShashiMenon, Taylor & Francis, 2005.

7KC53: RAILWAY ENGINEERING
(PROFESSIONAL ELECTIVE – I)

B Tech III Year I Sem

	L	**T**	**P/D**	**C**
	3	1	-	3

1	2	3	4	5	6	7	8	9	10	11	12
x	x		x								

Course Objectives:
1. To understand the basic concepts of gauges in India and abroad.
2. To identify the factors affecting railway line alignment and associated surveys.
3. To study various components of railway track and their significance.
4. To study the principles of forces and stresses on tracks.
5. To study the basic concepts of track geometric design
6. To understand the importance of track maintenance.

Course Outcomes:
At the end of the course the student will be able
1. To determine different gauges existing in India and world and gauge significance.
2. To evaluate factors affecting alignment and Surveys required.
3. To differentiate various components of Railway track and their significance.
4. To evaluate of stresses and forces acting on a track.
5. To carry out geometric design of track.
6. The importance and need of track maintenance.

UNIT – I
Introduction and Gauges: Developments in Indian Railways, Different Modes of Transport, Organization of Indian Railways, Classification of Railway Lines in India, Gauges on World Railways, Different Gauges on Indian Railways, Choice of Gauge, Problems Caused by Change of Gauge.

UNIT – II
Alignment of Railway Lines and Engineering Surveys:
Importance of Good Alignment, Basic Requirements of an Ideal Alignment, Selection of a Good Alignment, Engineering Surveys and Construction of New Lines, Need for Construction of a New Railway Line, Preliminary Investigations for a New Railway Line, Types of Surveys- Traffic Survey, Reconnaissance Survey, Preliminary Survey, Preliminary Engineering-cum-traffic Survey, Final Location Survey.

UNIT – III
Components: Permanent way components – Railway Track Gauge – Cross Section of Permanent Way – Functions of various Components like Rails, Sleepers and Ballast –Rail Fastenings – Creep of Rails- Theories related to creep – Adzing of Sleepers- Sleeper density – Rail joints.

UNIT – IV
Track and Track Stresses: Track and Track Stresses**,** Requirements of a Good Track, Maintenance of Permanent Way, Track as an Elastic Structure, Forces Acting on the Track, Coningof Wheels, Tilting of Rails.

UNIT – V
Geometric Design: Necessity for Geometric Design, Details of Geometric Design of Track, Gradients, Grade Compensation on Curves

UNIT – VI
Track Maintenance: Necessity and Advantages of Track Maintenance, Essentials of Track Maintenance, Measuring Equipment and Maintenance Tools for Tracks, Maintenance of Rail Surface, Deep Screening of Ballast, Track Drainage and Maintenance of Track in Track circuited Lengths.

TEXT BOOKS:
1. Railway Engineering by Satish Chandra and Agarwal M.M., Oxford University Press, New Delhi.
2. 'Highway, Railway, Airport and Harbour Engineering' by Subramanian KP, Scitech Publications (India) Pvt. Limited, Chennai.

REFERENCES:
1. 'Railway Engineering'bySaxena& Arora – DhanpatRai, New Delhi.
2. 'Highway, Railway, Airport and Harbour Engineering' by Subramanian KP, Scitech Publications (India) Pvt. Limited, Chennai.
3. 'Transportation Engineering' by Srinivasa Kumar R, University Press, Hyderabad

7KC54: SOIL MECHANICS - I
(PROFESSIONAL ELECTIVE – I)

B. Tech III Year I Sem.

	L	T	P/D	C
	3	1	-	3

1	2	3	4	5	6	7	8	9	10	11	12
x	x	x									

Course Objectives

1. To know the functions of various geosynthetics and its manufacturing
2. To learn about various properties of geosynthetics
3. Exposed to the Principle of soil reinforcement and design of reinforced soil structures
4. To study about bearing capacity of soil reinforcedwith geotextile
5. Exposed to various techniques of land fill
6. To know about various components of waste disposal units

Course Outcomes: To acquire knowledge about

1. Types and functions of various geosynthetics and its manufacturing process
2. Testing and valuation of various properties of geosynthetics used in soil structures
3. Principle of soil reinforcement and design of reinforced soil retaining structures
4. Use of geosynthetics in pavement, geo-environmental engineering to fulfil the various functions
5. Designing the components of land fill
6. Design of liners and various components of waste disposal units

UNIT - I

Introduction on reinforced earth and Geotextiles, principle and mechanism of reinforced soil, the nomenclature on various types of geosynthetics, functions of geotextiles, application areas, raw materials of geosynthetics and manufacturing methods.

UNIT - II

Geotextile Testing and evaluation, design methods on selection of the geotextiles, hydraulic characteristics of geotextiles, geogrid testing and evaluation, allowable versus ultimate geotextile properties-strength and flow related problems, designing with geotextiles for various functions of separation, filtration, and drainage applications

UNIT - III

Designing with geotextiles for soil reinforcement and roadway reinforcement functions, Geotextiles for improved bearing capacity in soft soils, Modes of failures, In-situ slope stabilization, Embankments on soft soils, Design and construction of geosynthetics, Reinforced soil retaining structures, Walls and slopes, and Codal provisions

UNIT - IV

Geosynthetics in Environmental control, liners for ponds and canals, covers and liners for landfills, material aspects and stability considerations, landfills, occurrences and methods of mitigation, Erosion causes and techniques for control

UNIT - V

Environmental-geotechnical application , introduction ,basic considerations of ground improvement systems ,load environmental factor design criteria, load factor design criteria and approaches , environmental load factor design criteria, soil structure , structural soil interaction , soil foundation structure interactions, load factor of safety and allowable condition, bearing capacity of granular soil, friction forces and angle between two materials.

UNIT - VI

Liners, different types, properties of liners, clay liners, geo-synthetic liners, composite liners, design aspects.

TEXTBOOKS

1. Colin JFP Jones, Earth reinforcement and soil structures, 3rd edition, Thomas Telford Ltd, London, 1996

 2. G L Sivakumar Babu, An introduction to soil reinforcement and geosynthetics, second edition, universities press Pvt. Ltd., Hyderabad, 2009

REFERENCES:

1.Bowles, J.E, "Foundation Analysis and Designs" 5th Ed. Mc Graw Hill Publishing, New York – 2008.

2. Murthy, V.N.S., " Principles of Soil Mechanics and Foundation Engineering", 5th Revised Ed., UBS Publishers and Distributors ltd, New Delhi, 2001

3. J.N Mandal, "Reinforced Soil and Geotextiles", Oxford and IBH Publishers Co. Pvt. Ltd, New Delhi, 1988.

7EC01: DATA STRUCTURES

(Open elective – I)
(Common to all Branches)

L	T	P/D	C
3	0	-	3

B. Tech III Year I Sem.

Course Objective:

1. Understand the concepts of Abstract data Type, linear data structures such as stacks, queues and lists and their applications.
2. Comprehend different non linear data structures such as trees and graphs and analyze their time complexities.
3. Understand object oriented programming and advanced C++ concepts and be able to write programs with C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, Templates etc.

Course Outcomes:

1. Explain Abstract data type, stack and Queues with their applications
2. Write programs on Singly linked lists, Doubly linked lists, Circular list and explain their operations.
3. Explain concepts of Trees, AVL Trees and Graphs with examples and applications.
4. Describe and solve problems of searching and sorting and evaluate the time complexity of each algorithm.
5. Explain concepts of OOPs and implement programs using objects, classes, constructors and destructors.
6. Explain and apply concepts of oops , write programs implementing functions, operator overloading and inheritance.

UNIT I

Introduction to data structures: Abstract data type (ADT), Stacks, Queues and Circular queues and their implementation with arrays.
Applications of Stack: infix to post fix conversion, postfix expression evaluation.
Applications of Queues .

UNIT II

Singly linked lists, Advantages of Linked lists over Arrays, Doubly linked lists, Circular list and their operations, representing stacks and queues with Linked lists.

UNIT III

Trees- Binary trees, terminology, representation, traversals.
AVL trees, AVL tree operations: Insertion, deletion and searching.
Graphs- terminology, representation, graph traversals (DFS and BFS).

UNIT IV

Searching - Linear and binary search methods.

Sorting - Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort.

Heaps - Introduction, Min Heap, Max Heap,Operations on Heaps, Heap Sort.

Performance analysis of Searching and Sorting Algorithms.

UNIT V: Introduction to C++ programming-object oriented programming concepts, Structured Vs OOP.

Classes and objects-class definition, Objects, class scope and accessing members, Constructors-default constructor, parameterized constructor, copy constructor. Destructor.

UNIT VI: Static class members, this pointer, friend functions, Dynamic memory management with operators new and delete. Overloading-function overloading, Operator overloading, restrictions on operator overloading, overloading unary and binary operators, templates, inheritance: single, multiple and multi level inheritance.

TEXT BOOKS:
1. Data Structures and C++ by Reema Thareja
2. Data Structure through C by Yashavant Kanetkar.
3. The complete reference C++ By Herb Schildt.

REFERENCES:
1. Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft. *Data Structures and Algorithms*. Addison Wesley, 1983.
2. Data Structures using c Aaron M.Tenenbaum , Yedidyah Langsam,Moshe J Augenstein.
3. Introduction to Data Structures In C By Kamtane
4. Data Structures, A pseudocode Approach with C by Richard F. Gilberg and Behrouz A. Forouzan.

7ZC22 BASICS OF ENTREPRENEURSHIP
(Open elective – I)

B. Tech III Year I Sem.

				L		T		P/D		C	
				3		0		0		3	

a	b	c	d	e	f	g	h	i	j	k	l
				x		x				x	

Course Objective: The objective of the course is to make students understand the nature of Entrepreneurship, and its importance to business to the engineering students, which will allow them to get the required intuition and interest in starting their own start-up's

Course Outcomes:
1. The students' will acquire basic knowledge on Skills of Entrepreneurship.
2. The students' will understand the techniques of selecting the customers through the process of customer segmentation and Targeting
3. Business Models and their validity are understood by the students'.
4. The basic cost structure, Revenue Streams and the pricing strategies are understood by the students'.
5. The students' will acquire knowledge about the project management and its techniques.
6. The students' get exposure on marketing strategies and business regulations for the Start up.

Unit – I: Introduction to Entrepreneurship & Self Discovery: - Define Entrepreneurship, Entrepreneurship as a Career option, Find your Flow, Stock of Your Means, Characteristics, Qualities and Skills of Entrepreneurship, Effectuation, Principles of Effectuation, Life as an Entrepreneur, Stories of Successful Entrepreneurs.

Unit – II: Opportunity & Customer Analysis: - Identify your Entrepreneurial Style, Methods of finding and understanding Customer Problems, Run Problem Interview, Process of Design Thinking, Identify Potential Problems worth Solving, Customer Segmentation, Niche Marketing and Targeting, Craft your Values Proportions, Customer-driven Innovation.

Unit – III: Business Model & Validation: - Introduction to Business Models, Lean approach to Business Model Canvas, Blue and Red Ocean Strategies, the Problem-Solution Fit, Build your Solution Demo, Solution Interview Method, Identify Minimum Viable Product (MVP), Product-Market fit test.

Unit – IV: Economics & Financial Analysis: - Revenue Analysis, Identify different Revenue Streams and Costs Analysis – Startup Cost, Fixed Cost and Variable Cost, Break Even Analysis, Profit Analysis, Introduction to Pricing, different Pricing Strategies, Sources of Finance, Bootstrapping and Initial Financing, Practice pitching to Investors and Corporate.

Unit – V: Team Building & Project Management: - Leadership Styles, Shared Leadership Model, Team Building in Venture, Roles and Responsibilities of team in venture, Explore collaboration tools and techniques, Brainstorming, Introduction to Project Management, Project Life Cycle, Create a Project Plan.

Unit – VI: Marketing & Business Regulations: - Positioning, Positioning Strategies, Branding, Branding Strategies, Selecting and Measuring Channels , Customer Acquisition, Selling Process, Selling Skills, Sales Plans. Business regulations – List of Required Registrations, Compliance Check List, Business Structures and Legal Entities.

ESSENTIAL READINGS:

- Robert D Hisrich, Michael P Peters, Dean A Shepherd, Entrepreneurship, Sixth Edition, New Delhi, 2006.
- Thomas W. Zimmerer, Norman M. Scarborough, Essentials of Entrepreneurship And Small Business Management, Fourth Edition, Pearson, New Delhi, 2006
- Alfred E. Osborne, Entrepreneur's Toolkit, Harvard Business Essentials, HBS Press, USA, 2005.

SUGGESTED READINGS:

- Madhurima Lall, Shikha Sahai, Entrepreneurship, Excel Books, First Edition, New Delhi, 2006.
- S.S. Khanka, Entrepreneurial Development, S. Chand and Company Limited, New Delhi, 2007.
- H. Nandan, Fundamentals of Entrepreneurship, Prentice Hall of India, First Edition, New Delhi, 2007.
- S.R. Bhowmik, M. Bhowmik, Entrepreneurship-A tool for Economic Growth   And
A key to Business Success, New Age International Publishers, First Edition, (formerly Wiley Eastern Limited), New Delhi, 2007.
- *https://www.wfglobal.org/*
- *https://www.learnwise.org/#/IN/en/home/login,*

7ZC05 BANKING, INSURANCE AND RISK MANAGEMENT

(Open elective – I)

	L	T	P/D	C
	3	0	0	3

B. Tech III Year I Sem.

a	b	c	d	e	f	g	h	i	j	k	l
							x			x	

Course Objectives: To make the students understand the concepts and principles of Indian Banking Business, Insurance Business and Capital market business products and services, which facilitate them to understand the nature of market

Course outcomes:

CO 1 To provide the information about Indian Banking sector operations and services rendered by different banks.

CO 2 To enlighten the students regarding various banking systems and banking sector regulations with focus on reforms in our country.

CO 3 To make the students understand the importance of existence of insurance industry.

CO 4 To understand the terminology used in the insurance sector and the regulations.

CO 5 To know the types of risks associated to individuals and corporate and to know the managing skills of the same

CO 6 To make the students understand the functioning of various financial, commodities and currency markets and its applications in risk management.

UNIT I

INTRODUCTION TO BANKING BUSINESS: Introduction to financial system - History of banking business in India, Structure of Indian banking system: Types of accounts, advances and deposits in a bank. KYC norms, New Dimensions and products- E-Banking: Mobile-Banking, Net Banking, Digital Banking, Negotiable Instruments: Cheque system.

UNIT II

BANKING SYSTEMS AND ITS REGULATION: Banking Systems: Branch Banking, Unit Banking, Correspondent Banking, Group Banking, Deposit Banking, Mixed Banking and Investment Banking - Banking Sector Reforms with special reference to Prudential Norms, Capital Adequacy Norms, Classification of Assets and NPA's, Functions of RBI, Role of RBI in regulating Indian Banking.

UNIT III

INTRODUCTION TO INSURANCE: Introduction to insurance, Need and importance of Insurance, principles of Insurance, characteristics of insurance contract, branches of insurance and types of insurance: Life insurance and its products, General Insurance and its variants.

UNIT IV

INSURANCE BUSINESS ENVIRONMENT: Procedure for issuing an insurance policy – Nomination - Surrender Value - Policy Loans – Assignment - Revivals and Claim Settlement; Insurance as a tax mitigation tool, Role of IRDA in Insurance Regulation.

UNIT V

RISK MANAGEMENT: Introduction to Risk Management – meaning, classification of risks – Systematic Risk and Unsystematic Risk, Risk management process – Stages, Risk Management Approaches and Techniques.

UNIT VI

DERIVATIVES AS A RISK MANAGEMENT TOOL: Introduction to Financial Derivatives, Advantages of Derivatives - types of Derivative Contracts - Forwards, Futures, Options and Swaps - Differences among Forwards, Futures and Option Contracts.

ESSENTIAL READINGS:
- Varshney, P.N., Banking Law and Practice, Sultan Chand & Sons, New Delhi.
- General Principles of Insurance Harding and Evantly
- Mark S. Dorfman: Risk Management and Insurance, Pearson, 2009.

SUGGESTED READINGS:
- Scott E. Harringam Gregory R. Nichanus: Risk Management & Insurance, TMH, 2009.
- Geroge E. Rejda: Principles of risk Management & Insurance, 9/e, pearson Education. 2009.
- G. Koteshwar: Risk Management Insurance and Derivatives, Himalaya, 2008.
- Gulati: Principles of Insurance Management, Excel, 2009.
- James S Trieschmann, Robert E. Hoyt & David N. Sommer: Risk Mgt. & Insurance, Cengage, 2009.
- Dorfman: Introduction to Risk Management and Insurance, 8/e, Pearson, 2009.
- P.K. Gupta: Insurance and Risk Management, Himalaya, 2009.
- Vivek & P.N. Asthana: Financial Risk Management, Himalaya, 2009.
- Jyotsna Sethi & Nishwan Bhatia : Elements of Banking and Insurance, 2/e,PHI, 2012.

7ZC25 BASICS OF INDIAN ECONOMY

(Open elective – I)

B. Tech III Year I Sem.

		L	T	P/D	C
		3	0	0	3

a	b	c	d	e	f	g	h	i	j	k	l
								x		x	

Course Objectives:

To provide basic knowledge relating to the Indian Polity and Economy, thus making the students appreciate the current aspects related to both polity and economy.

Course outcomes:

CO1: Gain knowledge relating to the Indian Constitution and the Preamble to the Constitution.

CO2: Gain knowledge relating to the fundamental rights and duties of the Indian citizens and the directive principles of state policy.

CO3: Students will learn about the federal structure and judiciary of India.

CO4: Gain knowledge relating to Economics, various sectorial growth and National Income.

CO5: Students will learn about Indian Industrial policy and benefits of LPG to India

CO6: Comprehend knowledge relating to Fiscal policy & Taxation system in India

Unit I INTRODUCTION TO SALIENT FEATURES OF CONSTITUTION: Significance of the Constitution, Distinction between Written and Unwritten Constitution, Composition of the Constituent Assembly and the role and objectives of the Drafting Committee, Main features and the nature of the Constitution of India. Preamble to the Constitution and its relevance; Basic principles of Preamble and their reflection in the constitutional provisions.

Unit II FUNDAMENTAL RIGHTS, DUTIES AND DIRECTIVE PRINCIPLES OF STATE POLICY: Fundamental Rights and Duties of Citizens- Importance of Rights and Duties, Dignity of an individual, Safeguards against deprivation of life and personal liberty; Writs for the protection of Fundamental Rights; Meaning of Directive Principles of State Policy, Classification of the Directive Principles, Role of Directive Principles, Role of Directive Principles in the establishment of economic and social democracy.

Unit III GOVERNMENT AND JUDICIARY: Legislative, financial and judicial powers of the President; Appointment of Prime Minister and constitution of Council of Ministers; Powers and functions of Prime Minister; Individual and collective responsibility; Powers and discretionary powers of the Governor; Appointment of the Chief Minister, Formation of the Council of Ministers; Powers and jurisdiction of the Supreme Court and High Courts of India.

Unit IV INTRODUCTION TO ECONOMICS& NATIONAL INCOME: Definition, Economics and economy, back ground of economy, sectors of the economy, types of

economy, growth of economy, primary moving force of Economic growth in India, mixed economy, Introduction to National Income & related aggregates : GNP, NNP,GDP&NDP.

Unit V INDUSTRIAL POLICY & LIBERALIZATION OF ECONOMY: Industrial policy in India, its objectives, Review of Industrial policies up to 1986, Industrial policy 1991 - causes of its implementation, benefits of Liberalization, privatization & Globalization to the Indian economy.

Unit VI FISCAL POLICY & TAXATION SYSTEM: Fiscal policy- Definition, objectives, importance, setbacks, recent fiscal policy of India, Reforms to strengthen the fiscal policy in India. Taxation system in India, methods of taxation, a good tax system, VAT, GST, Reforms in taxation.

ESSENTIAL READINGS:

- Indian Polity - M. Laxmikanth, 5th Edition, McGraw Hill Education, Chennai
- Environment And Ecology A Complete Guide for Civil Services Preliminary and Main Examinations – R. Rajgopalan, 2017, Oakbridge Publishing Pvt. Limited.
- Indian Economy, Datt & Mahajan, 70th Edition, Sultan Chand publishers.
- Latest Budget document by Ministry of Finance

SUGGESTED READINGS:

- Introduction to Constitution of India – Dr. Durga Das Basu, 22nd Edition, 2015, LexisNexis
- Our Constitution – Subhash C Kashyap, 5th Edition, 2015, National Book Trust, India
- Indian Economy, Misra & Puri, 33rd Edition, Himalaya publishing house

7K571: HYDRAULICS ENGINEERING LABORATORY

B.Tech III Year I Sem.

			L	T	P/D	C
			-	-	3	1.5

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x		x							

Course Objectives:

To enable the student
1. Understand uniform and non-uniform flows and the importance of Froude number in open channel flows.
2. Determine the force exerted by fluid jet on vane, determine efficiency and performance of turbine sand centrifugal pumps.
3. Study streamline patterns in a fluid flow system and air pressure distribution around an air foil.

Course Outcomes:

At the end of the course, the student should have learnt:
1. To compute the open channel viscosity coefficient in uniform flows and Froude number and energy losses in non- uniform flows.
2. To differentiate between uniform, non-uniform flows and flow in curved channel
3. To determine work done by fluid jet on vane, compute work done and draw performance characteristic curves for turbines and centrifugal pumps.
4. To find the discharge between stream lines and pressure variations around an air foil.

List of experiments:
1. Finding Chezy's coefficient and manning's coefficient for an open channel.
2. Hydraulic jump - Determination of Froude number, Loss of energy
3. To study the flow characteristics over a hump/weir
4. Impact of jet on vanes - Determination of force on vanes.
5. Centrifugal Pump- Determination of efficiency and performance characteristics of a pump.
6. Multistage centrifugal pump test rig
7. Reciprocating pump at constant speed
8. Pelton Wheel Turbine - Determination of efficiency and performance characteristics of a Pelton wheel Turbine.
9. Francis Turbine- Determination of efficiency and performance characteristics of a Francis turbine.
10. Kaplan turbine - efficiency and performance characteristics of a Kaplan turbine
11. Performance of variable speed centrifugal pump.
12. Super elevation study in open channel flow.

References:
1. Laboratory Manual.

7K572 :GEOTECHNICAL ENGINEERING LABORATORY

B.Tech III Year I Sem.   **L   T   P/D C**
                                                              -   -   3   1.5

a	b	c	d	e	f	g	h	i	j	k	l
x		x						x			

Course Objective

Students should understand the methods for:
1. Determine the basic engineering properties of soil.
2. Determine the Index properties of soil.
3. Various tests on Soil to investigate its behaviour.

Course Outcome

On successful completion of the Laboratory practical course, students will be able to assess
1. The method of determining basic engineering properties of soil
2. To classify the soil with the help of Atterberg's limits and Classification of soil.
3. To determine the cohesion and friction using direct shear test and tri-axial tests.

List of experiments conducted.
1. Determination of moisture content and specific gravity of soil sample
2. Grain size analysis of soil sample by Sieve analysis.
3. Determination of in situ density by core cutter and sand replacement methods
4. Determination of Liquid limit (Cassagrande and cone penetration methods) of soil samples
5. Determination of Plastic limit & Shrinkage limit of Soil sample
6. Determination of compaction characteristics of soil by standard Proctor compaction test
7. Determination of compaction characteristics of soil by modified Proctor compaction test
8. Determination of coefficient of permeability of soil sample by constant head method
9. Determination of coefficient of permeability of soil sample by variable head method
10. Determination of Shear strength parameters of soil by Direct shear Test
11. Determination of shear strength parameters of soil sample by Tri-axial shear test and unconfined compression test.
12. Determination of compression index and coefficient of consolidation by consolidation test.

References:
1. Laboratory Manual.

7K573 :TRANSPORTATION ENGINEERING LABORATORY

B Tech III Year I Sem

	L	T	P/D	C
	-	-	3	1.5

a	b	c	d	e	f	g	h	i	j	k	l
	X			X							

Course Objectives:
To enable the student
1. Assess the quality of the material used in pavement construction and compare with IRC specifications.
2. Identify the field data required for assessing the traffic parameters.

Course Outcomes
At the end of the course, student should have learnt
1. To apply methods for assessing various types of material to be used in the pavement construction.
2. To plan for the collection of field data, present the same for performing critical analysis and hence aid in taking decisions so as to enable smooth movement of traffic

List of Experiments

Tests on Bitumen
1. Penetration Test
2. Ductility test
3. Softening point test
4. Specific gravity test
5. Viscosity test
6. Flash and fire point test

Tests on Aggregates
1. Aggregate crushing value test
2. Los Angeles Abrasion test
3. Aggregate Impact Value test
4. Shape test (Flakiness Index & Elongation Index)
5. Water absorption test
6. Soundness

Traffic Studies
1. Traffic volume study
2. Spot speed study
3. & D studies
4. Speed & delay studies

Miscellaneous tests (Demonstration only)
1. Determination of CBR
2. Preparation of representative sample by coning and quartering
3. Bitumen Extraction test
4. Marshall stability – concept and test

TEXTBOOKS

1. Khanna, S. K. and Justo, C. E. G, A Veeraraghavan (2013), "Highway Materials & Pavement Testing", Nem Chand and Brothers.
2. Laboratory Manual

7H518: QUANTITATIVE APTITUDE
(Common to All Branches, 2019-20)

B Tech III Year I Sem

	L	T	P/D	C
	1	1	0	2

a	b	c	d	e	f	g	h	i	j	k	l
X											

Course Outcomes: *Students will able to answer*
1. *The questions given on testing divisibility, prime number and questions of HCF and LCM .*
2. *The questions given on averages, percentage and profit and loss.*
3. *The questions given on ratio and proportion.*
4. *The questions given on simple and compound interest.*
5. *The questions given on time and work, time and distance.*
6. *The questions given on mensuration and data sufficiency.*

Unit I
Number System: Test for Divisibility, Test of prime number, Division and Remainder – HCF and LCM of Numbers - Fractions.

Unit II
Average: Average of different groups, Replacement of some of the items - Percentage - Profit and Loss.

Unit III
Ratio and Proportion: Properties of Ratio, Comparison of Ratios, Useful Simple Results on Proportion – Partnership and Share.

Unit IV
Simple Interest: Effect of change of P, R and T on Simple Interest - Compound Interest: Conversion Period, Difference between Compound Interest and Simple Interest.

Unit V
Time and Work-Pipes and Cisterns, Time and Distance- Problems on Trains- Boats and Streams, Allegation or Mixtures.

Unit VI
Mensuration: Area of Plane Figures, Volume and Surface Area of Solid Figures.
Data Interpretation: Tabulation, Bar Graphs, Pie Charts, Line Graphs.

Text Books:
1.Quantitative Aptitude by R.S.Agarwal
2. Quantitative Aptitude by Abhijit Guha
3. Quantitative Aptitude for Competative Examinations, U.Mohan Rao, Scitech Publication.

7K591 : TECHNICAL SEMINAR –V

B. Tech III Year I Semester

	L	T	P	C
	-	-	-	1

1	2	3	4	5	6	7	8	9	10	11	12
								X	X		X

Course Objective :
1. Develop ability to be a public speaker with the aid of Power Point Presentations.
2. Learn delivering technical seminars demonstrating clarity in thinking and enunciating complex technical concepts.
3. Practice and develop communication skills and interview performance skills.

Course Outcomes:
1. Demonstrate public speaking with the aid of Power Point Presentations
2. Identify current general and specific technological topics of interest and prepare and present the content cogently.
3. Demonstrate communication skills and interview performance skills

Procedure
1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. Progress of the seminars is reviewed by the concerned HOD once in 15 days.
5. The evaluation for technical seminars is informed to students and displayed in the classrooms.
6. The presentation (PPT) must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

Distribution of marks
There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year Second Semester. The evaluation is purely internal and will be conducted as follows:

Content	: 20 marks
Presentation including PPT	: 20 marks
Seminar Notes	: 10 marks
Interaction	: 10 marks
Report	: 25 marks
Attendance	: 10 marks
Punctuality	: 5 marks
Total	**100 marks**

7K613: GEOGRAPHIC INFORMATION SYSTEM

B Tech III Year II Sem

	L	T	P/D	C
	3	-	-	3

a	b	c	d	e	f	g	h	i	j	k	l
	X		X	X							

Course Objectives:
The student is being exposed to the subject with following Objectives:
1. To provide the basic definition of GIS and its application.
2. To understand the various model generation pattern.
3. To understand the data formats with editing and error rectification of topology.
4. To learn the basic analysis of data and interpretation of the same.
5. To understand the application of GIS in Project Planning and Execution.
6. To expose the students to the wide areas of application in Civil Engineering arena.

Course Outcomes:
On successful completion of the course, the student shall:
1. know the basic definition of GIS.
2. be able to generate various model from raw data.
3. be able to edit and rectify the topography data.
4. be capable to analyze and interpret the data generated.
5. be able to know the concept of application of GIS in Projects.
6. know the various spheres of application for Civil Engineers.

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 - Transformations.

Unit - II
Projection systems – classification – cylindrical projection – conical projection – selection of a particular projection – Fundamental concepts of GIS – Modelling Real World Features, Raster data model – Data Analysis, Local Operations, Neighbourhood Operations, ZonalOperations Physical distance measurement, Vector Data model - Comparison of Raster and Vector based Data Analysis.

Unit - III
Data formats – Spatial and non-spatial data – data collection and input – data conversion – Topology –types of topology –Rules of Topology – slivers - Editing and error rectification – topological relationships . TIN, DEM

Unit - IV

Spatial Analysis – Buffer Analysis – Variations in buffering – Applications in buffering – overlay analysis – Feature type and Overlay – Vector Overlay Methods – Network Analysis – Impedance – Shortest Path analysis – Closest facility – concepts of proximity analysis

Unit - V

GIS Project Planning – Steps in GIS Project – Software engineering as applied to GIS, GIS Project Planning, SDLC, Systems analysis and user requirement studies (only process identification).

Unit - VI

GIS Application areas – Transportation – Water Resources – Environment – Geology – Emergency Management – Agriculture – Real Estate (only the concepts and ideas); Advances in GIS – Concepts, Application of mobile and Web GIS.

TEXTBOOKS:
1. Kang-Tsung Chang, Intorduction to Geographic Information Systems, Tata McGraw Hill Publishing Company Ltd, New Delhi, 2008.
2. Peter A. Burrough and Rachael A.McDonnell, Principles of Geographical Information Systems, Oxford University Press, 2005.

REFERENCES:
1. C.P. Lo, Albert K.W. Yeung, Concepts and Techniques of Geographic Information Systems, Prentice Hall India Pvt. Ltd, New Delhi, 2002.
2. Sujit Choudhury, Deepankar Chakrabarti, Suchandra Choudhury, "An Introduction to Geographic Information Technology" I K International Publishing House Pvt. Ltd, 2008.

7K614: ENVIRONMENTAL ENGINEERING

B.Tech III Year II Sem.
               L   T P/D C
               3   0- 3

a	b	c	d	e	f	g	h	i	j	k	l
X		X	X		X						

Course Objectives:

To enable the student to

1. Know how to estimate population for the forthcoming decades and estimate head loss in water distribution pipe networks
2. Know the design aspects and analysis of water distribution system
3. Know the wastewater collection and characterisation and sewage treatment method
4. Know the layout and general outline of treatment units in a municipal wastewater treatment plant.
5. To know the design aspects and principles involved in basic treatment processes
6. To study the collection, classification, transportation and treatment of solid waste.

Course Outcomes:

At the end of the course, the student should have learnt:

1. how to design the treatment units based on the population estimation
2. basics involved in a water supply network.
3. Collection of sewage and treatment of sewage water
4. To understand the basic phenomenon/ units involved in the treatment plants.
5. To understand the basic treatment processes involved in treating water
6. About solid waste management and low cost treatment technologies

UNIT – I

Introduction: – Protected water supply – Population forecasts, design period – water demand – factors affecting – fluctuations – fire demand – water quality and testing – drinking water standards - Waterborne diseases - Comparison from quality and quantity and other considerations – intakes – infiltration galleries.

Present Scenario of Urban Sanitation in India- Basic Philosophy of Sewage Treatment-Sewerage and Sewage Treatment Technology. Basic design considerations as per CPHEEO Manual for Sewerage Treatment.

UNIT-II

Water distribution network analysis : Distribution systems – Requirements, Layout of Water distribution systems - Design procedures- Hardy Cross and equivalent pipe methods service reservoirs – joints, valves such as sluice valves, air valves, scour valves and check valves water meters – laying and testing of pipe lines – pump house.

UNIT-III

Waste water collection and characterstics: Conservancy and water carriage systems – sewage and storm water estimation – time of concentration – storm water overflows combined flow – characteristics of sewage – cycles of decay – decomposition of sewage, examination of sewage – B.O.D. – C.O.D. equations.

UNIT - IV

Waste water treatment : Layout and general outline of various units in a waste water treatment plant – primary treatment design of screens – grit chambers – skimming tanks – sedimentation tanks – principles of design – biological treatment – trickling filters – standard and high rate – Construction and design of Oxidation ponds.

UNIT – V

Water treatment: –sedimentation – principles – design factors – coagulation flocculation clarifier design – coagulants – feeding arrangements

FILTRATION AND CLORINATION: Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation comparison of filters – disinfection – theory of chlorination, chlorine demand, and other disinfection practices- Miscellaneous treatment methods.

UNIT – VI

Solid waste - definition, sources, classification and characteristics, Generation and Quantification. Collection & Transport-Collection equipments, systems of collection, transfer stations, bailing and compacting.

TEXT BOOKS:
1. Metcalf and Eddy- Wastewater Engineering, Tata McGraw Hill Publishing Company Ltd., New Delhi 2003.
2. Karia G.L. and Christian R.A. "Wastewater Treatment Concepts and Design Approach" Prentice Hall of India Pvt., Ltd., New Delhi (2001).

REFERENCE BOOKS:
1. Eckenfelder and 0' Conner - Biological Waste treatment.
2. Gaudy – Advanced Waste Water treatment.
3. Ramalho, R. S. 1983. Introduction to Wastewater Treatment Processes. New York: Academic Publishers.
4. Santosh kumar Garg. "Sewage Disposal and Air Pollution Engineering" Khanna Publishers New Delhi 2006.
5. Punmia B. C. and Arunkumar Jain, "Environmental Engineering II", Laxmi Publishers Pvt. Ltd, New Delhi, 2000.
6. P.N.Modi, "Environmental engineering I & II", Standard Publishers 2013
7. Howard S. Peavy, Donald R. Rowe, George T, "Environmental Engineering", McGraw Hill, International edition, 1985.
8. Manual on sewerage and sewage treatment-Central Public Health and Environmental Engineering Organization.

7K615: CONCRETE TECHNOLOGY

B. Tech III Year II Sem.

	L	T	P/DC
	3	0	-	3

a	b	c	d	e	f	g	h	i	j	k
x	x	x								

Course Objectives: To enable the students to
1. Learn origin and basics of cement, its manufacturing, testing and its applications.
2. Learn about aggregates and its classification and properties.
3. Learn about fresh concrete, its manufacturing process and its behaviour. Also, basics of admixtures and its impact on behaviour of concrete.
4. Understand behaviour of hardened concrete and testing of hardened concrete.
5. Learn the process of Mix-Design of concrete using IS code books.
6. Learn different types of concrete and its behaviour and applications.

Course Outcomes: At the End of the course, the student
1. Will be able to test cement and know cement applications.
2. Can appropriately assess aggregates and its properties.
3. Is able to assess fresh concrete and its behaviour on using admixtures.
4. Can evaluate and analyse behaviour of hardened concrete and testing of hardened concrete.
5. Is able to Mix-Design concrete using IS code books.
6. Is able to assess different types of concrete and its behaviour and applications.

UNIT -I
Cement
Portland cement – chemical composition, hydration, setting of cement , structure of hydrated cement –Tests on physical properties – Different grades of cement – Manufacturing process of concrete (dry-grinding and wet-grinding).

UNIT –II
Aggregates
Classification of aggregates – Particle shape & texture – bond, strength & other Mechanical properties of aggregates – specific gravity, bulk density, porosity, adsorption & moisture content of aggregate– sieve analysis – fineness modulus - Grading curves - Grading of fine & coarse aggregates – gap graded aggregate –maximum aggregate size – alkali aggregate reaction –thermal properties.

UNIT –III
Fresh concrete
Workability – Factors affecting workability – Measurement of workability by different tests - setting times of concrete - Effect of time and temperature on workability - Segregation & Bleeding - Mixing and vibration of concrete - Steps in the manufacture of concrete – Quality of mixing water.
Admixtures
Types of Admixtures – Mineral and chemical admixtures – properties – dosages – effects - usage.

UNIT –IV

Hardened concrete

Water/cement ratio - Abram's Law – Gel space ratio , Maturity concept; Compression test - Tension Test - Flexure Test - Splitting Test- Factors affecting strength - Factors affecting strength -Relation between compressive & tensile strengths

Testing of hardened Concrete

Non-Destructive Testing methods – Codal provisions for NDT - Modulus of Elasticity – Static and Dynamic modulus of elasticity- Poisson's ratio -Creep & Shrinkage of concrete and factors affecting them.

UNIT-V

Mix design

Factors in the choice of mix proportions - Durability of concrete – quality control of concrete -Statistical methods – Acceptance criteria –Proportioning of concrete mixes - BIS method of mix design for ordinary and pumpable concrete

UNIT-VI

Special concretes

Introduction to Light weight concrete – lightweight aggregates – cellular concrete – Nofines concrete – fibre reinforced concrete – polymer concrete – High performance concrete – Sulphate resistant concrete - Self compacting concrete – Bacterial concrete - Self curing concrete - Ready Mix concrete.

TEXT BOOKS:
1. Concrete Technology by M.S.Shetty – S.Chand &Co. ;7th edition, 2006.
2. Properties of concrete by A.M.Neville – Low priced edition – 5th edition, 2012.

REFERENCES:
1. Concrete Technology by A. R. Santha Kumar, Oxford university press, New Delhi,3rd edition,2006.
2. Concrete: Micro Structure, Properties and Materials – P. K. Mehta and J. M. Monteiro, Mc-Graw Hill Publishers, 4th edition, 2013.
3. Special Structural concretes by Rafat Siddique, Galgotia Publications, 1st edition, 2000.
4. Concrete Technology by M.L.Gambhir – Tata Mc.Graw Hill press, New Delhi, 5th edition,2013. 3. IS : 10262 – 2009 Recommended Guidelines for Concrete Mix Design.

7KC61: DESIGN OF STEEL STRUCTURES
(PROFESSIONAL ELECTIVE – II)

B.Tech III Year II Sem.   L   T   P/D C
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Course Objectives:
To enable the students
1. Learn and apply the design philosophies (working stress method and limit state method) for various steel structural components and their connections, as per the relevant standards.
2. Understand the Failure modes, Behaviour of compression members, Elastic buckling of slender compression members, Sections used for compression members.
3. Understand the design principles of tension members design of lug angles staggered bolting of Steel Structures to field problems.
4. To learn plastic analysis plastic hinge, plastic moment and design of laterally supported beams and laterally unsupported Beams
5. Understand the types of trusses, Estimation of loads and design of purlins, design of its members with angle sections
6. To learn design of simple slab base and gusseted base and design of plate girders optimum depth design of main section.

Course Outcomes:
At the end of the course, the student
1. Attains fundamental knowledge of the design of various Steel Structures and connections and is able to interpret the specifications of relevant codes.
2. Gets adequate knowledge and skills to apply the design principles to field problems.
3. Is able to design principles to field problems of tension members.
4. Is able to draw, understand and interpret the detailing aspects of steel structural drawings.
5. Is able to investigate into the critical issues of steel structures, compare various options and chose the best solution for the problems in the area of steel structures.
6. Is able to design the end bearing Stiffness and intermediate stiffness.

UNIT- I:
Materials and Specifications: Chemical composition of steel, types of Structural
Steel - classification of Rolled Steel Sections.
Loads and Load Combinations: Design Loads & load Combinations; Characteristic Loads, Partial safety factors for materials and loads.
Bolted Connections (Limit State Method): Introduction, Behaviour of Bolted joints, Design strength of ordinary Black Bolts, Design strength of High Strength Friction Grip bolts (HSFG).
Welded Connections (Limit State Method): Introduction, Welding process, Welding electrodes, Advantages of Welding, Types and Properties of Welds, Types of joints, Weld symbols, Weld specifications, Effective areas of welds, Design of welds, Simple joints, Moment resistant connections,

UNIT –II:
Design of Compression Members: Introduction, Failure modes, Behaviour of compression members, Elastic buckling of slender compression members, Sections used for compression members, Effective length of compression members, Design of compression members.

UNIT- III:
Design of tension members (Limit State Method): Introduction to tension members - Applications of tension members, Modes of Failure, Design of Tension Members –Design of Lug Angles - Staggered bolting.

UNIT –IV:
Design of Beams (Limit State Method) : Introduction to Plastic Analysis – Plastic Hinge, Plastic moment, Shape factor; Classification of Cross Sections, Design of Laterally Supported beams and Eccentric connections.

UNIT –V:
Design of Roof trusses (Limit State Method): Types of trusses, Estimation of loads- dead load, live load and wind load, Design of Purlins, Analysis of roof trusses and design of its members with angle sections.

UNIT –VI:
Design of Column Bases - Design of simple slab base and gusseted base.
Design of Plate girders - optimum depth design of main section- design of end bearing Stiffness and intermediate stiffness.

TEXT BOOKS
1. Design of Steel Structures -, N.Subramanian, Oxford, 2008.
2. Limit State Design of Steel Structures 2nd EDITION –S.K .Duggal. TATA Megra Hill 2010

REFERENCE BOOKS
1. Design of steel structure – K. S Sai Ram, Person Education.2010
2. Design of steel structure Ashok Kumar Jain ,B.C Punmia, Arun Kumar Jain LAXMI PUBLICATIONS (P)LTD.1998
3. IS800-2007, General Construction in Steel - Code of Practice.
4. Steel Tables as per IS 800, Birla Publications Pvt. Ltd.

7KC62: CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT
(PROFESSIONAL ELECTIVE – II)

B.Tech III Year II Sem.

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Course Objectives: To enable the students:
1. Understand Earth's climate system.
2. Understand Global Circulations.
3. Understand Climate change.
4. Understand impacts of Climate change.
5. Grasp Climate change adaptation and mitigation measures.
6. Grasp various Clean technologies for sustainable development

Course Outcomes: Atthe end of the course the student is able to:
1. Identify factors influencing global climate systems.
2. Identify global circulation systems.
3. Assess climate change on global and local scales
4. Assess impacts of climate change on global and local scales.
5. Develop strategies for adaptation and mitigation measures.
6. Identify clean technologies for sustainable development.

Unit –I:
Earth's Climate System: Introduction-Climate in the spotlight -The Earth's Climate Machine –Climate Classification -Global Wind Systems –Trade Winds and the Hadley Cell –The Westerlies -Cloud Formation and Monsoon Rains –Storms and Hurricanes.

Unit –II:
The Hydrological Cycle –Global Ocean Circulation –El Nino and its Effect -Solar Radiation –The Earth's Natural Green House Effect –Green House Gases and Global Warming –Carbon Cycle.

Unit –III:
Climate Change: Observation of Climate Change –Changes in patterns of temperature, precipitation and sea level rise –Observed effects of Climate Changes –Patterns of Large Scale Variability –Drivers of Climate Change –Climate Sensitivity and Feedbacks –The Montreal Protocol –UNFCCC –IPCC –Evidences of Changes in Climate and Environment –on a Global Scale and in India.

Unit –IV:
Impacts Of Climate Change: Impacts of Climate Change on various sectors – Agriculture, Forestry and Ecosystem –Water Resources –Human Health –Industry,

Settlement and Society –Methods and Scenarios –Projected Impacts for Different Regions–Uncertainties in the Projected Impacts of Climate Change –Risk of Irreversible Changes.

Unit –V:

Climate Change Adaptation And Mitigation Measures: Adaptation Strategy/Options in various sectors –Water –Agriculture –-Infrastructure and Settlement including coastal zones –Human Health –Tourism –Transport –Energy –Key Mitigation Technologies and Practices –Energy Supply –Transport –Buildings –Industry –Agriculture –Forestry -Carbon sequestration –Carbon capture and storage (CCS).

Unit –VI:

Clean Technology And Energy: Clean Development Mechanism –Carbon Trading-examples of future Clean Technology –Biodiesel –Natural Compost –Eco-Friendly Plastic –Alternate Energy –Hydrogen –Bio-fuels –Solar Energy –Wind –Hydroelectric Power –Mitigation Efforts in India and Adaptation funding.

Text Books:

1. Anil Markandya, Climate Change and Sustainable Development: Prospects for Developing Countries, Routledge, 2002.
2. Heal, G. M., Interpreting Sustainability, in Sustainability: Dynamics and Uncertainty, Kluwer Academic Publ., 1998

References:

1. Jepma, C.J., and Munasinghe, M., Climate Change Policy –Facts, Issues and Analysis, Cambridge University Press, 1998
2. Munasinghe, M., Sustainable Energy Development: Issues and Policy in Energy, Environment and Economy: Asian Perspective, Kleindorfor P. R. et. al (ed.), Edward Elgar, 1996
3. Dash Sushil Kumar, "Climate Change –An Indian Perspective", Cambridge University Press India Pvt. Ltd, 2007

7KC63: AIRPORT PLANNING & DESIGN
(PROFESSIONAL ELECTIVE – II)

B Tech III Year II Sem

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Course Objectives:
1. To understand the basic concepts of air transport planning.
2. To identify the factors affecting airport master plan.
3. To study the basic concepts of airport capacities and performance measures.
4. To study the standard principles of airport layout and runway orientation.
5. To understand the various airport forecast methods.
6. To study the significance of passenger and cargo terminal facilities.

Course Outcomes:
At the end of the course the student should have learnt,
1. To determine different gauges existing in India and world and gauge significance.
2. To understand the guidelines and elements of airport master plan preparation.
3. To evaluate the performance of airport in terms of capacity and level of service.
4. To identify factors affecting runway orientation and airport layout.
5. To carry out airport forecasts and air mode choice modeling.
6. To identify the need and functionalities of passenger and cargo facilities.

UNIT – I
Airport Planning: Aviation Planning - Levels of Planning - Planning Airport Systems under different States - Effect of Airline Hubs and Deregulation on Indian Airport System - Air Transport Planning in the India and in Europe/USA.

UNIT – II
Airport Master Planning: Airport Master Plan:- Definition and Objectives - Hierarchy of Planning - Elements of Airport Master Plan: - FAA - ICAO Guidelines for Structure of Master Plan – Airport Layout Design - Structure of Master Plan Report - Airport Site Selection.

UNIT – III
Airport Capacity: Capacity - Level of Service - Airside Capacity - Factors Affecting Airside Capacity and Delay - Determination of Runway Capacity and Delay - Annual Service Volume - Preliminary Capacity Analyses - Calculating Aircraft Delay - Taxiway and Gate Capacity -Airport Landside Capacity.

UNIT – IV

Airside Configuration and Geometric Design of the Airside: Principles of Airport Layout - Airfield Configuration - Runway Orientation – Obstructions to Airspace: - FAA and ICAO Standards - Runway Length - Separation of Parallel Runways- Runway and Taxiway Cross

Section - Longitudinal-Grade Design for Runways and Stopways - Longitudinal-Grade Design for Taxiways -Taxiway Design - Holding Aprons - Terminal Aprons.

UNIT – V
Forecasting Air Transport Demand: Conventional Airport Forecast Methods - General Aviation Forecasts - Airport ground access mode choice modeling process - Use of airport ground access models in airport planning - Integration of airport ground access models in regional planning process.

UNIT – VI
Passenger and Cargo Terminal: Function of Airport Passenger and Cargo Terminal - Facilities Required at Passenger Terminal - Passenger and Baggage Flow - Elements to Be Considered in Design of Air Freight Terminals - Example of Design of Middle -Technology Freight Terminal.

TEXT BOOKS:
 1. Airport Engineering by Khanna & Arora – Nemchand Bros, New Delhi.
 2. Norman J. Ashford, Saleh Mumayiz, Paul h. Wright; Airport Engineering Planning,Design, and Development of 21st century Airports, John Wiley & Sons, Inc.,2011

REFERENCES:
 1. 'Airport Engineering' by Virendra Kumar, DhanpatRai Publishers, New Delhi.
 2. 'Highway, Railway, Airport and Harbour Engineering' by Subramanian KP, Scitech Publications (India) Pvt. Limited, Chennai.
 3. 'Transportation Engineering' by Srinivasa Kumar R, University Press, Hyderabad.

7KC64: SOIL MECHANICS - II
(PROFESSIONAL ELECTIVE – II)

B Tech III Year II Sem

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Course Objectives

1. To learn about the basics of theory of vibrations
2. To learn about properties of soils under dynamic loading and liquefaction phenomenon
3. Exposed to the Soil structure interaction under dynamic loads and earth pressure
4. To study thedesign criteria of machine foundations
5. Exposed to graphical and analytical methods to determine the lateral earth pressure
6. To analyse and design earth retaining structures

Course Outcomes: To acquire knowledge about

1. Theory of vibrations, spring-mass system, and wave propagation
2. Dynamic properties of soils and liquefaction related phenomenon
3. Soil structure interaction under dynamic loads, earth pressure, design of retaining walls and slopes, and pile dynamics
4. Design criteria of various types of machine foundations and IS codal procedures
5. Graphical and analytical methods to determine the lateral earth pressure under various influencing factors
6. Analysis and design of all types of earth retaining structures for the stability against sliding, overturning and bearing failure

UNIT – I

Theory of vibrations: Definitions, properties of harmonic motion, free vibrations of a spring-mass-system, undamped and damped free vibrations, forced vibrations with damping, frequency dependent exciting force, system under transient forces, Reyleigh's method, logarithmic decrement, determination of viscous damping, transmissibility, vibration isolator; Wave propagation in an elastic rod, elastic infinite medium, and semi-infinite elastic half space, waves generated by a surface footing.

UNIT – II

Dynamic Soil properties: representation of stress conditions by the Mohr Circle, measurement of dynamic soil properties-Field and laboratory tests; Stress-strain behavior of cyclically loaded soils: equivalent and cyclic nonlinear models; Strength of cyclically loaded soils-definition of failure, cyclic strength and monotonic strength

UNIT – III

Soil structure interaction: Illustration soil-structure interaction effects and methods of analysis; Dynamic earth pressure and retaining walls, modification of coulomb's theory, modified Cullman's soils, displacement analysis, Indian standard code of practice,ϕconstruction, analytical solutions for c- pile hammers, effect of vibrations on piles,

method of analysis of piles under lateral loads, solution for piles in non-cohesive and cohesive soils, soil-pile interaction under dynamic loads, method of a seismic analysis and design of piles

UNIT – IV

Machine foundations –criteria for a satisfactory machine foundation, methods of analysis, degrees of freedom of a block foundation, definition of soil spring stiffness; vertical, sliding, rocking, and yawing vibrations of a block; simultaneous rocking, sliding, and vertical vibrations of a block, Indian standard for design and construction of foundations for reciprocating machines; design procedure for a block foundation; vertical vibrations according to the elastic half space theory, sliding, rocking, and torsion vibrations according to the elastic half space theory, foundations for impact machines and Indian standard design procedure, vibration isolation and screening waves

UNIT – V

Types of earth pressures, Rankine's theory, Backfill features, Soil type, surface inclination, loads on surface, soil layers, water level, Coulomb's theory, Effect due to wall friction and wall inclination, Graphical methods, Earthquake effects.

UNIT – VI

Rigid retaining structures, Types, Empirical methods, stability analysis Flexible Retaining structures, Types, Material, Cantilever sheet piles, Anchored bulkheads, free earth method, fixed earth method, moment reduction factors, anchorages, Cofferdams, diaphragm walls.

Text Books:

1. Alexander Major, Dynamics in Soil Engineering, Akademiai,1980

2. Braja M Das, Principles of soil dynamics, Cengage Engineering, 2014.

References

1. Colin JFP Jones, Earth reinforcement and soil structures, 3rd edition, Thomas Telford Ltd, London, 1996

2. G L Sivakumar Babu, An introduction to soil reinforcement and geosynthetics, second edition, universities press Pvt. Ltd., Hyderabad, 2009

3. Bharat Bhushan Prasad, Fundamentals of soil dynamics and Earthquake engineering, prentice hall India learning Pvt. Ltd., 2009

7FC03 :PYTHON PROGRAMMING
(Open elective – II)

B Tech III Year II Sem

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Course Objectives:-

After taking this course, you should be able to:

Use Python interactively, execute a Python script at the shell prompt, use Python types, expressions, and None, use string literals and string type, use Python statements (if...elif..else, for, pass, continue, . . .), understand the difference between expressions and statements, understand assignment semantics, write and call a simple function., utilize high-level data types such as lists and dictionaries, understand the difference between mutable and immutable types, write a simple class and access methods and attributes, import and utilize a module, read from and write to a text file.

Course Outcomes:

CO1:   Gains exposure towards Python versions and their specifications.
CO2:   Build programs using primitive data types.
CO3:   Write applications that include functions, modules, packages along with respective exceptional handling mechanism.
CO4:   Writes applications using OO features of Python
CO5:   Write applications using Files.
CO6:   Hands on exposure on NumPy/Tkinter/Plotpy modules.

Unit -I :
Introduction to Python: History, Features, Modes of Execution, Setting up path, working with Python Basic   Syntax, Variable and Data Types, Operators.   Conditional Statements (If, If- else, Nested if-else) Looping (for, While Nested loops) Control Statements (Break, Continue, Pass).
Input-Output: Printing on screen, Reading data from keyboard, Opening and closing file

Unit-II:
Functions: Defining a function, calling a function, Types of functions, Function Arguments, Anonymous functions, Global and local variables
String Manipulation: Accessing Strings, Basic Operations, String slices, Function and Methods
Lists: Accessing list, Operations, Working with lists Function and Methods
Tuple: Accessing tuples, Operations, Working.
Dictionaries: Accessing values in dictionaries, working with dictionaries, Properties Functions and Methods.
Unit-III:
Modules: Importing module, Math module, Random module, Packages
Exception Handling: Exception, Exception Handling, Except clause, Try? Finally clause User Defined Exceptions

Unit-IV:
Python- OOPs concept: Class and object, Attributes, Inheritance, Overloading Overriding, Data hiding.
Regular expressions: Match function, Search function, Matching VS Searching, Modifiers Patterns.

Unit -V: Introduction to Files, File Handling, Working with File Structure, Directories, Handling Directories

Unit -VI: Case Study with NumPy/PlotPy/SciPy/GUI Programming, Introduction, Tkinter programming, Tkinter widgets

TEXT BOOK:
1. [Apress]-Beginning Python. From Novice to Professional, 2nd ed. - [Hetland] (2008)

Reference books:
1. Introduction to Computation and Programming using Python, Revised and Expanded Edition, John V. Guttag, The MIT Press.
2. Programming Python, Fourth Edition by Mark Lutz, O'Relly
3. Python Programming using problem solving approach, Reema Thareja, Oxford Higher Education.

7ZC23: Advanced Entrepreneurship
(Open elective – II)

B Tech III Year II Sem

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Course Objective: The course is designed to impart the necessary managerial skills and tactics required for an emerging Entrepreneur for the Engineering students to enhance their prospects as an Entrepreneur.

Course Outcomes:

- The Students' gain knowledge on the stages of Startup and the turbulence environment it undergoes and the stages related to growth of the Startup.
- The Students are exposed to the various business models and critically evaluating the effectiveness of the business models and products
- The students understand the method of business traction, create roles and build their A- team
- The students understand the various channels of revenue building and exploration of new revenue avenues.
- The students understand the need of sales planning and people plan and also financial modeling
- The students are exposed to the legal implications affecting the company's prospects and identifying right mentors and advisors to support startups

Unit – I: Fundamentals of Entrepreneurship & Refining Business Model and Product:

Fundamentals and key concepts of entrepreneurship, refining the business model, products and services, pivoting, types of business models, business model evolution, generating new business models, analyzing the business model, adding new customer segment, product manager, significance and role of product manager.

Unit – II: Business Planning & Exploring Revenue:

Business plan, sales plan, hiring sale team, people plan, financial planning, financial forecasting, create a procurement plan, negotiating role play, understanding primary revenue sources, exploring customer lifecycle for growth customers, exploring and identify secondary sources of revenue,

Unit- III: Funding the Growth & Building the A-Team:

Overview of funding, funding options for an entrepreneur, explore the right funding options, create funding plan, pitch deck, introduction to building A-Team, pitching to attract the talent, setting your team, defining roles, hiring the A-Team members.

Unit- IV: Brand and Channel Strategy & Leveraging Technologies:

Introduction to branding, drawn the venture's golden circle, positioning and positioning statements, creating brand name, logo, social media handle, Identify right channels, leaping ahead with technology, digital marketing for startups, plan a social media campaign, digital collaboration, store documents online, other technology platforms, make tech plan, platform wish list.

Unit V: Measuring Progress and Legal Matters:

Metrics for customer acquisition (CAC, CLV, and ARPU), metrics for customer retention and satisfaction, find CAC, CLV and ARPU, key financial metrics, communicate metrics, new revenue stream through key financial metrics, re-forecasting of financial plan, identify professional help for legal and compliance requirements, searching of trademark and brand name and company name.

Unit –VI: Seeking Support and Final Project:

Mentors help to create successful startups, identify mentors and advisors, importance of mentors and advisors, scout the board of directors, overview on final project, capstone project presentation, contents of capstone project.

ESSENTIAL READINGS:
- Entrepreneurship Rajeev Roy "" oxford ,2012
- Entrepreneurship Development Khanka, ,S.Chand 2012

SUGGESTED READINGS:
- Small Scale industries and Entrepreneurship Vasanth Desai "Himalya publishing 2012
- Robert Hisrich et al "enterpreneruship TMH 2012
- Entrepreneurship Development Khanka, ,S.Chand 2012
- Entrepreneurship Development B.Janikairam and M Rizwana
- e-source: - www.learnwise.org

7ZC19:ENTREPRENEURSHIP, PROJECT MANAGEMENT AND STRUCTURED FINANCE
(Open elective – II)

B Tech III Year II Sem

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Course Objective: The objective of the course is to make students understand the nature of Entrepreneurship, its importance and to create an awareness regarding the systematic planning and implementation of projects; highlight the components of structured finance and establish a framework of CMBS with respect to Servicing Agreements

Course Outcomes:

1. Students will understand the nature of Entrepreneurship andits importance
2. Will gain knowledge regarding project, its life cycle and organization
3. Will gain knowledge relating to project formulation and implementation
4. Comprehend the components of structured finance
5. Establish a framework of CMBS
6. Students will gain knowledge relating to the CRE Servicing

UNIT I
CONCEPTS OF ENTREPRENEURSHIP: Definition of Entrepreneurship, Evolution of Entrepreneurship, Classification of Entrepreneurs**,** Characteristics of Entrepreneur**,** Selection of Product and the means required for starting an enterprise, Financing and Financial incentives available, Successful Indian Entrepreneurs.

UNIT-II
BASICS OF PROJECT MANAGEMENT: Concept and characteristics of a project - types of projects - Objectives of project management - Project Organizational structure - Project life cycle - Challenges and problems of project management - Qualities & functions of a project manager.

UNIT III
PROJECT FORMULATION AND IMPLEMENTATION: Generation of Project Ideas; Monitoring the environment; Preliminary Screening of Projects; Feasibility study; Project Selection. Detailed Project Report: Market, Technical, Financial and Economic aspects.Pre-requisites for Successful Project Implementation; Control of in-progress Projects (Gantt chart, PERT, CPM – Only Theoretical Concepts); Project Risk Management Process, Post-audit; Abandonment Analysis

UNIT-IV
INTRODUCTION TO STRUCTURED FINANCE: Term Loans, Bonds/Debentures, Types of debentures, Issue of debt instruments. Structured Finance: Evolution, Securitization

process, characteristics, and structured finance products (ABS, CDO, MBS, CDS); Property types, characteristics and property performance

UNIT-V
COMMERCIAL MORTAGAGE LOAN BASICS: Definition and characteristics of CMBS, CMBS Vs other Mortgage Backed Securities, CMBS three level perspective: property level, loan level, bond level; Life cycle of commercial real estate loans – Loan cycle, Key players in loan cycle.

UNIT-V1
BASICS OF CRE SERVICING: Introduction to servicing, Role of the Servicer, Servicing approaches, Influence of technology, Ethics in commercial servicing, Servicing – sources of income, Overview of servicing agreements, Pooling & Servicing agreement, Sub servicing agreement.

ESSENTIAL READINGS:

- H. Nandan, Fundamentals of Entrepreneurship, Prentice Hall of India, First Edition, New Delhi, 2007.
- Jeffrey K. Pinto "Project Management", 2nd edition, Pearson
- Dhandapani Alagiri "Structured Finance – Concepts & Perspectives", ICFAI University press.

SUGGESTED READINGS:

- Projects by Prasanna Chandra, McGraw-Hill Publishing Co. Ltd
- Project Management: Systems approach to Planning Scheduling and Controlling, H. Kerzner.
- The Complete Real Estate Documents by Mazyar M. Hedayat, John J. Oleary
- The Fundamentals of Listing and Selling Commercial Real Estate - By Keim K. Loren (Author)

7ZC26: Basics of Polity and Ecology
(Open elective – II)

B Tech III Year II Sem

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Course Objectives:

To provide basic knowledge relating to the Ecology and Disaster Management, thus making the students appreciate the current aspects related to both Ecology and Disaster Management.

Course outcomes:

CO1: Comprehend knowledge relating to the conservation of the environment.

CO2: Learn about bio-diversity and climatic changes occurring in the environment.

CO3: Know about the international treaties, conventions and organizations active in the field of environmental protection.

CO4: To provide students an exposure to disasters, their significance and types.

CO5: To enhance awareness of institutional processes in the country

CO6: To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)

Unit I ECOLOGY AND ENVIRONMENT : Environment-Origin, Evolution of Environment and its uses by Humans; Degradation of Natural Environment, Principles of Ecology; Composition and various types of Ecosystem; International Solar Alliance.

Unit II BIO-DIVERSITY AND CLIMATE CHANGE: Classification of Biodiversity, Biodiversity loss, Methods of biodiversity conservation, Conservation of Natural Resources such as Soil, Land, Water and Energy. Sustainable Development and Cleaner Technology. Greenhouse effect and Global Warming, Strategies to cope with Green House Effect, Desertification, Depletion of ozone layer.

Unit III INTERNATIONAL TREATIES, CONVENTIONS & ORGANIZATIONS: Indian Board for Wildlife (IBW). United Nations Environmental Programme (UNEP), United Nations Framework Convention for Climate Change (UNFCCC). International Union for conservation of Nature and National Resources (IUCN), World Wide Fund for Nature (WWF).Montreal Protocol (1987), Kyoto Protocol (1997), Paris Agreement (2016).

UnitIV: INTRODUCTION TO DISASTERS: Concepts and definitions (Disaster, Hazard, Vulnerability, Resilience, Risks) Disasters – Classification, Causes, Impacts (including

social, economic, political, environmental, health, psychosocial, etc.). Differential impacts – in terms of caste, class, gender, age, location, disability

Unit V: DISASTER MANAGEMENT IN INDIA: Hazard and vulnerability profile of India. Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management; Institutional arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Other related policies, plans, programs and legislation); Case studies.

Unit VI: APPROACHES TO DISASTER RISK REDUCTION: Disaster cycle – its Analysis, Phases. Culture of safety, prevention, mitigation and preparedness; Community-based DRR: Structural and nonstructural measures, roles and responsibilities of community, Panchayati Raj Institutions / Urban Local Bodies (PRIs / ULBs), district administration, states, centre, and other stakeholders; Case studies.

ESSENTIAL READINGS:
- Environment and Ecology – Anil Kumar De and Arnab Kumar De, 2009, New Age International (P) Limited.
- B. K. Khanna: "Disasters: All you wanted to know about", New India Publishing Agency, New Delhi
- Amita sinvhal ,"Understanding earthquake disasters"TMH,2010

SUGGESTED READINGS:

- ICSE Environment Education for Class X – Dr. M.P. Mishra , 2009, S.Chand and Company
- Pradeep sanhi,Madhavi malalgoda and arya bandhu,"Diasaster risk reduction in south asia "PHI

7K671: GEOGRAPHICAL INFORMATION SYSTEMS LABORATORY

B Tech III Year II Sem

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Course Objectives:
1. The student shall be trained to extract geographic data from toposheet.
2. The student shall learn to digitize the various features and define their attributes.
3. The student shall learn to generate maps with defined patterns.

Course Outcomes:
1. The student will be able to extract various details from the topography survey map.
2. The student shall be able to convert the raw data into vector and raster forms.
3. The student shall be able to generate maps with various geographic features.

Laboratory Experiments
1. Georeferencing of Toposheet / satellite Imagery and verification
2. Digitization of Points and Lines
3. Digitization of polygons
4. Editing Map Elements
5. Attribute Date Entry and Manipulation
6. Cleaning, Building and Transformation
7. Vector data Analysis – Overlay
8. Vector data Analysis - Buffer
9. Raster data analysis
10. Map Generation With Patterns and Legends
11. Network Analysis
12. Interpolation Methods

References
1. Q GIS manuals
2. LABORATORY MANUAL

7K672: ENVIRONMENTAL ENGINEERING LABORATORY

B. Tech III Year II Sem.   **L   T   P/D   C**
                                                                      -   -   3   1.5

a	b	c	d	e	f	g	h	i	j	k	l
X		X	X								

Course Objectives:

To enable the students,

1. Conduct common environmental experiments relating to water and wastewater quality.
2. Interpret laboratory results and report the values in comparison with environmental quality standards.
3. Apply the laboratory results for problem identification, quantification, and basic environmental design.

Course Outcomes:

At the end of the course, the student should have learnt:

1. to establish water and wastewater quality, and know which tests are appropriate for given environmental problems?
2. to Statistically analyse and interpret laboratory results.
3. to use the water and wastewater sampling procedures and sample preservations.
4. to Obtain the necessary background for subsequent courses in environmental engineering.

List of experiments:

1. Determination of pH and Turbidity
2. Determination of Conductivity and Total dissolved solids.
3. Determination of Alkalinity/Acidity.
4. Determination of Chlorides.
5. Determination and Estimation of total solids, organic solids and inorganic solids.
6. Determination of iron.
7. Determination of Dissolved Oxygen.
8. Determination of Nitrogen.
9. Determination of total Phosphorous.
10. Determination of B.O.D
11. Determination of C.O.D
12. Determination of Optimum coagulant dose.
13. Determination of Chlorine demand.
14. Presumptive coliform test.

References

1. Laboratory Manual

7K673: COMPUTER APPLICATIONS IN CIVIL ENGINEERING LABORATORY

B. Tech III Year II Sem.

		L	T	P/D	C
		-	-	3	1.5

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x		x							

Course Objectives:
1. To expose the students to various computer programming skills related to Civil Engineering field.
2. To empower the students to develop programs using Excel /other related software's.

Course Outcomes:
At the end of the course the student will be able to:
1. Use Excel sheets for Civil Engineering applications.
2. Write computer programs for structures with various loading and support conditions using Civil Engineering related software such as STAAD Pro.

List of Experiments:

Using Excel application

1. Design of RCC beams and slabs.
2. Design of Axially loaded short column.
3. Calculation of vertical stresses of Pressure Bulb under a concentrated load.
4. Calculation of Runoff for a given area.

Using StaadPro. Software

5. Analysis of continuous beam with different loading conditions.
6. Analysis of Frame with different loading conditions.
7. Analysis and Design of Column.
8. Analysis and Design of a single storied Building.
9. Analysis and Design of a multi storied Building under seismic and wind load.
10. Analysis and Design of a Simple Truss.
11. Determine the stresses in footing to the given loads.
12. Design of footing for the given loading condition.

References
1. Laboratory Manual

7HC74: SOFT SKILLS AND TECHNICAL COMMUNICATION

B. Tech III Year II Sem.   **L – T –P/D - C**
                                                                        0   0   2   1

A	B	C	D	E	F	G	H	I	J	K	L
							X	X	X		X

Course Objectives:
The objective of the course is to help students in up-skilling themselves to meet the expectations of the industry. The course tries to sharpen the soft skills and the technical communication skills of the students and churn them out as promising assets to the organizations they work for, in future

Programme Outcomes: Students will be able to
  ➢ make a self-assessment
  ➢ enhance their soft skills and behavioral patterns
  ➢ equip themselveswith the required skillset for their career advancement
  ➢ develop interpersonal communication skills
  ➢ participate in group tasks and use effective language skills in interviews
  ➢ overcome stress and enhance employability quotient
  ➢ practice technical communication with ease

Unit 1: Know Yourself – SWOT / SWOC Analysis
  1. **Introduction: Importance of knowing yourself**
  2. **Meaning of SWOT / SWOC**
  3. **SWOT / SWOC analysis**
  4. **Benefits of SWOT / SWOC analysis**
  5. **SWOT / SWOC grid**
Emotional Intelligence
  1. Nature and significance of Emotional Intelligence
  2. Five basic competencies of Emotional Intelligence according to Goleman:
     a. Self-awareness   b. Self regulation   c. Motivation   d.
     Empathy
       e. Social skills.
  3. Strategies to enhance Emotional Intelligence

Unit 2:Soft Skills-I
  1. Introduction to Soft skills
  2. Definition of Soft Skills. Difference between Soft Skills and Hard Skills
  3. Importance of Soft Skills
  4. **Positive Attitude:** Meaning; Difference between Attitude and Behavior
  5. Attitude Building
  6. Need for developing Positive Attitude

  Goal Setting
    1.The purpose of Goal setting
    2.Types of Goals
    3. How to set SMART goals

Time Management
    1. Need and Importance of Time Management
    2. Scheduling and Prioritizing tasks
    3. Identifying major time wasters

Unit 3:Soft Skills-II

Team work and Team Dynamics
    1. Introduction
    2. Team Vs Group
    3. Stages of team building
    4. Characteristics of an effective team, role of a team leader
Problem Solving
    1. Definition
    2. Skill sets in Problem solving
    3. Steps in solving problems
Decision Making
    1. Decision making: Definition, Importance of Decision Making.
    2. Decision Making process

Unit 4: Technical Communication
    1. Definition and importance of Technical Communication
    2. Types of Technical Communication
    3. Report writing: Significance, types, steps, layout and Mechanism
    4. Review of technical articles.

Unit 5: Etiquette and Stress Management
    1. **Etiquette: Introduction and classification**
    2. Work place etiquette
    3. Strategies to handle Stress

Unit 6:Résumé Writing andInterview Skills
Résumé: Introduction
    1. Types of Résumé
    2. Difference among Bio-data, Curriculum Vitaé and Résumé
    3. Resume writing: Purpose and Design
    4. Tips to write a winning Resume.
    5. Cover letter
Interview Skills
    1. Meaning and purpose of an Interview
    2. Types of interviews (Face to Face / Panel Interviews/Telephonic interviews etc.)
    3. Interview Preparation techniques
    4. Common mistakes
    5. Dress code at an interview
    6. FAQs in HR Interview
    7. Mock Interviews

7H619: LOGICAL REASONING
(Common to All Branches2019-20)

L T P/D C
1 1 0 2

B. Tech III Year Semester-II

a	b	c	d	e	f	g	h	i	j	k	l
X											

Pre Requisites: Nil

Course Outcomes: *Students will able to answer*

1. *The questions given on series completion and analogy.*
2. *The questions given on odd one out in classification and coding and decoding.*
3. *The questions given on blood relations.*
4. *The questions given on directions and Arithmetical reasoning.*
5. *The questions given on Venn diagrams, cubes and dice. .*
6. **The questions given on clocks and calendar.**

Unit–I: Series Completion: Number Series, Alphabet Series, Alpha – Numeric Series.
Analogy: Completing the Analogous Pair, Simple Analogy, Choosing the Analogous pair, Double Analogy, Word Analogy, and Number Analogy.

Unit–II: Classification / Odd One Out: Word Classification, Number Classification and Letter Classification.Coding – Decoding: Letter Coding, Number Coding, Matrix Coding, Substitution, Deciphering Message Word Codes, Jumbled Coding.

Unit–III: Blood Relations, Deciphering Jumbled up Descriptions, Relation Puzzle – Direction sense test.Number, Ranking & Time Sequence Test –Mathematical Operations.

Unit –IV: Directions, Arithmetical Reasoning.Puzzle Test: Classification Type Questions, Seating Arrangements Comparison Type Questions, Sequential Order of Things, Selection Based on given conditions, Family – Based Puzzles, Jumbled Problems.

Unit –V: Assertions and Reason– Logical Venn Diagrams – Alpha Numeric Sequence Puzzle. Cubes and Dice – Analytical Reasoning .Logical Deduction: Logic, Statement – Arguments,

Unit – VI: Clocks & Calendar .Data Sufficiency and Syllogism.

Text Books:
1. Verbal and Non Verbal Reasoning by R.S.Agarwal.
2. Quantitative Aptitude and Reasoning, R.V.Praveen, Second Edition, PHI Learning Pvt. Ltd.

7K680: Group Project

B. Tech III Year II Sem.   L   T   P/D   C
                                                                 -    -   4   2

Course Objectives:
> To acquire basic knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

Course Outcomes: After completing this course, student shall be able to

1. Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
2. Exhibit the interest in learning the modern tools and technologies.
3. Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs to the marked and society as a whole.
4. Improve their communication skills and team work skills.
5. Work as in individual and in a team.

A group project shall be carried out by a group of students consisting of 2 to 3 in number. This work shall be carried out under the guidance of the faculty assigned as internal guide and shall involve field work, design, testing, laboratory experiments, design, model preparations, software development or any other significant activity. This can be interdisciplinary nature also.

There will be 100 marks in total with 30 marks of internal evaluation and 70 marks of external evaluation.

Internal Evaluation:
        Day to day work   : 10 marks
        Report   : 10 marks
        Presentation   : 10 marks
                                   ----
                        30 marks

End examination   : **70 Marks.**

The end examination will be carried out by a committee consisting of an external examiner, head of the department, a senior faculty member and the supervisor.

7K689: COMPREHENSIVE VIVA VOCE –II

B. Tech III Year II Sem.   L   T   P/D   C
                                                     -     -   -   1

Course Objectives:
Prepare students in basics and advanced relevant courses to revise and face technical interviews for enhancing employability.

Course Outcomes: After completing this course, student shall be able to

6. Assess the relevant courses they have undergone till the completion of that academic year.
7. Assessment is done in the relevant courses they have undergone till the completion of that academic year.
8. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.
9. They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.

There will be 100 marks in total with 30 marks of internal evaluation and 70 marks of external evaluation.

Internal:
Comprehensive Viva Voce is Conducted twice in a semester and evaluated for 15 marks each.

End examination   :   **70 Marks.**

The end examination will be carried out by a committee consisting of an external examiner, head of the department, a senior faculty member and the supervisor.

7K717: FINITE ELEMENT METHOD FOR CIVIL ENGINEERS

B. Tech IV Year I Semester

L	T	P/D	C
3	1	-	3.5

a	b	c	d	e	f	g	h	i	j	k	l
x	x		x			x					

Course objectives:

The student:

1. Understands the basic equations in elasticity, and fundamental concepts and limitations of finite element method using equations of elasticity as reference.
2. Studies application of FEM methodology for the analysis of one dimensional problem.
3. Studies application of FEM methodology for the analysis of two dimensional problems
4. Studies formulation of four nodded element Iso-parametric formulation
5. Understands the concepts of numerical integration techniques.
6. Understands how to use ANSYS software for structural engineering problems

Course outcomes:

On successful completion of the course, students will have ability to:

1. Apply Rayleigh-Ritz (Potential energy) method to structural engineering problems.
2. Generate and solve the governing FE equations for one-Dimensional problems.
3. Generate and solve the governing FE equations for two-Dimensional problems.
4. Able to formulate FE equations for four nodded Iso-parametric element.
5. Able to apply the numerical integration technique to FEM problems.
6. Analyze structural elements using ANSYS software.

UNIT-I

Introduction to Finite Element Method – Usefulness of FEM method; Basic Equations in Elasticity – stress strain equations ; Strain displacement relations; concept of plane stress – plane strain; Potential energy principle –Rayleigh – Ritz method; About Galerkin's method (only concept); Errors in FEM.

UNIT-II

Finite Element Analysis (FEA) of – one dimensional problems – bar element – shape functions; stiffness matrix; strain and stress calculations;treatment of boundary conditions; Assembly of global stiffness matrix; FEA Beam elements – Hermite shape functions- stiffness matrix; strain and stress calculations – continuous beams.

UNIT-III

FEA Two dimensional problem – CST element; About LST element (only concept) – shape function – strain and stress calculations; About Lagrangian – Serendipity elements (only concept).

UNIT-IV

Iso-parametric formulation – Concepts of iso-parametric elements for 2D analysis – formulation of 4- noded iso-parametric quadrilateral elements.

UNIT-V

Numerical Integration, One point and two point Gaussian Quadrature; Static condensation.

UNIT-VI

Introduction to ANSYS, Illustration on different modules of ANSYS / Structural engineering applications of the package/Creation of a simple 1-D model, 2-D model and a 3-D model/ analysis and post processing of the results.

TEXT BOOKS:

1. Chandrupatla, T. R. And Belegundu, A. D, (2001). "Introduction to Finite Elements in Engineering", Prentice Hall of India, New Delhi.
2. Cook, R. D. (1981). "Concepts and Application of Finite Element Analysis", John Wiley and Sons.
3. Reddy, J. N, (1993). "An Introduction to the Finite Element Method", McGraw Hill, New York.

REFERENCES:

1. Zienkiewicz, O. C. And Taylor, R. L, (1989). "The Finite Element Method", Vol.1, McGraw Hill Company Limited, London.
2. Seshu. P, (2003). "Finite Element Analysis", Prentice Hall of India Private Limited, New Delhi.
3. David V. Hutton, (2005). "Fundamentals of Finite Element Analysis", Tata McGraw-Hill Publishing Company Limited, New Delhi.
4. Bathe, K. J, (2006). "Finite Element Procedures", Prentice Hall of India, New Delhi.
5. Desai C.S. and Abel J.F, "Introduction to the Finite Element Method", Van Nostrand, 2002.
6. Krishna Moorthy C.S., "Finite Element Analysis", Tata Mc. Graw Hill, 1997.

7K718: DESIGN AND DETAILING OF HYDRAULIC STRUCTURES

B.Tech IV Year I Semester

		L	T	P/D	C
				30 -	3

a	b	c	d	e	f	g	h	i	j	k	l
X	X	X					X				

Course Objectives:
Students are expected to know the details of major and minor irrigation structures and their design. A student, who successfully completes the course, should be able to carry out design of various hydraulic structures in the given field conditions. Also to make the students familiarize with the relevant I.S codes and to enhance the capability of reading the working drawings. The students should understand:
1. Practical profile of a gravity dam
2. Design principles of Super passage
3. Design principles of Canal Drops and in particular Glacis type canal drop
4. Design principles of Cross Regulator
5. Design principles of spillways and in particular Ogee spill way
6. Design principles of surplus weir

Course Outcomes: The Student will be able to design procedures and detail a:
1. Practical profile of a gravity dam.
2. Super passage
3. Glacis type canal drop.
4. Vent way in Cross Regulator.
5. Ogee Spillway.
6. Surplus weir.

UNIT - I:
Storage structures: Types of dams - gravity dam - selection of site - forces acting on dams - elementary profile - limiting height of gravity dam - practical profile of a high gravity dam- design methods and design by gravity analysis only.

UNIT - II:
Canal Conveyance Structures: Types; selection of suitable type of canal conveyance works - types of aqueducts- design of super passage; detailed designs and drawings of super passage.

UNIT - III:
Canal Drops: Types of Canal Drops and Falls; Detailed design and detailing of Glacis type Canal Drop

UNIT - IV:
Cross Regulator: General design principles - General arrangements of various components - design of vent way by drowning ratio

UNIT - V:
Spillways: Types of spillways, selection of spillways; discharge over Ogee spillway, hydraulic design of Ogee spillway

Energy Dissipaters: Types of stilling basins, design and detailing of hydraulic jump forming stilling basin

UNIT - VI:
Surplus Weir: components; design and detailing of surplus weir

TEXT BOOKS:
1. Challa Sathya Narayana Murthy, Water Resources Engineering - Principles and Practice, New Age International Publishers.
2. Hydraulic Structures, P. Novak, A. I. B. Moffat, C. Nalluri and R. Narayanan, Taylor and Francis, U. K.
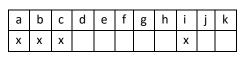
REFERENCES:
1. Hydraulics of Spillways and Energy Dissipators, R. M. Khatsuria, Marcel Dekker Publishing, New York.
2. S. K Garg, Irrigation Engineering and Hydraulics, Khanna Publishers
3. Subramanya.K, Engineering Hydrology ,Tata Mcgraw Hill NewDelhi
4. Asawa, Irrigation Engineering, Wiley Eastern Publication
5. Manual on Barrages and Weirs on Permeable Foundation, Publication 179, (Volumes I and II), Central Board of Irrigation and Power, New Delhi.
6. Jayarami Reddy, A Text Book Of Hydrology, Laksmi Publications, New Delhi.
7. H.M. Raghunath, Hydrology, Wiley Eastern Publication, New Delhi. 56
8. R.K. Sharma and Sharma, Hydrology and Water Resources Engineering, Oxford and IBH, New Delhi.
9. Linsley, Kohler and Paulhus, Applied Hydrology, Wiley Eastern Publication, New Delhi.
10. Varshney R.S., Theory & Design of Irrig. Structures, Nem Chand
11. Punmia B.C., Irrigation & Waterpower Engg., Laxmi Publications
12. Serge Liliavsky, Irrigation & Hydraulic Design, Chapman and Hall
13. IS: 6512 (1984) – Criteria for design of storage gravity dams
14. IS 7784 (Part I (1993), Part II Section 1 to 5 (1995)) Design of cross drainage works – Code of Practice
15. IS: 6966 Part I (1989) – Hydraulic design of barrages and weirs – Guidelines
16. IS: 11130 (1984) – Criteria for structural design of barrages and weirs
17. IS:6531 (1972) – Criteria for design of canal head regulator
18. IS:7114(1973) – Criteria for hydraulic design of cross regulator for canal
19. IS:6936 (1992) – Guide for location ,selection and hydraulic design of canal escapes
20. IS:12331– General requirement of canal outlets

7K719: ESTIMATION, COSTING AND VALUATION

B. Tech IV Year I Semester

				L	T	P/D		C		
				3	0	-		3		

a	b	c	d	e	f	g	h	i	j	k
x	x	x						x		

Course Objectives:
To enable the students understand
1. The working of detailed estimates for a building.
2. The working of detailed estimates for roads and canals.
3. The rate Analysis for different items of works.
4. The working and scheduling of shuttering and bar bending.
5. About contract, Tenders, Earnest Money Deposit (EMD), M-Book and concept of present practices of tenders.
6. To introduce the student to the basic concept and procedure of valuation.

Course Outcomes:
After the successful completion of the course, the student will be able
1. To prepare detailed estimates for different buildings.
2. To do the rate analysis for different items of works of buildings.
3. To prepare the rate analysis for different items of works.
4. To prepare the schedules for shuttering and bar bending.
5. To work out different types of contracts, prepare tenders, to suit the present day practices of tendering.
6. To valuate buildings as per norms.

UNIT –I:
Need and importance of estimating and costing, Data required, General items of works in a building-Standard unit principles of working out quantities for detailed and abstract estimates- Approximate methods of estimation-Cubical Content, Plinth Area & Unit Base methods. Detailed estimates of buildings (Long-wall Short-wall and Centre line methods)- CC, RCC, Brickwork, Plastering, White washing works.

UNIT –II:
Estimation of earthwork for roads and canals: Estimation methods- Mid sectional area, Mean sectional area, Prismoidal and Trapezoidal, Canal work estimations, Roadwork estimations using RLs, Pitching/Turfing estimation.

UNIT –III:
Rate Analysis- Factors affecting Rate analysis, Outturn or Task, Working out data for various items of work- over head and contingent charges, Rate analysis for works like: Cement Concrete, RCC, Plastering, Brickwork, whitewashing.

UNIT –IV:
Shuttering material requirements and schedules. Estimation of reinforcement- bar bending scheduling and costing for beams, columns and slabs.

UNIT –V:
Contracts: Types of contracts- Merits and demerits along with suitability, Elements of Contract, Terminology, Contract documents- Conditions of contract- Sub contracting, Bidding- Bid documents and bidding procedure.

UNIT –VI:

Earnest Money Deposit, Security Deposit, Retention Money, Valuation of buildings: Methods of building valuation- Rental Method of Valuation, Direct Comparisons of the capital value, Valuation based on the profit, Valuation based on the cost, Development method of Valuation, Depreciation method of Valuation, Standard specifications for different items of building construction.

TEXT BOOKS:

1. Estimating and Costing in Civil Engineering – Theory and Practice by B N Dutta, 28th Revised Edition, 2016, UBS Publishers Distributors Pvt. Ltd.
2. Textbook of Estimating and Costing: Civil Engineering by G S Birdie, DhanpatRai Publications, 1988.

REFERENCES:

1. Estimating and Costing in Civil Engineering by Jagjit Singh, Galgotia Publications, New Delhi, 1996.
2. Estimating, Costing, Specifications and Valuation in Civil Engineering by M. Chakraborthi, Publisher: M Chakraborti, 24th Edition, 2010.
3. Civil Engineering Contracts and Estimation by B S Patil, Universities Press III Edition, (2009), Hyderabad.
4. Standard scheduled rates and relevant BIS codes.

7KC71: DISASTER MITIGATION AND MANAGEMENT

(Professional Elective –III)

B.Tech IV Year I Semester

L	T	P/D	C
3	1	-	3

a	b	c	d	e	f	g	h	i	j	k
X		X		X						

Course objectives:

1. To equip the students with the basic knowledge of hazards, disasters, risks and vulnerabilities including natural, climatic and human induced factors and associated impacts.
2. To impart knowledge in students about the nature, mechanism causes, consequences and mitigation measures of the various natural disasters including hydro meteorological and geological based disasters.
3. To enable the students to understand risks, vulnerabilities and human errors associated with human induced disasters including chemical, biological and nuclear warfare agents.
4. To equip the students with the knowledge of various chronological phases in the disaster management cycle.
5. To create awareness about the disaster management framework and legislations in the context of national and global conventions.
6. To enable students to understand the applications of geospatial technologies like remote sensing and geographical information systems in disaster management.

Course outcomes

1. Ability to analyze and critically examine existing programs in disaster management regarding vulnerability, risk and capacity at local, national and international levels
2. Ability to choose the appropriate activities and tools and set up priorities to build a coherent and adapted disaster management plan.
3. Ability to understand various mechanisms and consequences of natural and human induced disasters for the participatory role of engineers in disaster management.
4. Develop an awareness regarding the chronological phases of disaster preparedness, response and relief operations for formulating effective disaster management plans.
5. Ability to understand various participatory approaches/strategies and their applications in disaster management
6. Ability to understand the concepts of remote sensing and geographical information systems for their effective application in disaster management

UNIT-I
Introduction- Natural, human induced and human made disasters – Meaning, nature, types and effects; International decade of natural disaster reduction (IDNDR); International strategy of natural disaster reduction (ISDR)

UNIT-II
Natural disasters– Hydro meteorological disasters: Causes, impacts, Early warning systems, structural and non-structural measures for floods, drought and cyclones; Tropical cyclones: Overview, cyclogenesis, drought monitoring and management.

UNIT - III
Geographical based disasters- Earthquakes and Tsunami- Overview, causes, impacts, zoning, structural and non-structural mitigation measures; Tsunami generation; Landslides and

avalanches: Overview, causes, impacts, zoning and mitigation measures. Case studies related to various hydro-meteorological and geographical based disasters.

UNIT - IV:

Human induced hazards: Risks and control measures in a chemical industry, Causes, impacts and mitigation measures for chemical accidents, chemical disaster management, current status and perspectives; Case studies related to various chemical industrial hazards eg: Bhopal gas tragedy; Management of chemical terrorism disasters and biological disasters; Radiological Emergencies and case studies; Case studies related to major power break downs, fire accidents and traffic accidents .

UNIT - V:

Use of remote sensing and gis- in disaster mitigation and management; Scope of application of ICST (Information, communication and space technologies in disaster management, Critical applications& Infrastructure; Potential application of Remote sensing and GIS in disaster management and in various disastrous conditions like earthquakes, drought, Floods, landslides etc.

UNIT - VI:

Concept of disaster management- Introduction to disaster management, Relationship between Risk, vulnerability and a disaster, Disaster management cycle, Principles of disaster mitigation: Hazard identification and vulnerability analysis, Early warning systems and forecasting; Infrastructure and development in disaster management; Disaster management in India: National disaster management framework at central, state, district and local levels. Community based disaster management.

TEXT BOOKS:
1. Rajib, S and Krishna Murthy, R.R (2012) "Disaster Management Global Challenges and Local Solutions" Universities Press Hyderabad.
2. Battacharya, T. (2012), Disaster Science and Management. Tata McGraw Hill Company, New Delhi.
3. Navele, P & Raja, C.K. (2009), Earth and Atmospheric Disasters Management, Natural and Manmade. B.S. Publications, Hyderabad.

REFERENCES:
1. Fearn-Banks, K (2011), Crises computations approach: A case book approach. Route ledge Publishers, Special Indian Education, New York & London.
2. Notes / Reading material published by National Disaster Management Institute, Ministry of Home Affairs, Govt. of India.

7KC72: SURFACE WATER HYDROLOGY

(Professional Elective – III)

B. Tech IV Year I Semester

	L	T	P/D	C
	3	1	-	3

1	2	3	4	5	6	7	8	9	10	11	12
X	X	X		X							

Course objectives:

To enable the students,

1. Get comprehensive knowledge about occurrence, quantification of precipitation;
2. Understand abstractions of precipitation;
3. Understand runoff calculation
4. Know about various water withdrawals and uses;
5. Understand different water distribution systems;
6. Study various types of dams and spillways.

Course outcomes:

At the End of the course the student will be able to,

1. Quantify precipitation;
2. Estimate various abstractions of precipitation;
3. Estimate runoffs from given data;
4. Grasp and apply the knowledge of various water withdrawals and uses to practical problems;
5. Able to apply design basic water distribution systems;
6. Able to arrive at hydrologic design of spillways.

Unit - I

Review of Hydrologic cycle, Climate and water availability, Water balances, Review of Precipitation: Forms, Classification, Variability, Measurement, Data analysis, Evaporation and its measurement, Review of Evapotranspiration and its measurement, Penman Monteith method. Infiltration: Factors affection infiltration, Horton's equation and Green Ampt method.

Unit - II

Hyetograph and Hydrograph Analysis: Hyetograph, review of Runoff: drainage basin characteristics, Hydrograph concepts assumptions and limitations of unit hydrograph, Derivation of unit hydrograph S hydrograph, Flow duration curve.

Unit - III

Groundwater & Well Hydraulics: Occurrence and movement of groundwater, Darcy's law, governing ground water flow equations, Factors governing ground water flow, Types of aquifers, porosity, specific yield, specific retention, storage coefficient, permeability, hydraulic conductivity, hydraulic transmissibility, Conjunctive use and it's necessity.

Unit - IV

Reservoir: Types, Investigations, Site selection, Zones of storage, Safe yield, Reservoir capacity, Reservoir sedimentation and control. Teaching scheme

Unit - V

Flood Management: Indian rivers and floods, Causes of flooding, Alleviation, Leeves and floodwalls Flood-ways, Channel improvement, Flood damage analysis.

Unit - VI

Drought Management and Water Harvesting Definition of drought, Causes of drought, measures for water conservation an augmentation, drought contingency planning. Water harvesting: rainwater collection, small dams, runoff enhancement, runoff collection, ponds, tanks, natural and artificial ground water recharge methods.

TEXT BOOKS:

1. K Subramanya, Engineering Hydrology, Mc-Graw Hill.

2. K N Muthreja, Applied Hydrology, Tata Mc-Graw Hill.

3. K Subramanya, Water Resources Engineering through Objective Questions, Tata McGraw Hill.

REFERENCES:

1. G L Asawa, Irrigation Engineering, Wiley Eastern.

2. L W Mays, Water Resources Engineering, Wiley.

3. J D Zimmerman, Irrigation, John Wiley & Sons

4. C S P Ojha, R Berndtsson and P Bhunya, Engineering Hydrology, Oxford.

7KC73: PAVEMENT DESIGN
(Professional Elective – III)

B Tech IV Year I Semester

	L	T	P/D	C
	3	1	-	3

a	b	c	d	e	f	g	h	i	j	k	l
X				X							

Course Objectives:
1. Introduction to various factors affecting pavement design
2. Concepts of mechanistic and empirical methods of flexible pavements
3. Concepts of mechanistic and empirical methods of rigid pavements
4. Understand various verification techniques used for pavement designs
5. Knowledge of pavement evaluation
6. Will e able to understand theories related to pavement maintenance activities

Course Outcomes:
1. Application of basic principles in pavement design
2. Assimilation of mechanistic principles for the pavement design
3. Assimilation of empirical principles for the pavement design
4. Will be able to perform various verification techniques used for pavement designs
5. Explain about appropriate evaluation methods
6. Discuss about pavement maintenance measures for better serviceability of pavements

UNIT - I
Introduction of Pavement Design: Various Factors, Types of Pavements, Functions of Individual Layers, Classification of Axle Types of Rigid Chasis and Articulated Commercial Vehicles, Legal Axle and Gross weights on single and multi units, Tire Pressure, Contact pressure, EAL and ESWL concepts, Equivalent Axle Load Factor, Traffic Analysis: ADT.AADT, Truck factor, Growth factor, Lane, Directional distributions & Vehicle Damage factors, Effect of Transient & Moving loads.

UNIT - II
Stresses in Pavements: Vehicle-Pavement Interaction, Stress inducing factors in flexible and Rigid pavements. Stress in Flexible Pavements: Visco-Elastic Theory and Assumptions. Layered system concepts, Stress solutions for one, two and three layered systems. Fundamental Design concepts. Stresses in Rigid Pavements: Westergaard's theory and Assumptions, Stresses due loading, warping and Frictional Stresses, Friberg's Analysis of Dowel Bars and deflection of dowel-joints.

UNIT- III
Mechanistic Design Methodology for Pavements: General Methodology, Classification of design Methods; Pavement Design Concepts; Flexible Pavements: Climatic Models, Structural models, Distress models: fatigue cracking, rutting and thermal cracking models; Rigid Pavements: Structural models, fatigue cracking: load and curling stress, Pumping and Erosion Models, Faulting Models, Joint Deterioration and Punch out models;

UNIT - IV
Need and verification of Flexible and Rigid pavement Mechanistic design procedures.

Methods of Pavement Designs: Flexible Pavement Design Concepts, Asphalt Institute Methods with HMA and other Base Combinations, AASHTO, IRC Methods as per IRC37 and IRC:SP:72. Design of Rigid Pavements: Introduction to Calibrated Mechanistic Design Process, PCA, AASHTO, IRC specifications,

UNIT - V
Introduction to pre-stressed and continuously Reinforced cement Concrete Pavement Design, Dowel bar design and design of tie bars as per IRC:58.

Pavement Evaluation: Types of pavement evaluation: Serviceability concepts, IRI, Quarter Car Model, skid resistance; Pavement Deflection - Different Methods of NDT, Benkelman Beam, LaCroix Deflectometer, Dynaflect, Road Ratar, Rolling Dynamic Deflectometer, Load man

UNIT - VI
Different Types of Falling Weight Deflectometers (FWD) for evaluation of rigid and flexible pavements. Design of overlays: Types & Design of overlays: Asphalt Institute's Principal Component Analysis, IRC Methods of Overlay Design.

TEXT BOOKS
1. Design of Functional Pavements, Nai C. Yang, McGraw Hill Publications.
2. Teng, Functional Design of Pavements - McGraw hill - 1990.
3. Concrete Pavements, AF Stock, Elsevier, Applied Science Publishers
4. Principles of Pavement Design, Yoder J. & Witzac Mathew W. John Wiley & Sons.

REFERENCES
1. Pavement Analysis & Design, Yang H. Huang, Prentice Hall Inc.
2. Pavement and surfacing for Highway & Airports, Micheal Sargious, and Applied science Publishers Limited.
3. Kadiyali and Lal, Principles of highway engineering, Khanna Publishers, Delhi-6
4. IRC related Codes for Flexible and Rigid Pavements design
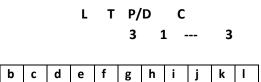
7KC74: GROUND IMPROVEMENT TECHNIQUES

(Professional Elective – III)

B Tech IV Year I Semester

		L	T	P/D	C
		3	1	---	3

a	b	c	d	e	f	g	h	i	j	k	l
x		x									

Course Objectives: To enable the student to learn

1. The necessity of soil strength improvement
2. The mechanical modification of the ground by compaction.
3. The Hydraulic modification of the ground by lowering of water table
4. The Stabilization of various soil types.
5. The Chemical modifications of the soil.
6. Grouting techniques and its effects on soil properties.

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

1. Able to assess ground improvement factors.
2. Able to apply mechanical modification to improve the soil properties.
3. Able to use the hydraulic modification of the ground by lowering of water table.
4. Assess the necessity of drainage of slopes, vertical drains sand drains etc.,
5. Able to use chemical modifications of the ground by lime stabilization and other methods.
6. Able to use the method of grouting and other advanced methods.

UNIT - I

Ground Improvement: Definition, Objectives of soil improvement, Classification of ground improvement techniques. Factors to be considered in the selection of the best soil improvement technique.

Mechanical Modification: Type of mechanical modification, Aim of modification, compaction, Principle of modification for various types of soils.

UNIT - II

Compaction: Effect of grain size distribution on compaction for various soil types like BC soil, lateritic soil, coarse-grained soil, micaceous soil. Effect of compaction on engineering behaviour like compressibility, swelling and shrinkage, permeability, relative density, liquefaction potential. Field compaction – static dynamic, impact and vibratory type. Specification of compaction. Tolerance of compaction Shallow and deep compaction.

UNIT - III

Hydraulic Modification: Definition, aim, principle, techniques, gravity drain, lowering of water table, multistage well point, vacuum dewatering. Discharge equations. Design of dewatering system including pipe line effects of dewatering.

Drainage & Preloading: Drainage of slopes, preloading, vertical drains, sand drains. Assessment of ground condition for preloading electro kinetic dewatering.

UNIT - IV

Chemical Modification-I, Definition, aim, special effects, and methods Techniques – sandwich technique, admixtures, cement stabilization on permeability, Swelling and shrinkage, Criteria for cement stabilization, Stabilization using Fly ash

UNIT - V

Chemical Modification-II: Lime stabilization, suitability, process, special effects, criteria for lime stabilization. Other chemicals, chlorides, hydroxides, lignin, hydrofluoric acid. Properties of chemical components, reactions and effects. Bitumen tar or asphalt in stabilization.

UNIT - VI

Grouting: Introduction, Effect of grouting, Chemicals and materials used.Types of grouting, grouting procedure, Applications of grouting.

Miscellaneous Methods (Only Concepts): Introduction, Soil reinforcement. Thermal methods, Soil reinforcement, reinforcement with strip and grid reinforced soil, In situ ground reinforcement, ground an anchor Ground improvement by confinement – Crib walls, Gabions and Mattresses. Anchors, Rock bolts and soil nailing.

TEXT BOOKS:
1. Purushothama Raj. P, "Ground Improvement Techniques" Laxmi Publications, New Delhi,
1999.
2. Koerner.R.M. "Construction and Geotechnical Methods in Foundation Engineering" McGraw
Hill Publ., New York, 1985.
REFERENCES:
1. Manfred Haussmann, "Engineering Principles of Ground Modification", Mc Graw Hill Pub., New
York, 1990
2. Nelson. J.D and Miller. D.J, "Expansive Soils" John Wiley and Sons, 1992.
3. Bell, F.G. Butterworth, Methods of treatment of unstable ground-Butterworth, London.

7DC55: INTERNET OF THINGS (IOT)

B Tech IV Year I Semester   (Open Elective – III)

	L	T	P/D	C
	3	0	---	3

a	b	c	d	e	f	g	h	i	j	k	l	m
	x	x	x	x								x

Course Objectives: The student will learn about
1. Terminology, technology and applications of IoT
2. IoT system management using M2M (machine to machine) with necessary protocols
3. Python Scripting Language preferred for many IoT applications
4. Raspberry PI as a hardware platform for IoT sensor interfacing
5. Implementation of web based services for IoT with case studies

Course Outcomes: After completing this course, student shall be able to
1. Identify the implementation layers of an IoT application system
2. Summarize the characteristics and challenges of designing SDN and NFV
3. Describe the management of an IoT system using necessary protocols
4. Design, Develop and Illustrate IoT applications using Raspberry PI platform and Python Scripting
5. Implement web based services on IoT devices
6. Design new projects using Raspberry PI

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 like Wireless Sensor Networks, Cloud Computing, Big data analytics, and Communication protocols, Embedded Systems, IoT Levels and Templates

UNIT II: IoT and M2M
Software defined networks, network function virtualization, difference between SDN and NFV for IoT; Basics of IoT System Management with NETCOZF-YANG (Block Diagrams)

UNIT III: Developing IoT
IoT Design Methodology – The 10 steps design methodology; **Logical design using Python:** Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, date/time operations, Python packages of interest for IoT

UNIT IV:IoT Physical Devices and Endpoints
Raspberry PI – Introduction to Raspberry PI and its Interfaces (serial, SPI, I2C) **Programming** – Python programming with Raspberry PI – Controlling Input / output (Interfacing with LED and LDR).

UNIT V:IoT Physical Servers and Cloud Offerings
Cloud concepts (IaaS, PaaS, Saas), Introduction to Cloud Storage models and communication APIs – WAMP, Xively; Python web application framework with Django, Designing a RESTful web API

UNIT VI: Case Studies Illustrating IoT Design
Home Automation – Smart Lighting, Home intrusion detection, *Cities* – Smart parking, *Environment* – Weather monitoring system, Weather reporting bot, Air pollution monitoring, Forest fire detection, *Agriculture* – Smart irrigation, *Productivity applications* – IoT printer

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

7ZC24: INNOVATION & DESIGN THINKING

((Open Elective – III)

Common to all Branches)

B Tech IV Year I Semester

		L	T	P/D	C
		3	0	0	3

a	b	c	d	e	f	g	h	i	j	k	l
				x		x					

Course Objective:

The objective of the course is to make students understand the nature of Innovation, creativity and IPRs, and to motivate the student to start his/her own enterprise with innovative skills.

Course Outcomes:

1. The students gain the knowledge on the inputs required for innovation and also gain familiarity on Entrepreneurship.
2. The students will get exposure on creative methods of ideation and the importance of protecting the ideas.
3. The students gain knowledge on design thinking and types of thinking.
4. The students gain familiarity on emerging technologies like Internet of things (IOT).
5. The students understand the process of building the startup.
6. The students gain knowledge on various startup funding and also to branding building for the startup.

Unit – I: Introduction to Innovation: - Meaningof Innovation, Difference between innovation and invention, Difference between Innovation and Creativity, Need to be Creative , Importance of Innovation, Innovation as a Competitive Advantage, Innovation Continuum, Innovation Cycle, Disruptive Innovation, , Breakthrough innovations and its consequences on the society, Challenges in Innovation.

Unit – II: Creative Thinking : - Types of Creative Thinking, Creative Thinking Process, Components of Creativity, Characteristics of a Creative Mindset, New product ideas, Idea generation methods, Principles of Idea Generation, Difference between Idea Generation and Brainstorming, Killing the ideas through Stage Gate Models, Process of Reverse Thinking.Intellectual Property Rights, Importance of IPR, Role of WIPO, Case Studies on Patents and Infringement of Rights.

Unit – III: Design Thinking & Liberal Art: - Concept of Design Thinking, Difference between Designer and Scientist, Stages of Design Thinking, Difference between Convergent Thinking and Divergent Thinking. Definition of Liberal Art and its Importance of Liberal Art , Role of Art and Culture to Innovate Business.

Unit – IV: Emerging Technologies: - Meaning of Internet of Things, Components of IoT, Benefits of IoT, Types of Product – Service hybrid, examples of IoT enabled Innovations,

Impact of IoT on Business, Future of IoT. Case Study on IoT.Innovation Leadership &Network: - Leadership, Skills and Characteristics of an Innovation Leadership, Meaning of Innovation Network, Significant of Innovation Network, Define Social Media Analysis, Steps to Build an Innovation Network.

Unit –V: Building Startup

Kelly Johnsons KISS Principle, Road map for building a startup, identify, analyze and evaluate
funding, advantages of crowd funding. Pricing strategies.Determining factors for Monetizing Innovation, Process of Monetization, Fixing the price of an Innovative Project.Detailed study on market potential, pitfalls andNegative effects of Monetizing innovation.Reasons for failure of Monetization of Innovation.

Unit-VI: Startup Funding & Branding

Sources of funding: Bootstrapping, Angel Investors, Crowd funding, Venture capitalists, Advantages of crowd funding, Schemes of Government through Startup India, role of Institutional support and Commercial Banks. Introduction to branding a startup and developing branding strategies.

ESSENTIAL READINGS:

- Peter Drucker (1993), "Innovation and Entrepreneurship", Hyper Business Book.

- C.K. Prahalad, M.S. Krishnan, The new age of Innovation – TATA McGRAW-HILL Edition 2008.

- "Innovation by Design", Gerald H. (Gus) Gaynor, AMACOM {American Management Association), NYC, 2002

SUGGESTED READINGS:

- Bholanath Dutta: Entrepreneurship – Text and cases, Excel, 2009.

- Vasanth Desai: Entrepreneurship, HPH, 2009

- Barringer: Entrepreneurship, Pearson, 2009.

- H. Nandan: Fundamentals of Entrepreneurship, PHI, 2009.

- John M Nicholas "Project Management for Business and Technology" Prentice Hall of India Pvt. Ltd.
- Stay Hungry Stay Foolish, Rashmi Bansal and published by IIM., Ahmedabad

7ZC15:FINANCIAL INSTITUTIONS, MARKETS AND SERVICES
(Open Elective – III)

B Tech IV Year I Semester

	L	T	P/D	C
	3	0	0	3

a	b	c	d	e	f	g	h	i	j	k
x			x					x		

Course Objective:
The objective of the course is to provide to students an understanding of Financial Markets, the major Institutions involved and the Services offered within this framework.

Course Outcomes:

1. This unit enables the students to understand the financial structure and the financial sector reforms after 1991.
2. The unit gives the exposure on the role of RBI and the Regulating and credit policies adopted by the RBI.
3. The students get awareness on the role of Non-Banking financial institutions and the role of financial institutions in India.
4. The unit educates the students to know the role of regulatory bodies like SEBI and also to know the capital and money market instruments
5. The unit equips the students to understand about the asset fund based financial services
6. The students will get exposure about the investment banking and merchant banking.

UNIT I
INTRODUCTION: The structure of financial system, Equilibrium in financial markets, Indicators of Financial Development, Financial system and Economic Development, Financial Sector Reforms after 1991.

UNIT II
BANKING INSTITUTIONS: Structure and Comparative performance, Functions and Role of RBI, Competition, Interest rates, Spread; Bank Capital Adequacy norms; Banking Innovations – BPLR to Base rate, Core Banking System, Financial Inclusion, Current rates: Policy rates, Reserve Ratios, Exchange rates, Lending/ Deposit rates.

UNIT III
NON BANKING FINANCIAL INSTITUTIONS: Structure and functioning of Unit Trust of India and Mutual Funds, Growth of Indian Mutual funds and their Regulation, Role of AMFI. Performance of Non-Statutory Financial Organizations: IFCI, IRBI, NABARD, SIDBI and SFCs.

UNIT IV
FINANCIAL AND SECURITIES MARKETS: -, Role and functions of SEBI, Structure and functions of Call Money Market, Government Securities Market – T-bills Market, Commercial Bills Market, Commercial paper and Certificate of Deposits; Securities Market – Organization and Structure, Listing, Trading and Settlement, SEBI and Regulation of Primary and Secondary Markets.

UNIT V
ASSET/FUND BASED FINANCIAL SERVICES: Lease Finance, Consumer Credit and Hire purchase Finance, Factoring - Definition, Functions, Advantages, Evaluation, Forfeiting, Bills Discounting, Housing Finance, Venture Capital Financing. Fee-based Advisory services: Stock Broking, Credit Rating.

UNIT VI
INVESTMENT BANKING AND MERCHANT BANKING:
Investment Banking: Introduction, Functions and Activities, Underwriting, Banker to an Issue, Debenture Trustees and Portfolio managers, Challenges faced by Investment Bankers. Merchant Banking: Definition, Merchant Banks Vs Commercial Banks, Services of Merchant Banks.

ESSENTIAL READINGS:

- L.M. Bhole: Financial Institutions and Markets, TMH, 2009.
- E. Gordon, K. Natarajan: Financial Markets and Services, Himalaya Publishing House, 2013.
- Vasant Desai: Financial Markets and Financial Services, Himalaya,2009

SUGGESTED READINGS:

- Pathak: Indian Financial Systems, Pearson, 2009
- M.Y. Khan: Financial Services, TMH, 2009.
- S. Gurusamy: Financial Services and System, Cengage,2009
- Justin Paul and Padmalatha Suresh: Management of Banking and Financial Services, Pearson, 2009.
- Gomez, Financial Markets, Institutions and Financial Services, PHI, 2012.
- R M Srivatsava: Dynamics of Financial Markets and Institutions in India, Excel, 2013.

7ZC27: INDIAN HISTORY, CULTURE AND GEOGRAPHY

(Open Elective – III)

B Tech IV Year I Semester

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

a	b	c	d	e	f	g	h	i	j	k	l
								x	x	x	x

Course Objectives:

To equip the students with necessary knowledge relating to Indian HistoryGeography and Culture

Course outcomes:

C$_{O1}$:To appreciate and understand our Indian History, Culture and Indian heritage.

C$_{O2}$: To understand earth evolution and world climatic change.

C$_{O3}$:To understand India Oceanography.

C$_{O4}$: Able to enhance and understand Indian monsoons, Indian agriculture.

C$_{O5}$: To understand secularism of our country.

C$_{O6}$:To appreciate and understand the social reformers who brought revolutionary changes in Indian society.

Unit I ANCIENT INDIAN HISTORY: Fundamental Unity of Indian Harappan and Vedic Civilization – Evolution of Caste System – Jainism and Buddhism – Gandhara Art., Political unification of India under Mauryas and Guptas, Historical evolution of Satavahanas., Contribution of Pallavas and Cholas to Art – Chola Administrative Systems .

Unit IIGEO MORPHOLOGY AND CLIMATOLOGY: The Origin and Evolution of the Earth, Interior of the Earth, Distribution of Oceans and Continents , Minerals and Rocks, Geomorphic Processes, Landforms and their Evolution Composition and Structure of Atmosphere, Solar Radiation, Heat Balance and Temperature. Atmospheric Circulation and Weather Systems, World Climate and Climate Change

Unit III OCEANOGRAPHY: Water (Oceans), Movements of Ocean Water, Physical features of India viz., The Mountains in the North , The Northern Plains, The Peninsular Plateau, The Great Indian Desert, The Coast; and The Islands.

Unit IV PHYSICAL FEATURES OF INDIA AND INDIA'S MONSOON: India's monsoon., Winter, Summer(pre-monsoon),rainy (monsoon),autumn (post-monsoon)., Indian Agriculture, Agriculture and colonialism,Indian Agriculture after Independence Major crops and yields, Horticulture, Organic farming.

Unit V MEDIEVAL INDIA AND CULTURE: Influence of Islam on Indian Culture – The Sufi, Bhakthi and Vishnavite movements, Historical Achievements of Vijayanagara Rulers., Contribution of Shershah and Akbar to the evolution of administration system in India – Cultural Development under Mughals.

Unit VI MODERN INDIA: Western Impact on India – Introduction of Western Education – Social and Cultural awakening and social reform movements – Raja Rama Mohan Roy – Dayananda Saraswathi – Theosophical Society – Ramakrishna Paramahamsa and Vivekananda – Iswara Chandra Vidyasagar and Veeresalingam – Emancipaition of women and struggle against Caste. Rise of Indian Nationalism – Mahatma Gandhi – Non Violence and Satyagraha – Eradication of untouchability – Legacy of British rule.

ESSENTIAL READINGS:

- Sharma .R.S., (2011).Indian Ancient past.,Oxford Publications.
- Nitin Singhaniya.,(2017). Indian Culture and Heritage., Publisher: Mcgraw TestPrep., Second Edition.
- Certificate of Physical and Human Geography,Goh Cheng Leong,Oxford University Press.
- Bipin Chandra.(2000). India's Struggle for Independence., Penguin Global Publishers
- Saveendra Singh: Physical Geograpghy.,Prayag Pustak Bhavan ISBN-10: 8186539298. Edition : 1st Edition Number of Pages : 641 Pages Publication : Year 2006.

SUGGESTED READINGS:

- Majumdar, R. C. et al. *An Advanced History of India* London: Macmillan. 1960. ISBN 0-333-90298-X

- Basham, A.L. : The wonder that was India ,New York: Grove Press, 1954. (OUP, Madras 1983)

- Basham, A.L. : Cultural heritage of India , Vols.I to IV ,Oxford University Press, Delhi, 1975.

7K771: CONCRETE TECHNOLOGY LAB

B.Tech IV Year I Semester

	L	T	P/D	C
	-	-	3	1.5

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x									

Course Objectives:
1. Perform the test procedures to find Physical properties of Cement
2. Understand the test procedures to find Specific Gravity, Bulking of Aggregates.
3. Evaluate fresh concrete properties
4. Understand the test procedures to find properties of Hardened Concrete

Course Outcomes:
The student will be able to:
1. Test Fineness, Specific Gravity, Setting Time, Soundness and Compressive Strength of Cement
2. Test Specific Gravity of Coarse Aggregate and Fine Aggregate, Bulking of Fine Aggregate.
3. Design Concrete Mix Proportioning by Using Indian Standard Method.
4. Test Workability of Fresh Concrete and Compressive strength, Split Tensile Strength of Hardened Concrete.

List of experiments
1. To determine the Standard consistency of cement.
2. To determine the Initial and Final setting time of cement.
3. To determine the Specific Gravity of cement.
4. To determine the Fineness and Soundness of cement.
5. To determine the Compressive Strength of cement.
6. To determine the Specific Gravity of Fine Aggregate.
7. To determine the Specific Gravity of Coarse Aggregate.
8. To determine the Bulking of Fine Aggregate.
9. Formulate a mix design of concrete as per IS:10262.
10. To determine the workability of concrete using Slump cone, Compaction factor and Vee - Bee consistometer.
11. To determine the Compressive, Split Tensile & Flexural strength of concrete.
12. To determine the Modulus of Elasticity & evaluate Non Destructive results of concrete.

REFERENCES:

1. Laboratory Manual

7K772: REVIT LABORATORY

B. Tech IV Year I Semester   **L   T   P/D   C**

                                                                         -   -   3   1.5

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x		x							

Course Objectives:
1. To expose the students to architecture software related to Civil Engineering.
2. To empower the students to develop building information modelling workflow.

Course Outcomes:

At the end of the course the student will be able to:
1. Develop the architectural design for the structure based on the requirement of end user.
2. Develop the design and documentation for the various structures using REVIT software.

List of Experiments:

Using Revit Software:

1. Introduction to Building Information Modelling.
2. Developing The basics building model by creating a Basic Floor Plan
3. Adding and Modifying Walls based on the plinth area.
4. Adding and Modifying Doors and Windows for a given plan.
5. Working with Ceilings and floor.
6. Adding Stair case
7. Adding Parapet wall and Railings
8. Developing an elevation for the given plan.
9. Creating Renderings using Sun and Shadow Settings
10. Construction Documentation (Creating and Modifying Schedules, Rooms, Legends and Keynotes).
11. Develop a residential building for a given area.
12. Develop an industrial building for a given area.

REFERENCES:

1. Revit Architecture Laboratory Manual

7K773: ESTIMATION AND QUANTITY SURVEYING LABORATORY

B. Tech IV Year I Semester

	L	T	P/D	C
	-	-	3	1.5

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x		x							

Course Objectives:
1. To expose the students to estimate the material quantities.
2. To empower the students for rate analysis for a given work.

Course Outcomes:
At the end of the course the student will be able to:
1. Use Excel sheets for Civil Engineering applications.
2. Develop the documentation for material quantities and rate analysis for different structures.

Experiments:
1. Estimate the quantities of steel in Bar-bending Schedule Of Beams
2. Estimate the quantities of steel in Bar-bending Schedule of rectangular and spiral Columns.
3. Estimate the quantities of steel in Bar Bending Schedule Of Slab
4. Estimate the quantities of steel in Bar-bending Schedule of Isolated Footing
5. Perform the Rate Analysis For earthwork quantities
6. Perform the Rate Analysis For Plain Cement Concrete (P.C.C)
7. Rate Analysis For Reinforcement Concrete (Column Beam And Slab)
8. Rate Analysis For Masonry Work
9. Rate Analysis For Plaster Work
10. Rate Analysis For Flooring
11. Rate Analysis For Paint Work
12. Bill Of Quantity For A Project According to IS Codes

TEXT BOOKS:
1. Estimation and Quantity Survey Laboratory Manual.
2. Estimating and Costing in Civil Engineering – Theory and Practice by B N Dutta, 28th Revised Edition, 2016, UBS Publishers Distributors Pvt. Ltd.
3. Textbook of Estimating and Costing: Civil Engineering by G S Birdie, DhanpatRai Publications, 1988.

REFERENCES:
1. Estimating and Costing in Civil Engineering by Jagjit Singh, Galgotia Publications, New Delhi, 1996.
2. Estimating, Costing, Specifications and Valuation in Civil Engineering by M. Chakraborthi, Publisher: M Chakraborti, 24th Edition, 2010.
3. Civil Engineering Contracts and Estimation by B S Patil, Universities Press III Edition, (2009), Hyderabad.
4. Standard scheduled rates and relevant BIS codes.

7K780: PROJECT -I

B. Tech IV Year I Sem.   **L   T   P/D   C**

                                                                    -     1   3   2

Course Objectives :

To enhance project selection, conceptualization, and associated skills of design, experimenting, modeling, and presentation in order to improve the employability of the students.

Course Outcomes: After completing this course, student shall be able to:

1. Have a thorough review and outline various civil engineering problems that can be taken up as project work
2. Work in a team to select a problem for project work
3. Review and evaluate the available literature on the chosen problem
4. With the help of faculty advisor formulate a methodology to solve the identified problem
5. Apply the principles, tools and techniques to solve the problem
6. Prepare and present project report

The evaluation is for 100 marks. It is internal evaluation only.

 The committee consists of HOD, a Senior Faculty member and Internal Guide.

> **Division of marks for internal assessment – 100 marks**
>
> 1. Progress of Project work and the corresponding interim report
>   as evaluated by internal guides at the end of 5 weeks   : 10 Marks
> 2. Seminar at the end of 5 weeks   : 10 Marks
> 3. Progress of Project work as evaluated by guides
>   at the end of 10 weeks   : 10 Marks
> 4. Seminar at the end of 10 weeks   : 10 Marks
> 5. Evaluation by the Guides (at the end of 15 weeks)   : 20 Marks
> 6. Project Report   : 10 Marks
> 7. Final presentation and defence of the project   : 30 Marks
>   ---------------------------
>   100 Marks

7KC81 :STRUCTURAL ENGINEERING
(Professional Elective – IV)

B.Tech IV Year II Semester.

1	2	3	4	5	6	7	8	9	10	11	12
x	x	x		x							

L   T P/DC
3   1 -3

Course Objectives: To enable the student to learn
1. The advantage of statically indeterminate structure over the statically determinate structure.
2. Solve the statically indeterminate structures by applying the principles of equilibrium.
3. Analyze the deflections in beams, frames using energy principles.
4. Draw the Influence line diagrams for reaction, SF and BM under different loading conditions on the structure.
5. Analyse the structure based on rotations and deflections.
6. Analysis of frames, Plastic theory and its application in analysis of indeterminate structures.

Course Outcomes: At the end of the course, the student will be able to
1. Differentiate between statically determinate and indeterminate structures.
2. Sketch the SF and BM diagrams for determinate and indeterminate beams.
3. Calculate the deflections in beams and frames.
4. Able to draw the SFD and BMD for structures with and without sway.
5. Able to analyse the indeterminate structure for various types of loads.
6. Able to analyze the truss and also able to determine the Plastic moment capacity of a structure.

UNIT - I
Introduction to Structures and Indeterminacy: Equilibrium and compatibility equations - Types of supports and reactions, types of joints and equilibrium equations, Static and kinematic indeterminacies of beams and frames. Effect of force releases like moment hinge, shear releases, link on static indeterminacy, Relative Merits of indeterminate structures over determinate structures.

UNIT - II
Propped Cantilever and Fixed Beams: Analysis of Propped cantilever and fixed beams subjected to uniformly distributed load, concentrated point load, uniformly varying load, couple and combination of loads - Shear force and Bending moment diagrams for Propped Cantilever and Fixed Beams - Deflection of Propped cantilever and fixed beams; effect of sinking of support, effect of rotation of a support.

UNIT - III

Slope deflection method: Analysis of

1) Continuous beams with and without sinking supports:

2) Single bay - single storied portal frames with and without side sway; - Loading on each span may be point load(s) and uniformly distributed load on whole span.

- Sketching of shear force and bending moment diagrams.

UNIT-IV

Moment distribution method: Analysis of

1) Continuous beams with and without sinking of supports;

2) Single bay single storied portal frames with and without side sway;

-Loading on beam/portal frame shall be point load(s) and uniformly distributed load on whole span - shear force and bending moment diagrams.

UNIT – V

Kani's method: Applied to continuous beams with and without sinking of supports; and single bay single storey portal frames with and without side way.

-Loading on beam/portal frame shall be point load(s) and uniformly distributed load on whole span - Sketching of shear force and bending moment diagrams.

UNIT – VI:Analysis of determinate pin jointed plane frames (trusses): By Method of joints and Method of sections.

PLASTIC ANALYSIS OF STRUCTURES: Plastic moment of resistance - Shape factor - Load factor - Plastic Hinge and mechanism.

TEXT BOOKS:

1. T.S.Thandavamoorthy, "Structural Analysis":,Oxford Higher Education, Second Impression, 2016.
2. Ramamrutham.S, "Theory of Structures", DhanpathiRai Publishing Company (P) Ltd., 2014.

REFERENCE BOOKS:

1. Structural Analysis by R.C Hibbeler, PEARSON Publications, Sixth Edition 2016,

2. Structural Analysis by Aslam Kassimali, CENGAGE Learning Publication.

3. D.S. PrakashRao, "Structural Analysis" - A Unified Approach, University Press, 1996
4. S.B. Junarkar and Shah, "Mechanics of structures", Charotar Pub. House, 2001.
5. S.P. Gupta and G.S.Pandit, "Theory of Structures", Tata McGraw Hill, 1999
6. B.C. Punmia, Ashok Jain and Arun K. Jain, "Theory of Structures", Laxmi , Publication, 2000

7KC82: GROUND WATER HYDROLOGY

(Professional Elective – IV)

B.Tech IV Year II Semester

L	T	P/D	C
3	1	-	3

a	b	c	d	e	f	g	h	i	j	k	l
x		x		x			x				

Course Objectives:

To enable the student
1. Understand the Hydrologic cycle, types of aquifers, Concepts of permeability, transmissibility and ground water flow.
2. Understand the various types of flows into well.
3. Comprehend the various methods of Geophysical exploration.
4. Understand, interpret and implement the concepts of Ground water recharge and ground water management.
5. To understand the Basics and Principles Groundwater Management, sustainable management of ground water resources.
6. In Modelling and managing ground water resources.

Course Outcomes:

At the end of the course, the student is able to
1. Interpret the concepts of permeability, transmissibility and ground water flow to field problems.
2. Evaluate the flow into a well
3. Apply various methods of geophysical explorations to field situations.
4. Interpret and implements the concepts of Ground water recharge and ground water Management.
5. To understand the Basics and Principles Groundwater Management, sustainable management of ground water resources.
6. In Modelling and managing ground water resources.

UNIT – I:
Introduction: Ground water utilization & historical background, ground water in hydrologic cycle, ground water budget, and ground water level fluctuations & environmental influence, literature/ data/ internet resources.

UNIT – II:
Occurrence and movement of ground water: Origin & age of ground water, rock properties affecting groundwater, groundwater column, zones of aeration & saturation, aquifers and their characteristics/classification, groundwater basins & springs, Darcy's Law, permeability & its determination, Dupuit assumptions, heterogeneity &anisotropy, Ground water flow rates & flow directions, general flow equations through porous media.

UNIT– III:

Surface/ sub-surface investigation of ground water: Geological /geophysical exploration/ remote sensing / electric resistivity /seismic refraction based methods for surface investigation of ground water, test drilling & ground water level measurement, sub-surface ground water investigation through geophysical / resistivity /spontaneous potential /radiation / temperature / caliper / fluid conductivity / fluid velocity /miscellaneous logging.

UNIT– IV:

Pollution and quality analysis of ground water: Municipal **/**industrial /agricultural /miscellaneous sources & causes of pollution, attenuation/ underground distribution / potential evaluation of pollution, physical /chemical /biological analysis of ground water quality, criteria & measures of ground water quality, ground water salinity & samples, graphical representations of ground water quality.

Saline water intrusion in aquifers: Ghyben-Herzberg relation between fresh & saline waters, shape & structure of the fresh & saline water interface, upcoming of saline water, fresh-saline water relations on oceanic islands, seawater intrusion in Karst terrains, saline water intrusion control.

UNIT – V:

Groundwater management - Basics and Principles Groundwater Management - Lumped Parameter Models Optimization in Water Quality Management.

Sustainable management of ground water resources- Legal provisions of ground water. Role of Central Ground Water Board (CGWB), State Ground water Departments, Existing Ground water Regulatory arrangements. Best Ground water management practices.

Criteria for location and selection of type of water harvesting structures based on site conditions.

UNIT –VI:

Modelling and management of ground water: Ground water modelling through porous media /analog / electric analog / digital computer models, ground water basin management concept, hydrologic equilibrium equation, ground water basin investigations, data collection & field work, dynamic equilibrium in natural aquifers, management potential & safe yield of aquifers, stream-aquifer interaction.

TEXT BOOKS:
1. D.K. Todd, Ground Water Hydrology, John Wiley & Sons, Inc., USA
2. H.M. Raghunath, Ground Water, Wiley Eastern Limited, New Delhi.

REFERENCES:
1. K.P. Karnath, Ground Water Assessment, Development and Management, Tata McGraw Hill Publishing Company, New Delhi
2. Walton, Ground Evaluation and Management, Mc. Graw Hill
   Bouwer, Ground Water Hydrology, Mc. Graw Hill.

7KC83: URBAN TRANSPORTATION PLANNING

(Professional Elective-IV)

B Tech IV Year II Semester

		L	T	P/D	C
		3	1	-	3

a	b	c	d	e	f	g	h	i	j	k	l
X				X							

Course Objectives:
1. To discuss various urban transportation systems planning process and its components
2. To understand a variety of travel surveys and data collection procedures
3. To review different travel demand forecasting models
4. To examine urban land use models and urban goods transportation models
5. To get exposed to the various components of transportation networks
6. To get a grasp of various elements of Master plan

Course Outcomes:
1. To describe and evaluate various urban transportation issues and planning methodologies
2. To identify the appropriate data collection methods and its procedures
3. To demonstrate effective way of understanding trip distribution and mode split models
4. To explain various issues related to trip assignment and land use transportation models.
5. To be able to analyze various transportation networks
6. To be able to prepare a Comprehensive Master plan

UNIT -I

Components of Transportation System and Challenges; Transportation system definition, urban issues, evolution of planning process, demand and supply, challenges, limitation, measure of effectiveness, measure of collectiveness, traffic problem elements, planning and management, models, planning methodologies. Emerging future trends in Transportation Systems.

UNIT - II

Data Collection and Travel Surveys; Collection of data, design of survey format, organization of surveys and analysis, study area definition, zoning system, types and sources of data, road side interview method, home interview survey, in-vehicle surveys, sampling, types, various techniques, expansion factors, logical checks, use of secondary sources of data, planning variables, vehicles ownership, projection of data and statistical techniques.

UNIT-III

Travel Demand Forecasting; Various trends, overall planning process, short and long term planning, travel attributes, traffic analysis zones, trip generation, category analysis, concept of gravity model, trip distribution, model split and trip assignment and land use transportation interaction.

UNIT-IV

Trip Distribution and Model Split Analysis; Growth factor models, synthetic pattern models, gravity model, competing opportunity model, intervening opportunity model, linear programming model and abstract mode model, time series models, aggregate and disaggregate models, mode choice, competing modes, mode split models, trip interchange, Toronto transit model, service ratio model, probabilistic models, discriminate analysis, probit analysis and logit analysis, and probabilistic approaches.

UNIT-V

Traffic Assignment and Plan Preparation; Nodes, links, transport. network, coding, rout characteristics, network skims, various methods, judgment, towpath method, diversion curves, network, assignment, all or nothing assignment, capacity restraint techniques, multi-path assignment technique, graph theory and probabilistic assignment model.

UNIT-VI

Allocation of traffic, equilibrium assignment, dynamic assignment, land use transport models, Lowry models, Garin Lowry models, ISGLUTI models, mobility and accessibility, five stage models, choice models, urban goods transport, strategies for the evaluation of alternate transportation plans and plan implementation, framework and case studies, preparation of master plans

TEXTBOOKS:
1. Hutchinson, E.G., Principles of Urban Transport Systems Planning, McGraw Hill, New York, 1974.
2. Ortuzar, J. and Williamson, E.G., Modelling Transport, Wiley, Chinchestor, 1994.
3. Oppenheim, N., Urban Travel Demand Modeling: From Individual Choices to General Equilibrium, Wiley, New York, 1995.

REFERENCES:
1. Thomas, R., Traffic Assignment Techniques, Avebury Technical, Aldershot, 1991.
2. Taniguchi, E., Thompson, R.G, Yamada, T. and Van Duin, R., City Logistics - Network Modelling and Intelligent Transport Systems, Elsevier, Pergamon, Oxford, 2001.
3. Bruton, M.I, Introduction to Transportation Planning, Hutchinson, .London, 1985.
4. Dickey, J.W, Metropolitan Transportation Planning, Tata McGraw Hill, New Delhi, 1975.

7KC84: LANDFILL ENGINEERING

(Professional Elective – IV)

B.Tech IV Year II Semester

	L	T	P/D	C
	3	1	-	3

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x									

Course Objectives

1. Will learn about various techniques of land fill
2. Will learn about liners and various components of waste disposal units
3. Exposed to the knowledge chemical constituents of leachate
4. Will learn about Design criteria of waste disposal units
5. Exposed to graphical and analytical methods to determine the lateral earth pressure
6. Will learn about Analyse about earth retaining structures

Course Outcomes: the student will be able to:

1. Acquired knowledge about various techniques of land fill
2. To design of liners and various components of waste disposal units
3. To understand analysis of chemical constituents of leachate
4. To design cover systems of waste disposal units
5. Familiar with graphical and analytical methods to determine the lateral earth pressure under various influencing factors
6. Analyse all types of earth retaining structures for the stability against sliding, overturning and bearing failure

UNIT - I

Environmental-geotechnical application , introduction ,basic considerations of ground improvement systems ,load environmental factor design criteria, load factor design criteria and approaches , environmental load factor design criteria, soil structure , structural soil interaction , soil foundation structure interactions, load factor of safety and allowable condition, bearing capacity of granular soil, friction forces and angle between two materials

UNIT - II

Liners, different types, properties of liners, clay liners, geo-synthetic liners, composite liners, design aspects.

UNIT - III

Reclaiming potentially combustible sites , Introduction to combustion process, combustion tests , use of combustion potential tests, Land fill gases , principal gases and their properties, Gas monitoring ,Data assessment and remedial solutions.

UNIT - IV

Establishment of new landscapes, Introduction, plant requirements, soil cover, soil fertility, site preparation, establishing grass cover, Establishing trees and shrubs, Maintenance.

UNIT - V

Types, at rest, active, passive, Rankine's theory, Backfill features, Soil type, surface inclination, loads on surface, soil layers, water level, Coulomb's theory, Effect due to wall friction and wall inclination, Graphical methods, Earthquake effects.

UNIT - VI

Rigid retaining structures, Types, Empirical methods, stability analysis Flexible Retaining structures, Types, Material, Cantilever sheet piles, Anchored bulkheads, free earth method, fixed earth method, moment reduction factors, anchorages, Cofferdams, diaphragm walls.

TEXT BOOKS:
1. Alam Singh and Chowdhary G.R, Soil Engineering in Theory and Practice. (1994), CBS Publishers and Distributors Ltd., New Delhi.
2. Punmia B.C, Soil Mechanics and Foundation Engg. (2005), 16th Edition Laxmi Publications Co. New Delhi 31

REFERENCES:

1. Hsai –yang Fang., "Introduction to Environmental Geotechenology" CRC press Newyork, 1997

2. Cairmey .T. , "Contominated land problems and solutions", Blackie Academic & Professional, NewYork, 1993.

7KC86: FOUNDATION ANALYSIS AND DESIGN

(Professional Elective – V)

B Tech IV Year II Semester

L	T	P/D	C
3	1	-	3

1	2	3	4	5	6	7	8	9	10	11	12
x	x	x									

Course Objectives

1. To understand the soil exploration methods
2. To understand the concepts of later
3. To Analyze shallow foundations
4. To Calculate the bearing capacity of soils and foundation settlements
5. To Design the Pile foundation
6. To acquire the knowledge of well foundation

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

1. understand soil exploration methods
2. calculate earth pressures on foundations and retaining structures
3. Analyse the shallow foundations
4. determine bearing capacity of soils and foundation settlements
5. Design the Pile foundation
6. Understand the concept of well foundation

Unit – I

Soil Exploration: Introduction and different methods – Direct methods, Semi-direct and Indirect methods; Sampling in soils and rocks; subsurface exploration program - Preparation of bore logs and preparation of exploration report

Unit – II

Lateral Earth Pressures: Lateral earth pressure theory, Different types of earth pressures, Rankine's active and passive earth pressures, pressure distribution diagram for lateral earth pressures against retaining walls for different conditions in cohesion-less and cohesive soils, Coulomb's active and passive earth pressure theory, Culmann's graphical construction, Problems.

Unit – III

Shallow foundations: Types of shallow foundations and choice, basic requirements, Significance of these foundations

Bearing capacity of foundation: Bearing capacity – Basic Definitions, Factors affecting bearing capacity, Estimation of Bearing capacity by different methods, Analytical measures – Terzaghi's and IS methods and calculations, Field measures – SPT, CPT and Plate load tests.

Unit – IV

Settlement of foundation: Settlement analysis – Types of foundation settlement, Components of settlements - their estimation, Allowable settlement values, Effects, Causes and remedial measures of total and differential settlements

Unit – V

Pile foundations: Classification and uses, Load carrying capacity calculations by different methods – static methods, dynamic methods, in-situ penetration tests, piles load test; Negative skin friction; under reamed pile foundations; Pile groups – Necessity, Efficiency, Group capacity and settlements.

Unit – VI

Well foundations; Types of caissons and their construction; Different shapes of wells, component parts and forces; Estimation of bearing capacity; sinking of wells and remedial measures for tilts and shifts.

TEXTBOOKS:

1. Murthy, V. N. S. Advanced Foundation Engineering. CBS Publishers & Distributors, 2007.
2. Arora, K. R. (2008). Soil mechanics and foundation engineering (geotechnical engineering). Standard Publishers Distributors, Nai Sarak, Delhi, 953p.
3. Das, Braja M. Principles of foundation engineering. Cengage learning, 2015

REFERENCES:

1. Designing with Geosynthetics. Fifth Edition. Prentice Hall. Lambe, T.W, and Whitman R.V. (1969).
2. Proceedings of the International symposium of Environmental Geotechnology (Vol.I and II), Environmental Publishing Company, 1986 and 1989.

7KC87: WATER QUALITY ENGINEERING
(Professional Elective-V)

B. Tech IV Year II Semester

L	T	P/D	C
3	1	-	3

a	b	c	d	e	f	g	h	i	j	k
X	X	X			X	X				

Course Objective
The objectives of learning the subject are to understand
1. Flow and transport through porous media
2. Basic principles of flows in porous media
3. Percolation theory
4. Single phase flow in a porous medium
5. Continuum approach, Pore network approach
6. Multiphase flows in porous media

Course Outcome
On successful completion of the course, students will be able to
1. Understand basics of flow and transport through porous media
2. Understand the basic principles of flows in porous media
3. Understand the single Phase Flow in a porous medium
4. Understand the concept of continuum approach
5. Understand the concept pore network approach and its method.
6. Understand Multiphase flows in porous media

UNIT-I:
The Porous Medium Introduction, the Physical Medium, Relevant Physical Phenomena, Pore Scale vs. Continuum Scale, Fluid and Porous Matrix Properties, Surface Phenomena Adsorption, Wetting, Thin Films, Transport through Membranes.

UNIT-II:
Balance Principles: Mass, Momentum and Energy Conservation, Equations of Motion; Diffusion and Convective-Diffusion Equations; Fluid Flow in Porous Media; Multiphase Flows in Porous Media

UNIT-III:
Characterization of pore space connectivity: Percolation theory: Network Models of porous media, Percolation Theory, connectivity and cluster property, Difference between numerical and continuum equation, porous material with low percolation threshold, Network model with correlation.

UNIT-IV:
Single Phase Flow in a Porous Medium: The Continuum Approach: Derivation of Darcy's Law: Ensemble Averaging, Measurement of Permeability, Exact Results, Fluid Flow, Transport, Effective-Medium and Mean-Field Approximations , Fluid Flow, Transport, Cluster Expansion, Fluid Flow, Rigorous Bounds

UNIT-V:

Single-Phase Flow and Transport in Porous Media: The Pore Network Approach, the Pore Network Model, Effective-Medium Approximation, Effective-Medium Approximation and Percolation Disorder, the Bethe Lattice Model, Critical Path Analysis, Random Walk Method, Non-Darcy Flow.

UNIT-VI:

Immiscible Multiphase Flow: Surface Chemistry, Thermodynamics of Interface, Interfacial Tension, Capillary Pressure, Simultaneous Flow of Two Fluids, models of two phase flow in unconsolidated porous media, Relative permeability, Measurement of relative permeability, Effects of wettability on relative permeability

TEXTBOOKS:
1. Dynamics of Fluids in Porous Media by Jacob Bear, Dover Publications.
2. Flow and Transport in Porous Media and Fractured Rock by Muhammad Sahimi, VCH.

REFERENCES:
1. The physics of flow through porous media by Adrian E. Scheidegge, third edition, University of Toronto Press.
2. Principles of Heat Transfer in Porous Media by M. Kaviany, second edition, Springer.
3. The method of volume averaging by Stephen Whitaker, Kluwer Academic Publishers.
4. Introduction of Modeling of Transport Phenomena in Porous Media by Jacob Bear and Yehuda Bachmat, Kluwer Academic Publishers.

7KC88: INTELLIGENT TRANSPORTATION SYSTEMS
(Professional Elective-V)

B. Tech IV Year II Semester

	L	T	P/D	C
	3	1	-	3

a	b	c	d	e	f	g	h	i	j	k
						X	X			

Course Objectives:
The student is being exposed to the course with the following Objectives:

1. Learn about the evolution of ITS, types and benefits
2. To develop an understanding of various sensor technology used in ITS.
3. To describe the ITS architecture and user needs in functional areas of ITS.
4. Understand the various models of ITS and evaluation methods.
5. Know about Traffic and incident management systems and study about travel demand management
6. Learn about Automated Highway Systems and various applications of ITS in developing countries

Course Outcomes:
At the end of the course the students:
1. Will have gained a basic understanding and appreciation of the concepts related to ITS technologies.
2. Differentiate different ITS user services.
3. Select appropriate ITS technology, depending upon site specific conditions.
4. Design and implement ITS components.
5. Perform Traffic and incident management and travel demand management works
6. Oversee operations at a typical ITS enabled transportation management center

UNIT – I
Fundamentals of ITS: Definition of ITS, the historical context of ITS from both public policy and market economic perspectives, Types of ITS; Historical Background, Benefits of ITS.

UNIT – II
Sensor technologies and Data requirements of ITS: Importance of telecommunications in the ITS. Information Management, Traffic Management Centers (TMC). Application of sensors to Traffic management; Traffic flow sensor technologies; Transponders and Communication systems; Data fusion at traffic management centers; Sensor plan and specification requirements; Elements of Vehicle Location and Route Navigation and Guidance concepts; ITS Data collection techniques – Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), GIS, video data collection.

UNIT – III
ITS User Needs and Services and Functional areas – Introduction, Advanced Traffic Management systems (ATMS), Advanced Traveller Information systems (ATIS), Commercial Vehicle Operations (CVO), Advanced Vehicle Control systems (AVCS), Advanced Public Transportation systems (APTS), Advanced Rural Transportation systems (ARTS).

UNIT – IV

ITS Architecture – Regional and Project ITS architecture; Concept of operations; ITS Models and Evaluation Methods; Planning and human factor issues for ITS, Case studies on deployment planning and system design and operation; ITS and safety, ITS and security, ITS planning.

UNIT – V

ITS applications: Traffic and incident management systems; ITS and sustainable mobility, travel demand management, electronic toll collection, ITS and road-pricing; Transportation network operations; commercial vehicle operations and intermodal freight; public transportation applications;

UNIT – VI

ITS and regional strategic transportation planning, including regional architectures: ITS and changing transportation institutions Automated Highway Systems – Vehicles in Platoons – Integration of Automated Highway Systems. ITS Programs in the World – Overview of ITS implementations in developed countries, ITS in developing countries.

TEXT BOOKS:
1. Fundamentals of intelligent transportation systems planning By Mashrur A. Chowdhury, Adel Wadid Sadek.
2. Sensor technologies and Data requirements of ITS., by Lawrence A. Klein,

REFERENCES:
1. ITS Hand Book 2000: Recommendations for World Road Association (PIARC) by Kan Paul Chen, John Miles.
2. Sussman, J. M., Perspective on ITS, Artech House Publishers, 2005.
3. National ITS Architecture Documentation, US Department of Transportation, 2007.

7KC89: ENVIRONMENTAL GEOTECHNOLOGY

(Professional Elective-V)

B. Tech IV Year II Semester

| | | L | T | P/D | C |
| | | 3 | 1 | - | 3 |

a	b	c	d	e	f	g	h	i	j	k	l
X	X				X	X	X				

Course Objectives
The objectives of learning the subject are to understand
1. soil physics, soil chemistry, hydrogeology, and biological processes along with the principles of soil mechanics.
2. Role of soil in geo environmental application.
3. The Soil-water-contaminant interaction.
4. Environmental problems related to the reduction of waste, waste disposal facilities and cleanup of contaminated sites.
5. Master concepts in unsaturated soils related to moisture migration
6. Advanced soil characterization.

Course Outcomes
On successful completion of the course, students will be able to
1. Understand the physical, chemical, biological and hydro geological behaviour of soil.
2. Know the various application of geo environmental engineering.
3. Understand the soil - water characteristics curves.
4. Know the Remediation methods for soil and groundwater.
5. Understand the concepts in unsaturated soils related to moisture migration
6. Analyse soil contaminant using electric method.

Unit-I:
FUNDAMENTALS OF GEOENVIRONMENTAL ENGINEERING – Introduction to Geo environmental Engineering, Multiphase behaviour of soil, Role of soil in Geoenvironmental applications, Importance of soil physics, soil chemistry, hydrogeology and biological process, Sources and type of ground contamination, Impact of contamination on Geoenvironmental, Some case histories on Geoenvironmental problems.

Unit-II:
SOIL-WATER-CONTAMINANT INTERACTION: Soil mineralogy, formation of soil minerals, important properties of clay minerals, applications of soil mineral analysis in Geoenvironmental engineering, Soil-water-contaminant interaction, Properties of adsorbed water, diffused double layer and different models representing double layer, cation exchange capacity and Factors influencing CEC of the soil, quantification of soil water.

Unit-III:
Movement of Water and Contaminant: movement of water in different hydrologic horizons: ground water zone, vadoze (unsaturated) zone, root zone, soil-water characteristic curve (SWCC) models, different soil-water-contaminant interaction mechanisms: Chemical mass transfer and attenuation, Mass transport, Other factors.

Unit-IV:

WASTE CONTAINMENT SYSTEM: Introduction to waste containment facilities and disposal practices, Landfills: Engineered landfills, Methods for landfill site selection; Subsurface investigation for waste management; Design of landfills; Governing differential equation for contaminant transport, Determination of hydrodynamic dispersion and retardation coefficient, Determination of diffusion coefficient.

Unit-V:

CONTAMINATED SITE REMEDIATION: Contaminated site characterization/ assessment; Selection and planning of remediation methods; Risk assessment of contaminated site; Remediation methods for soil and groundwater: Physico-chemical methods, Biological methods, Electro-kinetic methods, Thermal methods; Some examples of in-situ remediation.

Unit-VI:

ADVANCED SOIL CHARACTERIZATION: Soil contaminant analysis; Electrical property of soil, Uses of electrical properties of soil, Measurement of electrical properties of soil; Thermal property of soil, Factors influencing soil thermal resistivity, Measurement of soil thermal resistivity; Water content and permeability measurements: Volumetric water content sensors, Guelph permeameter, Tension Infiltrometer, Minidisk infiltrometer; Ground Penetrating Radar for site evaluation; Introduction to geotechnical centrifuge modelling, Potential of geotechnical centrifuge for Geoenvironmental Project.

TEXTBOOKS:
1. Lakshmi N. Reddy, Hilary. I. Inyang – Geo-Environmental Engineering – Principles and Applications – Makcel Dekker Ink, 2000
2. Geoenvironmental Engineering: Site Remediation, Waste Containment, and Emerging Waste Management Technologies. John Wiley & Sons, Inc.
3. Unsaturated Soil Mechanics. John Wiley & Sons, Inc. Mitchell, J.K. (1993).

REFERENCES:
1. Fundamentals of Soil Behavior. Second Edition, John Wiley & Sons, Inc. Sharma, H.D. and Lewis, S.P. (1994).
2. Waste Containment Systems, Waste Stabilization, and Landfills: Design and Evaluation. John Wiley & Sons, Inc. Sharma, H.D. and Reddy, K.R. (2004).
3. Daniel, David E. (1993). Geotechnical Practice for Waste Disposal. Chapman & Hall. Koerner, R.B. (2005).
4. Designing with Geosynthetics. Fifth Edition. Prentice Hall. Lambe, T.W, and Whitman R.V. (1969).
5. Proceedings of the International symposium of Environmental Geotechnology (Vol.I and II), Environmental Publishing Company, 1986 and 1989.

7K880: PROJECT - II

B. Tech IV Year II Sem.   **L   T   P/D   C**
                                                                    -    -   20   5

Course Objectives :

To enhance project selection, conceptualization, and associated skills of design, experimenting, modeling, and presentation in order to improve the employability of the students.

Course Outcomes: After completing this course, student shall be able to:

1. Have a thorough review and outline various civil engineering problems that can be taken up as project work
2. Work in a team to select a problem for project work
3. Review and evaluate the available literature on the chosen problem
4. With the help of faculty advisor formulate a methodology to solve the identified problem
5. Apply the principles, tools and techniques to solve the problem
6. Prepare and present project report

Out of the total evaluation is for 200 marks 60 marks shall be for internal evaluation and 140 marks for the external evaluation at the end of the semester. External evaluation of the project (viva-voce) shall be conducted by a committee appointed by the Chief Superintendent of Examinations. The committee consists of an external examiner, HOD, a senior faculty member and or internal guide.

Division of marks for internal assessment – 60 marks
- Progress of Project work and interim report at the end of 5 weeks : 05 Marks
- Seminar at the end of 5 weeks   : 05 Marks
- Progress of Project work at the end of 10 weeks   : 05 Marks
- Seminar at the end of 10 weeks   : 05 Marks
- Evaluation by the Guides (at the end of 15 weeks)   : 10 Marks
- Project Report   : 10 Marks
- Final presentation and defense of the project   : 20 Marks

Pattern of External Evaluation for Project – 140 Marks
1.   Final Project Report   : 30 Marks
2.   Presentation   : 20 Marks
Demonstration / Defense of Project   : 90 Marks