COURSE STRUCTURE APPROVED IN PREVIOURS BOS MEETINGS

(For 2018 – 2019 Admitted Batch) - V18 Regulation

I SEMESTER

S.No	Course Code	Course Name	L	Т	Р	С
1	V18ENT01	English – I	2	-	-	MNC
2	V18MAT01	Engineering Mathematics – I	3	1	-	4
3	V18CHT01	Engineering Chemistry	3	1	-	4
4	V18CST01	Programming in C for problem solving	3	-	-	3
5	V18MET01	Engineering Graphics	1	-	3	2.5
6	V18ENL01	English Communication Skills Lab – I	-	-	2	MNC
7	V18CSL01	Programming lab in C for problem solving	-	-	3	1.5
8	8 V18CHL01 Engineering Chemistry Lab		-	-	3	1.5
		Total	12	2	11	16.5

Total Contact Hours : 25 Total Credits : 16.5

II SEMESTER

S.No	Course Code	Course Name	L	Т	Р	С
1	V18ENT02	English – II	2	-	-	2
2	V18MAT02	Engineering Mathematics – II	3	1	-	4
3	V18PHT01	Optics and Waves	3	1	-	4
4	VI8MET03	Engineering Mechanics	3	1	-	4
5	V18ENL02	English Communication Skills Lab – II	-	-	2	1
6	V18CEL01	Computer aided Civil Engineering Drawing Lab	-	-	3	1.5
7	V18PHL01	Optics and Waves Lab	-	-	3	1.5
8	8 VI8MELO1 Engineering and IT Workshop		-	-	3	1.5
		Total	11	3	11	19.5

Total Contact Hours : 25 Total Credits : 19.5

C M-	Course Code Course Title	Occurre Title	Hours	s per week		Credits
5.INO	Course Code	Course Title	L	Т	Р	С
1	V18CET04	Strength of Materials-I		1	0	4
2	V18CET36	Building Materials Planning & Construction	3	1	0	4
3	V18CET10	Introduction to Fluid Mechanics	3	1	0	4
4	V18CET35	Principles of Environmental Science & Engineering	2	0	0	2
5	V18MAT04	Probability & Statistics	3	1	0	4
6	VI8EET01	Basic Electrical and Electronics Engineering	3	1	0	4
7	V18CEL02	Material Testing Lab	0	0	3	1.5
8	VI8EEL01	Basic Electrical and Electronics Engineering Lab	0	0	2	1
9	V18ENT03	V18ENT03 Professional Communication Skills -I			0	0
	Total				6	24.5

III SEMESTER

Total Contact Hours : 29 Total Credits : 24.5

IV SEMESTER

C Ma	Course Code	Course Code Course Title	Hours per week		eek	Credits
5.INO	Course Code	Course Thie	L	Т	Р	С
1	V18CET13	Strength of Materials-II	3	0	0	3
2	V18CET08	Engineering Geology	2	0	0	2
3	V18CET09	Concrete Technology	3	1	0	4
4	V18CET14	Hydraulic Engineering	3	1	0	4
5	V18CET11	Surveying and Geomatics	2	1	0	3
6	V18MBT51	Managerial Economics & Financial Analysis		0	0	3
7	V18CEL03	Concrete Technology Lab		0	3	1.5
8	V18CEL04	Surveying Lab	0	0	3	1.5
9	V18CEL05	Fluid Mechanics And Hydraulic Machinery Lab	0	0	3	1.5
10	V18CEL06	Engineering Geology Lab	0	0	2	1
11	11 V18ENT04 Professional Communication Skills -II				0	0
	Total				11	24.5

Total Contact Hours : 32 Total Credits : 24.5

V SEMESTER

S No	S No Course Course Title		Ho	urs per we	eek	Credits
5.INO	Code	Course The		Т	Р	С
1	V18CET15	Structural Analysis-I	3	0	0	3
2	V18CET16	Geotechnical Engineering-I	3	0	0	3
3	V18CET17	Hydrology & Water Resources Engineering		0	0	3
4	V18CET18	Design of Reinforced Concrete Structures	3	0	0	3
5	V18CET19	Transportation Engineering-I		0	0	3
6	V18CET33	Remote Sensing And Geographical Information System		0	0	2
7	V18CEL07	Transportation Engineering Lab	0	0	3	1.5
8	V18CEL08	Geotechnical Engineering Lab	0	0	3	1.5
9	V18ENT11	Constitution of India	2	-	-	0
10	0 V18ENT05 Professional Communication Skills -III		4	0	0	0
		Total	23	0	6	20

Total Contact Hours: 29

Total Credits: 20

VI SEMESTER

C N-	Course	C T:41-	Но	urs per w	eek	Credits
S.No Code Course little		Course little	L	Т	Р	С
1	V18CET20	Structural Analysis - II	3	0	0	3
2	V18CET21	Geotechnical Engineering – II	3	0	0	3
3	V18CET22	Design of Steel Structures	3	0	0	3
4	V18CET23	Transportation Engineering – II		0	0	3
5	V18CET24	Environmental Engineering - I		0	0	3
6		Open Elective I		0	0	3
7	V18CEL09	Environmental Engineering Lab	0	0	3	1.5
	V18CEL10	CAD & GIS Lab		0	3	1.5
8	V18ENT06	06 Professional Communication Skills – IV		0	0	0
		Total	22	0	6	21

Total Contact Hours: 28

Total Credits: 21

COURSE STRUCTURE PROPOSED FOR APPROVAL IN 4th BOS MEETING

VII S	VII SEMESTER								
C M-	Course Co la	Course Title		Hours per week					
5.NO	Course Code	Course Thie	L	Т	Р	С			
1	V18CET25	Estimation, Specification and Contracts		0	0	3			
2	V18CET26	Environmental Engineering - II	3	0	0	3			
3	V18CET27 V18CET28 V18CET29 V18CET30 V18CET31	 Professional Elective Course – 1 1. Pavement Analysis and Design 2. Air Pollution and Control 3. Irrigation Engineering 4. Bridge Engineering 5. Advanced Foundation Engineering 	3	0	0	3			
3	V18CET32 V18CET34 V18CET37 V18CET38 V18CET39	 Professional Elective Course – 2 1. Traffic Engineering & Management 2. Construction Project Planning & Systems 3. Solid Waste Management 4. Ground Water Development 5. Earthquake Engineering 	3	0	0	3			
4		Open Elective Course – 2	3	0	0	3			
6	V18CEPWA	Project Work Part - A	0	0	6	3			
		Total	15	0	6	18			

Total Contact Hours: 21 Total Credits: 18

VIII SEMESTER

S No	S.No Course Code Course Title		Но	urs per w	Credits	
5.110	Course Coue	Course Thie	L	Т	Р	С
1	V18CET40 V18CET41 V18CET42 V18CET43 V18CET44	 Professional Elective Course – 3 Highway Construction and Management Repair and Rehabilitation of Structures Rural Water Supply and onsite sanitation Systems. Pre stressed Concrete Engineering with Geo-synthetics 		0	0	3
2	V18CET45 V18CET46 V18CET47 V18CET47 V18CET48 V18CET49	 Professional Elective Course – 4 1. Urban Hydrology and Hydraulics 2. Environmental Impact Assessment and Management 3. Advanced Concrete Technology 4. Finite Element Methods 5. Ground Improvement Techniques 	3	0	0	3
3		Open Elective Course – 3		0	0	3
4	V18CEPWB	Project Work Part - B		0	14	7
		Total	9	0	14	16

Total Contact Hours: 23 Total Credits: 16

I B.Tech I Semester

English – I (Common to all branches)

S.No	Course Code	Course Name	L	Т	Р	C
1	V18ENT01	English –I	2	-	-	MNC*

(*MNC : Mandatory Non Credit Course)

CO-1

Course Outcomes

Understand human resources and their contribution to the society, listen to and read a text to comprehend, interpret and answer questions, and use prepositions and tenses appropriately.

CO-2

Appraise the problems of transport and the solutions, write the gist of a short-story, know the etymological roots of words, use prefixes and exhibit basic skills in writing.

CO-3

View Solar Energy as a viable alternative source, and read for comprehension, analysis and interpretation and present narratives in writing.

CO-4

Evaluate various alternative sources of energy, spell words appropriately, pronounce them with proper stress, punctuate sentences correctly and narrate instances and stories.

CO-5

Realize the value of our living environment, describe animals, birds, objects, events, processes, etc., write paragraphs coherently and use connectors effectively.

CO-6

Grasp the vital role of training in industrial organizations, use prepositions, take notes, follow the office etiquette and write impressive narrations.

Syllabus

Unit-1

Human Resources: (From 'English for Engineers and Technologists') Human resources and their contribution to the society Word Stress, Simple Present Tense and Simple Past Tense Using Present Continuous Tense Role-play Prepositions and Verb forms : Correct usage Phrases and Clauses **Reading Skills development** Paragraph writing : Cohesion An Ideal Family: A short story by Catherine Mansfield (From 'Panorama: A Course on Reading') Vocabularv Unit-2 Transport : Problems and Solutions (From 'English for Engineers and Technologists') Etymological roots Prefixes Pronunciation Parts of Speech

Useful expressions Writing Skills development Writing Minutes of Meeting War: A short story by Luigi Pirandello (From 'Panorama: A Course on Reading') Vocabulary Unit-3 **Evaluating Technology** (From 'English for Engineers and Technologists') Writing Reading Comprehension The Verger : A short story by Somerset Maugham (From 'Panorama: A Course on Reading') Vocabulary Antonyms and abbreviations Unit-4 Energy: Alternative Sources (From 'English for Engineers and Technologists') Word Stress Antonyms Suffixes Comprehension Spelling and Punctuation Sentence structures The Scarecrow : A short story by Satyajit Ray (From 'Panorama: A Course on Reading') Vocabulary Unit-5 **Our Living Environment** (From 'English for Engineers and Technologists') Connectors Describing an animal/ a bird Verb forms : practice **Reading Skills development** Writing Skills development Making notes A Village Lost to the Nation : A short story by Krishna Chandra Pujari (From 'Panorama: A Course on Reading') Vocabulary Unit-6 **Industry : Safety and Training** (From 'English for Engineers and Technologists') Taking notes Prepositions **Reading Skills development** Word formation : Etymological Roots Writing Skills development **Office Etiquette** Martin Luther King and the African: A short story by Chinua Achebe (From 'Panorama: A Course on Reading') Vocabulary **Books Prescribed:** 1. English for Engineers and Technologists Orient BlackSwan Pvt Ltd. 2. Panorama : A Course on Reading, Oxford University Press (Prescribed for I B.Tech students of the JNTUK, Kakinada under R16 Regulation) **Suggested Readings from AICTE**

1. Practical English Usage. Michael Swan, OUP. 1995

2. Remedial English Grammar, F.T. Wood. Macmillian, 2007

- 3. On Writing Well. William Zinsser.Harper Resource Book. 2001
- 4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press 2006
- 5. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press.2011
- 6. Exercises in Spoken English. Parts, I-III. CIEFL, Hyderabad Oxford University Press

Books for further reference

- 1. The Oxford guide to Writing & Speaking John Seely
- 2. Technical Communication : Principles and practice Meenakshi Raman & Sangeetha Sharma, Oxford University Press, New Delhi, 2014.
 - (For Gujarat Technological University)
- 3. Business communication Concepts, Cases and Application P.D. Chaturvedi and Mukhesh Chaturvedi, Pearson Education, Delhi, 2006.
- 4. The Students' Companion Wilfred D. Best (New Edition) Harper, Collins Publishers, 2012.

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I B.Tech I Semester

MATHEMATICS-I (Common to All Branches)

S.No	Course Code	Course Name	L	Т	Р	С
1	VI8MAT01	MATHEMATICS-I	3	1	-	4

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

CO1: Apply matrix technique to solve system of linear equation.

CO2: Find Eigenvalues and Eigen vectors

CO3: Solve the ordinary differential equations of first order & first degree

CO4: Solve the linear differential equations of higher order

CO5: Calculate maxima and minima of functions of two variables

CO6: Solve first order partial differential equations.

UNIT I: Linear system of equations:

Rank-Echelon form-Normal form – Solution of linear systems – Gauss elimination – Gauss Jordon- Gauss Jacobi and Gauss Seidal methods.

Applications: Finding the current in electrical Circuits.

UNIT II: Eigen values - Eigen vectors and Cayley-Hamilton theorem:

Eigenvalues - Eigen vectors - Properties - Cayley-Hamilton theorem (without proof) - Inverse and powers of a matrix by using Cayley-Hamilton theorem.

UNIT-III: Differential equations of first order and first degree:

Linear-Bernoulli-Exact-Reducible to exact differential equations.

Applications: Newton's Law of cooling-Law of natural growth and decay-Orthogonal Trajectories.

UNIT IV: Linear differential equations of higher order:

Linear non homogeneous differential equations of higher order with constant coefficients involving RHS term of the type e ax, sin ax, cos ax, polynomials in x, e ax V(x), xV(x)- method of variation of parameters.

UNIT V: Partial differentiation:

Introduction- Homogeneous function-Euler's theorem-total derivative-chain rule-generalized mean value theorem for single variable (without proof)-Taylor's and Maclaurin's series expansion of functions of two variables (without proof)– Functional dependence- Jacobian.

Applications: maxima and minima of functions of two variables without constraints and Lagrange's method (with constraints).

UNIT VI: First order Partial differential equations:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – solutions of first order linear (Lagrange) equation.

Text Books:

- 1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
- 2. N.P.Bali, Engineering Mathematics, Lakshmi Publications.

Reference Books:

- 1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India
- 2. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
- 3. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
- 4. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.

I Year – I/II Semester

ENGINEERING CHEMISTRY

(Common to all branches)

S.No	Course Code	Course Name	L	Т	Р	С
1	V18CHT01	ENGINEERING CHEMISTRY	3	1	-	4

Course Outcomes:

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

CO1: Apply different plastics and rubbers for various engineering applications.

CO2: Assess the quality of fuels and apply the knowledge of fuels for the preservation of natural fuels.

CO3: Understand relevant concepts of Electro Chemistry to apply them in designing electrochemical energy systems.

CO4: Analyse boiler troubles arising due to poor water quality and suggest suitable water treatment methods for different industrial applications.

CO5: Analyse the causes for practical corrosion problems and apply corrosion principles for protection of metallic structures from corrosion.

CO6: Identify the important applications of advanced engineering materials.

UNIT I: HIGH POLYMERS

Polymerisation: Introduction- Mechanism of Free radical addition polymerization – Plastics as engineering materials: advantages and limitations - Thermoplastics and Thermosetting plastics - Compounding and fabrication techniques (Compression, Injection, Transfer and Extrusion) - Preparation, properties and applications of Polythene (HDPE and LDPE), PVC, Bakelite, and Teflon.

Elastomers: Natural rubber - Vulcanization of rubber - Synthetic Rubbers: Preparation, properties and applications of Buna S, Buna N, and Thiokol.

UNIT II: FUEL TECHNOLOGY

Fuels – Characterstics of good fuel – Classification – Calorific value - HCV and LCV – Dulong's formula, Numerical problems - Bomb calorimeter - Numerical problems.

Solid fuels - Coal -- Proximate and ultimate analysis - Significance of the analyses, Numerical problems.

Liquid fuels -Petroleum- Refining - Cracking - Synthetic petrol (Fischer Tropsch and Bergius process) -Knocking - Octane and Cetane ratings – Anti-knocking agents.

Gaseous fuels – Natural gas, LPG and CNG – Biofuels.

UNIT III: ELECTROCHEMICAL CELLS

Single electrode potential – Electrochemical series and its significance - Standard electrodes (Hydrogen, Calomel and, Glass electrodes) - Conductometric titrations (Acid - Base).

Batteries: Primary battery (Dry Cell) – Secondary batteries (Lead acid cell, Ni-Cd cells).

Fuel cells: H₂-O₂ fuel cell, H₂-methanol fuel cell.

UNIT IV: WATER TECHNOLOGY

Hard water - Types of Hardness – Units of hardness - Determination of hardness and alkalinity - Boiler troubles: Priming and foaming, sludge and scale formation, Boiler corrosion, Caustic embrittlement - Softening of hard water: Zeolite process, Lime - Soda process, and Ion exchange process - Water for drinking purposes -Purification – Sterilization and disinfection: Chlorination, Break point chlorination – Desalination - Reverse Osmosis and Electrodialysis.

UNIT V: CORROSION

Definition – Theories of Corrosion (Chemical & Electrochemical) – Types of electrochemical corrosion (Galvanic corrosion, Concentration cell corrosion, Stress corrosion Pitting corrosionand Intergranular corrosion) -

Galvanic series - Factors which influence the rate of corrosion - Protection from corrosion:Metallic coatings (Cathodic and Anodic), Cathodic protection, Protective coatings –Methods of application of coatings on metals (Galvanizing, Tinning, &Electroplating) – Paints.

UNIT VI: CHEMISTRY OF ADVANCED MATERIALS

Nano materials: Introduction – Carbon nanotubes - Types, preparation (Arc discharge, Laser ablation and CVD Method) - Properties and applications of Nano materials.

Liquid crystals: Introduction – Types – Applications.

Biodegradable polymers – Conducting polymers.

Green Chemistry: Principles, Need for green Chemistry.

Text Books:

- 1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publications & Co.
- 2. A Text book of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd.

Reference Books:

- 1. Engineering Chemistry of Willey India Pvt. Ltd., Vajiram and others.
- 2. Engineering Chemistry by PrasanthRath, Cengage Learning.
- 3. Engineering Chemistry by Shikha Agarwal; Cambridge University Press.
- 4. B. Sivasankar, Engineering Chemistry, McGraw-Hill.

I	B.Tecl	1 – I	/II	Semester
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Programming in 'C' for problem Solving

(Common to all branches)

V18CST01	Programming in 'C' for problem Solving	L	Р	С	
VIOCOTOT		3	0	3	
Course Outcon	nes:				
CO1: Describe v	arious problem solving strategies such as Algorithms and	Flowcha	rts (K2)		
CO2: Develop va	rious programming constructs using Control Structures.		(K3)		
CO3: Summarize	e the process of modular programming approach		(K5)		
CO4: Illustrate t	CO4: Illustrate the usage of String handling functions and pointers				
CO5: Construct		(K3)			
CO6: Distinguish	between Sequential files and Random access files.		(K4)		

UNIT-I: Problem solving concepts: Problem solving strategies - Top down design, Bottom up design,

Algorithms, Flow-charts, Types of Programming Languages, Compiler, Assembler and Linker, Testing and Debugging a program. Introduction to C Programming: Overview and importance of C, C Program Structure, Creation and Compilation of C Programs, Identifiers, Variables, Data types, Constants, Declarations.

UNIT-II: Operators: Arithmetic, relational and logical operators, increment and decrement operators, conditional operator, assignment operator, bitwise operators, special operators, expressions, Precedence, Associativity, Order of evaluation, Type conversion, Programming Examples. Input and output statements: Input and output functions.

Flow of Control: Conditional statements - If-else, Switch-case constructs, Loops - while, do-while, for.

UNIT-III: Arrays: Single-Dimensional Arrays, multi-Dimensional Arrays, initialization and accessing individual elements. Functions: Top down approach of problem solving, standard library functions, user defined functions, parameter passing - call by value, call by reference, return statement, passing arrays as parameters to functions, recursion, command line arguments.

UNIT-IV: Storage Classes: Scope and extent, Storage Classes in a single source file: auto, extern and static, register. Strings in C- Concepts, string handling functions. Understanding pointers: Accessing the address of a variable, declaring pointer variables, initialization of pointer variables, accessing a variable through its pointer, pointer arithmetic, pointer and arrays, pointers and character strings, array of pointers.

UNIT-V:Structures and Unions: Defining, declaring, initialization, accessing, comparing, operations on individual members, array of structures, structures within structures, self referential structure, structures and functions, pointers and structures, bit fields, Programming Examples.

Dynamic Memory Allocation: Definition, malloc, calloc, realloc, free, dynamic arrays.

UNIT-VI:File Processing: Defining and Opening a file, closing a file, input/output operations on files, error handling during I/O operations, random access to files, Programming Examples.

Preprocessor: Definition, Macro substitution, file inclusion, compiler control directives, Programming Examples.

Text Books:

- 1. Computer Programming: Ashok N Kamthane, Pearson Education
- 2. C: The Complete Reference: Herbert Schildt, Osborne/Mcgraw Hill, Inc.
- 3. Let Us C, <u>Yashavant Kanetkar</u>, BPB Publications, 15th Edition

Reference Books:

- 1. Programming with C, Second edition, Byron S Gottfried, Tata McGrawhill
- 2. Programming in C, Reema Thareja, Oxford.
- 3. Problem Solving and Programm design in C, Hanly J R & Koffman E.B, Pearson Education, 2009.
- 4. Foundations of Computer Science (C Edition), Alfred V. Aho.
- 5. Programming and Problem Solving Using C, ISRD Group, Tata McGraw Hill, 2008.
- 6. Programming in C, Pradip Dey, Manas Ghosh, Oxford University Press, 2007.
- 7. Problem Solving Using C: Structured Programming Techniques, <u>Yuksel Uckan</u>.
- 8. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE.
- 9. Computer Programming in C Kerninghan & Ritchie, PHI

I B.Tech- I /II Semester

ENGINEERING GRAPHICS (Common to all branches)

V19MET01	ENGINEERING GRAPHICS	L	Р	С
VIONEIUI		1	3	2.5

Course Outcomes:

After successful completion of the course, the student will be able to

CO1: Demonstrate the usage of drawing instruments and sketch conic sections **(K3)**

CO2: Construct different types of scales and special curves **(K5)**

CO3: Draw the projections of the points, lines and planes with reference to the principal

planes. (K2)

CO4: Develop the projections of solids and its surfaces. **K3**)

C05: Draw the Isometric projections of solids. **(K2)**

CO6: Convert the isometric view to orthographic view and vice versa. **(K2)**

UNIT1: INTRODUCTION TO ENGINEERING GRAPHICS:

Introduction to Engineering Graphics and its significance, usage of Drawing instruments- Mini Drafter, Calipers, Set square etc..Lettering, Conic sections – Ellipse, Parabola, Hyperbola,

UNIT 2: SPECIAL CURVES & SCALES:

Special Curves - cycloid, epicycloids, hypocycloid, involutes; Scales - Plain, Diagonal and Vernier Scales.

UNIT 3: ORTHOGRAPHIC PROJECTIONS:

Introduction to Orthographic Projections- Projections of Points, Projection of lines inclined to both the planes; Projections of planes- inclined to both the Planes.

UNIT 4: PROJECTIONS OF REGULAR SOLIDS:

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes. Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone.

UNIT 5: ISOMETRIC PROJECTIONS :

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple solids and compound Solids;

UNIT 6:

Conversion of Isometric Views to Orthographic Views and Vice-versa.

Text Books:

1. Engineering Drawing by N.D. Butt, Chariot Publications

2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers

Reference Books:

- 1. Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers
- 2. Engineering Graphics for Degree by K.C. John, PHI Publishers
- 3. Engineering Graphics by PI Varghese, McGrawHill Publishers
- 4. Engineering Drawing + AutoCad K Venugopal, V. Prabhu Raja, New Age

I B.Tech I Semester

English Communication Skills Laboratory – I (Common to all branches)

S.No	Course Code	Course Name	L	Т	Р	С
1	V18ENL01	ECS Lab –I	-	-	2	MNC

CO-1

Listen to and make inquiries on phone, thank and respond to thanks in appropriate spoken idiom.

CO-2

Make requests, give permissions and directions in fluent English.

CO-3

Articulate well in the contexts of clarifying, inviting, complaining, congratulating, apolozing, advising, agreeing and disagreeing in conversational mode.

Course Outcomes

CO-4

Distinguish and pronounce letters and sounds of English phonetically.

CO-5

Practise and pronounce consonants, vowels and diphthongs and consonant clusters.

CO-6

Listen to and understand different accents in English, and pronounce English words and speak sentences with right stress and intonation.

Unit-1

Why Study Spoken English

Making Inquiries on the Phone, Thanking and

Responding to Thanks

Practice Work

Unit-2

Requests, Permissions, and Directions

Practice Work

Unit-3

Clarifying, Inviting, Complaining, Congratulating and

Expressing Sympathy

Apologising, Advising, Suggesting, Agreeing and Disagreeing

Practice Work

Unit-4

Letters and Sounds

Practice Work

Unit-5

The Sounds of English

Practice Work

Unit-6

Pronunciation

Stress and Intonation

Practice Work

Book Prescribed:

Interact : English Lab Manual for Undergraduate Students

Orient BlackSwan

(Prescribed for I B.Tech students of the JNTUK, Kakinada under R16 Regulation)

Books for further reference

- 1. The Official Cambridge Guide to IELTS, For Academic & General Training, (With DVD-ROM), Student Book with Answers, 2015.
- 2. English Language Communication Skills, Lab Manuel cum Workbook (with CD), Cengage Learning.

I B.Tech – I/II Semester

Programming Lab in 'C' for problem Solving

(Common to all branches)

VIRCEIA	1		L	Р	С
V TOUSLU	1	Programming Lab in 'C' for problem Solving	0	3	1.5
Course Outco	mes:			i	,
CO 1: Der	nonstr	rate problem solving techniques using Control Structures.		(K3)	
CO 2: Cor	nstruct	Programmes using the concepts of Arrays, Strings and Po	ointers.	(K3)	
CO3: App	ly the	concepts of Functions, Structures and Unions.		(K3)	
CO4: Us	e vario	us file processing operations to develop real time applica	tions.	(K4)	
LIST OF EX Tutorial Lab1: Fa Tutorial	PERI 1: Pro amiliar 2: Va	MENTS: blem solving using computers. ization with programming environment. riable types and type conversions.			
Lab 2: S	imple	computational problems using arithmetic expressions.			
Tutorial	3: Bra	inching and logical expressions.			
Lab 3: P	roblen	is involving if-then-else structures, switch – case.			
I utorial Lab 4. It	4: LO	ops, while and for loops.			
Lav 4. It Tutorial	5. 1D	Arrays: searching sorting			
Lah 5: 1	D Arr	av manipulation			
Tutorial	6: 2D	arrays.			
Lab 6: N	fatrix	problems.			
Tutorial	7: Fu	actions, call by value, call by reference, command line a	rgumen	ts.	
Lab 7: S	imple	functions.	0		
Tutorial	8: Str	ing handling.			
Lab 8: S	tring h	andling functions.			
Tutorial	9: Poi	nters.			
Lab 9: P	rogran	nming with pointers.			
Tutorial	10: R	ecursion, structure of recursive calls.			
Lab 10:	Recurs	sive functions.			
Tutorial	11: St	ructures, unions and dynamic memory allocation.			
Lab 11:	Structu	ures & unions.			
Tutorial	12: Fi	le handling.			
Lab 12:	File of	perations.			
Reference	e Boo	oks:			
1. Masterin	g C, K	.R. Venugopal and S.R. Prasad, TMH Publishers.			
2. Compute	r Prog	ramming in C, V. Rajaraman, PHI.	<i>.</i> .		
3. Program	ning ii	n C, Siepnen G. Kochan, Fourth Edition, Pearson Educa	uon.		
4. C- The C	ompie	with C. Dyron S. Cottfried, Second edition. Tota MaCraw	C.		
5. Programi	ning V	n C Reema Thereia Oxford	/11111.		
7 Drohlam	Solvin	a and Program design in C. Hanly I.D. & Koffman E.D.	Dearson	n Educativ	on 2000
		ig and i togram uesign m.C. Hamy J.K.& Kuttillall E.D.			JII, 2009

8. Programming and Problem Solving Using C, ISRD Group, Tata McGraw Hill,2008.

I Year - I/II Semester

ENGINEERING CHEMISTRY LABORATORY (Common to all branches)

S.No	Course Code	Course Name	L	Т	Р	С
1	V18CHL01	ENGINEERING CHEMISTRY LABORATORY	-	-	3	1.5

Course Outcomes:

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

CO1: Analyze quantitatively a variety of samples using volumetric methods and instrumental methods.

CO2: Applying volumetric and instrumental methods for the determination of water quality parameters namely Alkalinity, Hardness and pH.

CO3: Prepare polymeric materials and analyse the given coal samples.

List of Experiments:

- 1. Introduction to chemistry laboratory Molarity, Normality, Primary, Secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis etc.,
- 2. Trial experiment Estimation of HCl using standard Na₂CO₃ solution.
- 3. Estimation of KMnO₄using standard oxalic acid solution.
- 4. Determination of alkalinity of a sample of water.
- 5. Determination of total hardness of water using standard EDTA solution.
- 6. Determination of rate of corrosion of mild steel in acidic environment in the absence and presence of an inhibitor.
- 7. Estimation of ferrous iron using standard K₂Cr₂O₇solution.
- 8. Estimation of copper using standard EDTA solution.
- 9. Estimation of vitamin C using standard Iodine solution.
- 10. Estimation of pH of the given sample solution using pH meter.
- 11. Conductometric titration between strong acid and strong base.
- 12. Potentiometric titration between strong acid and strong base.
- 13. Proximate analysis of coal.
- 14. Preparation of phenol formaldehyde resin.

Reference Books:

- 1. Practical Engineering Chemistry by K. Mukkanti, B.S. Publications.
- 2. Vogel's Quantitative Chemical Analysis V Edition Longman.
- 3. A Text Book on experiments and Calculations Engineering by S.S.Dara, S.Chand& Co Ltd.
- 4. Chemistry Practical Manual, Lorven Publications.

I B.Tech II Semester

English – II (Common to All Branches)

S.No	Course Code	Course Name	L	Т	Р	С
1	V18ENT02	English –II	2	-	-	2

Course Outcomes

CO-1

Understand the real import of education and work of noble men, use nouns, verbs and adjectives appropriately, identify and correct common errors in usage and write official letters.

CO-2

Derive inspiration from real life samples, interpret and speak on them, use synonyms and antonyms of words properly and do E-correspondence with required netiquette.

CO-3

Assimilate and adjust to new cultural environments, write on life-sketches, make the right use of tense and aspect and concord in sentences and plan and develop speech-writing.

CO-4

Imbibe ideas from the lives and works of successful men, use adverbs, develop view-points and topics and write different types of essays.

CO-5

Emulate personality-development inputs, elaborate on inspiring scientists use one-word substitutes, develop précis writing and write for the media.

CO-6

Learn from the paradigm of great contributors, use collocations and write professional and technical reports in standard formats.

Syllabus

Unit-1

The Greatest Resource - Education (From 'English Encounters')

Understanding the author's perspective

Making use of nouns

Vocabulary – deriving nouns from verbs and adjectives

Misplaced modifiers

Synonyms and Antonyms

Identifying common errors

Letter writing : Standard formats for official letters

A.P.J. Abdul Kalam (From 'The Great Indian Scientists')

Synonyms and Anonyms

Unit-2

Jadav Payeng : 'The Forest Man of India'

Vocabulary : deriving adjectives

Synonyms and Antonyms

Identifying common errors in the use of adjectives

E-correspondence with required Netiquette

Cliches

C.V. Raman (From 'The Great Indian Scientists')

Use of Synonyms and Antonyms of words in different contexts

Unit-3

Cultural Shock : Adjustment to New Cultural Environments

(From 'English Encounters') Building Vocabulary – Verbs and nouns

Synonyms and Antonyms and appropriate usage

Making use of Tense and aspect and subject-verb agreement in sentences Planning and developing speech-writing Reading comprehensions **Homi Jahangir Bhabha** (From 'The Great Indian Scientists') Synonyms and Antonyms

Unit-4

Satya Nadella's First Letter to the Employees as CEO of Microsoft Building Vocabulary – deriving adverbs Identifying common errors in the use of adverbs Essay writing : Developing ideas and topics into different types of essays Redundancies Jagadish Chandra Bose (From 'The Great Indian Scientists') Using synonyms and antonyms of words in different contexts Unit-5 Excerpts from Robin Sharma's 'Who Will Cry When You Die?' One-word substitutes and usage Prepositions Required skills to write for the media Précis writing Prafulla Chandra Ray (From 'The Great Indian Scientists') Using synonyms and antonyms of words in different contexts Unit-6 **The Chief Software Architect** (From 'English Encounters') **Building Vocabulary : Collocations and Usage** Identifying common errors

Report writing – Standard formats and required skills

Srinivasa Ramanujan (From 'The Great Indian Scientists')

Using synonyms and antonyms of words in different contexts

Books Prescribed: **1. English Encounters**

A Text Book to Face Challenges in Communication

Maruthi Publications

(Prescribed for I B.Tech students of the JNTUK, Kakinada under R16 Regulation)

Lessons 2,4 and 5 in the above text book have been replaced by the following

- 1. Jadav Payeng : The Forest Man of India by Shreya Pareek, 2014 Net Source: https://www.thebetterindia.com
- 2. Satya Nadella's First Letter to the Employees as CEO of Microsoft Net Source: https://news.microsoft.com
- 3. Excerpts from Robin Sharma's 'Who Will Cry When You Die?' JAICO Publishing House, Mumbai, 2009
- 2. The Great Indian Scientists, Cengage

Suggested Readings from AICTE

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

Books for further reference

1. The Oxford guide to Writing & Speaking – John Seely

- 2. Technical Communication : Principles and practice Meenakshi Raman & Sangeetha Sharma, Oxford University Press, New Delhi, 2014.
- (For Gujarat Technological University)
- 3. Business communication Concepts, Cases and Application P.D. Chaturvedi and Mukhesh Chaturvedi, Pearson Education, Delhi, 2006.
- 4. The Students' Companion Wilfred D. Best (New Edition) Harper, Collins Publishers, 2012.

I B.Tech II SEMESTER

MATHEMATICS-II (Common to All Branches)

S.No	Course Code	Course Name	L	Т	Р	С
1	VI8MAT02	MATHEMATICS-II	3	1	-	4

Course Outcomes: At the end of the Course student will be able to:

CO1: Estimate approximate root of algebraic and transcendental equations

CO2: Compute interpolating polynomial for the given data

CO3: Solve ordinary differential equations using numerical methods

CO4: Evaluate multiple integrals and improper integrals

CO5: Calculate gradient of a scalar function, divergence and curl of a vector function.

CO6: Apply the knowledge of vector integral concepts to find characteristics of vector fields

UNIT I: Solution of Algebraic and Transcendental Equations:

Introduction- Bisection method – Method of false position – Iteration method – Newton-Raphson method (One variable).

UNIT II: Interpolation:

Introduction- finite differences- forward differences backward differences – central differences – symbolic relations and separation of symbols - differences of a polynomial-Newton's formulae for interpolation - Lagrange's interpolation formula.

UNIT III: Numerical Integration and solution of Ordinary Differential equations:

Trapezoidal rule- Simpson's 1/3rd and 3/8th rule-Solution of ordinary differential equations by Taylor's series- Euler's method - Runge-Kutta method (second and fourth order).

UNIT IV: Multiple Integrals:

Definition of Improper integrals - Double and triple integrals – Change of variables – Change of order of integration.

Applications: Finding areas and volumes.

UNIT V: Vector Differentiation:

Vector differential operator - Gradient- Divergence- Curl - Laplacian and second order operators - Vector identities.

UNIT VI: Vector Integration:

Line integral: Work done – Potential function – Surface and volume integrals - Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and related problems. **Text Books:**

1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.

2. N.P.Bali, Engineering Mathematics, Lakshmi Publications.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-

- 2. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
- 3. V.Ravindranath and P.Vijayalakshmi, Mathematical Methods, Himalaya Publishing House. India
- 4. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
- 5. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.

OPTICS AND WAVES (For Civil Engineering & Mechanical Engineering)

S.No	Course Code	Course Name	L	Т	Р	С
1	V18PHT01	PHYSICS: OPTICS AND WAVES	3	1	-	4

A student who successfully fulfills the course requirements will be able to:

1. Correlate the engineering concepts based on fundamental Physical Optics with Coherent source. Furthermore, students will be able to solve problems connected with the operation of optical instruments.

2. Study the sound waves & Use modern physics techniques and tools.

3. Illustrate the fundamental concepts of magnetism and dielectrics.

<u>UNIT-I</u>

INTERFERENCE: Introduction- Principle of Superposition – Coherent Sources – Interference in thin films (reflection geometry) – Newton's rings – construction and working principle of Michelson Interferometer **UNIT-II**

DIFFRACTION: Introduction- Fraunhofer diffraction at single slit - double slit and

N-slits (qualitative only)-Grating equation – Rayleigh's criterion for resolving power- Resolving power of a grating.

UNIT-III

POLARIZATION: Types of Polarization – Double refraction, Nicol Prism -Quarter wave plate and Half Wave plate.

LASERS: Characteristics– spontaneous emission and Stimulated emission of radiation – Einstein's Transition Probabilities- population inversion– pumping schemes-Ruby laser-He-Ne LASER –Applications of laser

<u>UNIT-IV</u>

ACOUSTICS: Introduction – Types of Acoustics – Sound Absorption – Absorption Coefficient - Reverberation time-Factors Effecting the Reverberation Time - Sabine's Formula- Eyring's Formula – Acoustics of Concert Hall. **UNIT-V**

ULTRASONICS: Introduction- Ultrasonic Transducers - Piezoelectric and Magnetostriction Transducers – Production of Ultrasonic Waves Using Piezoelectric Effect And Magnetostriction Method- Non-Destructive Testing - Pulse Echo Technique – Scan A, Scan B & Scan C Techniques.

<u>UNIT-VI</u>

MAGNETIC PROPERTIES: Introduction- Origin of Magnetic Moment, Classification of Magnetic Materials – Ferromagnetism- Hysteresis – Soft and Hard Magnetic Materials

DIELECTRIC PROPERTIES: Introduction, types of polarizations- Electronic, Ionic and Orientation polarizations (qualitative only), – Internal field – Clausius- Mossoti Equation-Dielectric in alternative fields (Dielectric loss, Strength and Breakdown.)

Text Books:

- 1. M. Armugam, Engineering Physics
- 2. Dr.P.Sreenivasa Rao, Engineering Physics

Reference Books:

- 1. S. Mani Naidu, Engineering Physics.
- 2. S.O.Pillai, Solid State Physics.
- 3. DK Bhattacharya, Engineering Physics.
- 4. Ajoy Ghatak, Optics.
- 5. A.J. Dekker, Solid State Physics.

ENGINEERING MECHANICS

(For ME, CE)

V10MET02		L	Т	Р	С
V18ME103	ENGINEERING MECHANICS	3	1	0	4

Course Outcomes:

After successful completion of the course, the student will be able to **CO1:** Compute the resultant force of a given system of forces **(K3)**

CO2: Calculate the forces in the different types of plane trusses **(K3)**

CO3: Find the Centroid, Center of Gravity and Moment of Inertia for plane figures and bodies **(K3)**

CO4: Illustrate the different types of plane motions of a particle to compute its velocity, acceleration and force.

(K3)

CO5: Illustrate the concept of Work and Energy **(K3)**

CO6: Apply the principle of Virtual Work to stability of equilibrium of beams and trusses **(K3)**

Unit I: Introduction to Engg. Mechanics – Basic Concepts.

Systems of Forces: Coplanar Concurrent Forces – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems.

Equilibrium of Systems of Forces: Free Body Diagrams, Equations of Equilibrium of Coplanar Systems for concurrent forces. Lami's Theorem, Graphical method for the equilibrium of coplanar forces, Converse of the law of Triangle of forces, converse of the law of polygon of forces condition of equilibrium.

Unit II: Analysis of Trusses by Method of Joints: Types of Trusses - Assumptions for forces in members of a perfect truss, Force table, Cantilever Trusses, Structures with one end hinged and the other freely supported on rollers carrying horizontal or inclined loads.

Unit III: Centroid: Centroid of simple figures (from basic principles) – Centroid of composite Figures

Centre of Gravity: Centre of gravity of simple body (from basic principles), Pappus theorems.

Area moments of Inertia: Definition - Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of **Composite Figures.**

Mass Moment of Inertia: Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia.

Unit IV: Kinematics: Rectilinear and Curvilinear motions – Velocity and Acceleration – Motion of Rigid Body – Types and their Analysis in Planar Motion.

Kinetics: Analysis as a Particle and Analysis as a Rigid Body in Translation – Central Force Motion – Equations of Plane Motion – Fixed Axis Rotation – Rolling Bodies.

Unit V: Work – Energy Method: Equations for Translation, Work-Energy Applications to Particle Motion, Connected System-Fixed Axis Rotation and Plane Motion. Impulse momentum method.

Unit VI: Principle of Virtual Work: Principle of virtual work, advantages of principle of virtual work, principle of virtual applied to stability of equilibrium. Application of principle of virtual work limited to beams, ladder problems and trusses only.

Text Books:

- Engg.Mechanics S.Timoshenko&D.H.Young., 4th Edn , McGraw Hill publications.
 Engineering Mechanics by A.K.Tayal , Umesh Publications.
 Engineering Mechanics, Fedinand . L. Singer, Harper Collins.

Reference Books:

- 1. Theory & Problems of engineering mechanics, statics & dynamics E.W.Nelson, C.L.Best& W.G. McLean, 5th Edn – Schaum's outline series - McGraw Hill Publ.
- 2. Meriam J. L., Kraige L. G., "Engineering Mechanics Dynamics", Wiley Student Edition, (Sixth Edition) reprint 2011.
- 3. Beer F. P., Johnston E. R., "Vector Mechanics for Engineers Statics and Dynamics", Tata• McGraw Hill Publishing company Ltd., New Delhi (Eighth Edition) reprint 2009
- 4. Shames Irving H., "Engineering Mechanics", Prentice Hall, New Delhi (Fourth edition) reprint 2009.

I B.Tech II Semester

English Communication Skills Laboratory - II (Common to all branches)

S.No	Course Code	Course Name	L	Т	Р	С
1	V18ENL02	ECS Lab –II	-	-	2	1

Course Outcomes

CO-1

Listen to people critically and argue rationally to present a view-point confidently in formal debates.

CO-2

Exhibit team spirit and communicative skill and participate effectively in group discussions.

CO-3

Plan, structure and give presentations in professional manner.

CO-4

Face and perform well in interviews with required etiquette.

CO-5

Compose E-mails in standard formats to communicate clearly and write different types of CV in vogue that befit today's career needs.

CO-6

Make apt use of idiomatic expressions and recognize and correct typical errors that Indian speakers of English make in pronunciation, spelling, vocabulary and grammar.

Syllabus

Unit-1

Presentation Skills Practice Work Unit-2 **Group Discussions** Practice Work Unit-3 Debating Practice Work Unit-4 **Interview Skills** Practice Work Unit-5 **E-mails** Practice Work Unit-6 **Idiomatic Expressions Common Errors in English Book Prescribed:** Interact : English Lab Manual for Undergraduate Students **Orient BlackSwan** (Prescribed for I B.Tech students of the JNTUK, Kakinada under R16 Regulation) **Books for further reference** 1. The Official Cambridge Guide to IELTS, For Academic & General Training, (With DVD-ROM), Student Book with Answers, 2015. 2. English Language Communication Skills, Lab Manuel cum Workbook (with CD), Cengage Learning.

I YEAR II SEMESTER

COMPUTER AIDED CIVIL ENGINEERING DRAWING

S.No	Course Code	Course Name	L	Т	Р	С
1	V18CEL01	COMPUTER AIDED CIVIL	0	0	3	1.5
		ENGINEERING DRAWING				

COURSE OUTCOMES:

After completion of the course the student should be able to

- Define AUTOCAD and list the applications
- Classify various AUTOCAD commands
- Explain orthographic projections and draw conventional signs as per IS standards
- Identify view points and view ports
- Utilize AUTOCAD commands to plan the buildings section and elevation
- Discover various 3D modeling concepts

UNIT 1 :- INTRODUCTION TO CAD

- Introduction to software; Definition of CAD; Applications of CAD; Advantages of CAD.
- Study of Basic Commands; generation of points, lines, curves, polygons, dimensioning.
- Edit Commands edit, zoom, cross hatching, utility commands, construct, insert

UNIT 2:- COMPUTER AIDED MODELING

- Orthographic Projections.
- Draw conventional signs as per I.S Standards, symbols used in civil Engineering drawing

UNIT 3:- VIEW POINTS AND VIEW PORTS

- View Point Coordinates Options like save, restore, delete, joint, single option
- Layout management ; scale setting ; plotting, Import and export

UNIT 4 : - Plans 2-D

- Building Plans
- Section
- Elevation

UNIT 5 :- 3-D Modeling Concepts

- Introduction to 3-D Modeling
- 3-D Coordinate system
- U.C.S
- Wireframe modeling
- Import and export

REFERENCES

- Engineering drawing with AUTOCAD by B.V.R.Gupta, M.Raja Roy
- Engineering drawing with an introduction to AUTOCAD Dhanunjay, Jolhea (Tata Mcgraw-Hill)

Optics & Waves Lab

For ME & CE

S.No	Course Code	Course Name	L	Т	Р	С
1	V18PHL01	Optics & Waves Lab	-	-	3	1.5

List of Experiments:

(Any eight of the following to be done)

- 1. Determination of Rigidity modulus of a material Torsional Pendulum
- 2. Determination of acceleration due to gravity Compound Pendulum
- 3. Verification of laws of vibrations in stretched strings Sonometer
- 4. Determination of velocity of sound Volume Resonator
- 5. Magnetic field Induction along the axis of current carrying coil Stewart and Gee's apparatus.
- 6. Determination of Planck's constant using photocell.
- 7. Determination of wave length of laser source using diffraction grating.
- 8. Melde's experiment Transverse and longitudinal modes.
- 9. Coupled oscillator Study two normal modes of coupled oscillator.
- 10. Determination of radius of curvature of Plano convex lens by forming Newton's rings.

Opto Electronics & Semiconductors Lab

For ECE, EEE & CSE

S.No	Course Code	Course Name	L	Т	Р	С
1	V18PHL02	Opto Electronics & Semiconductors Lab	-	-	3	1.5

List of Experiments:

(Any eight of the following to be done)

- 1. Newton's rings Radius of curvature of Plano Convex Lens.
- 2. Determination of wavelength of laser source using diffraction grating.
- 3. L-C-R Series Resonance Circuit.
- 4. Study of V/I Characteristics of Semiconductor diode.
- 5. Study of V/I Characteristics of zener diode.
- 6. Characteristics of Thermistor Negative Temperature Coefficient of resistivity.
- 7. Energy band gap of a Semiconductor p-n junction.
- 8. Determination of Hall Coefficient and Carrier Concentration Hall Effect
- 9. Determination of Planck's constant using photocell.
- 10. Study the Characteristics of a photo diode.

I B.Tech I/II Semester

Sri Vasavi Engineering College (Autonomous), Pedatadepalli, Tadepalligudem ENGINEERING WORKSHOP & IT WORKSHOP PRACTICE LAB

V18MFL01	ENGINEERING WORKSHOP & IT WORKSHOP PRACTICE LAB	L	Р	С
TOPILLUT		0	3	1.5

Engineering Workshop

Course Outcomes:

After successful completion of the course, the student will be able to

CO1: prepare different models in the carpentry trade such as Cross lap joint, Dove tail joint. **(K3)**

CO2: make various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder **(K3)**

CO3:model various basic prototypes in the trade of fitting such as Straight fit, V- fit. **(K3)**

CO4: prepare different models in the Black smithy such as Round rod to Square, S-Hook.. **(K3)**

CO5: perform various basic House Wiring techniques such as connecting one lamp with one switch, connecting

two lamps with one switch, connecting a fluorescent tube, Series wiring, Go down wiring. (K3)

CO6: prepare various basic prototypes in the trade of Welding such as Lap joint, Butt joint. **(K3)**

Engineering Workshop

Note: At least two exercises to be done from each trade.

Carpentry

T-Lap Joint
 Cross Lap Joint
 Dovetail Joint
 Mortise and Tenon Joint

Tin Smithy

- 1. Taper Tray
- 2. Square Box without lid
- 3. Open Scoop 4. Funnel

Fitting shop

1. V- Fit

- 2. Square Fit
- 3. Half Round Fit
- 4. Dovetail Fit

Black smithy

- 1. Round rod to Square
- 2. S-Hook
- 3. Round Rod to Flat Ring
- 4. Round Rod to Square headed bolt

House wiring

- 1. Parallel / Series Connection of three bulbs
- 2. Stair Case wiring
- 3. Florescent Lamp Fitting
- 4. Measurement of Earth Resistance

Welding shop (Arc welding)

- 1. Butt Joint
- 2. Lap Joint

V18MEL01	V18MEL01 IT WORKSHOP LAB	L	Р	C
		0	3	1.5

Course Outcomes:

After successful completion of the course, the student will be able to

- Demonstrate Disassemble and Assemble a Personal Computer and its peripherals(K3)
- Practice installation of operating system.(K3)
- Connect peripherals and install required drivers(K4)
- Demonstrate internet connectivity and usage of internet as per his/her requirement.(K3)
- Prepare the Documents for their projects(K3)
- Prepare Slide shows for their presentations (K3)

PC Hardware:

Task 1: Identification of the peripherals of a computer: To prepare a report containing the block diagram of the CPU along with the configuration of each peripheral and its functions. Description of various I/O Devices.

Task 2(Optional) : A practice on disassembling the components of a PC and assembling them to back to working condition.

Task 3: Examples of Operating systems- DOS, Installation of MS windows on a PC

Task 4: Introduction to Memory, types of Storage Devices, I/O Port, Device Drivers, Assemblers, Compilers, Interpreters

Software Troubleshooting (Demonstration): Identification of a problem and fixing the PC for any software issues.

Task 5: Hardware Troubleshooting (Demonstration): Identification of a problem and fixing a defective PC (improper assembly or defective peripherals).

Internet & Networking Infrastructure

Task 6: Demonstrating Importance of Networking, Transmission Media, Networking Devices- Gateway, Routers, Hub, Bridge, NIC, Bluetooth Technology, Wireless Technology, Modem, DSL,ISP.

Task 7: Search Engines & Netiquette: Students are enabled to use search engines for simple search, academic search and any other context based search (Bing, Google etc). Students are acquainted to the principles of micro-blogging, wiki, collaboration using social networks, participating in online technology forums.

<u>Word</u>

Task 8: MS Word Orientation: Accessing, overview of toolbars, saving files, Using help and resources, rulers, formatting ,Drop Cap , Applying Text effects, Using Character Spacing, OLE in Word, using templates, Borders and Colors, Inserting Header and Footer, Using Date and Time option, security features in word, converting documents while saving, , mail merge.

Task 9: Creating project : Abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check , Track Changes, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs.

Excel

Task 10: Using spread sheet features of EXCEL including the macros, formulae, pivot tables, graphical representations. **Creating a Scheduler -** Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text, Charts,

Task 11: Performance Analysis - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting.

Power Point

Task 12: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting – Images, Clip Art, Tables, animation and Charts in PowerPoint.

TEXT BOOK:

Faculty to consolidate the workshop manuals using the following references

- 1. Computer Fundamentals, Anita Goel, Pearson.
- 2. Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson, 2008.
- 3. Information Technology Workshop, 3e, G Praveen Babu, M V Narayana BS Publications.
- 4. Comdex Information Technology , Vikas Gupta, dreamtech.

REFERENCE BOOK:

- 1. Essential Computer and IT Fundamentals for Engineering and Science Students, Dr. N.B. Venkateswarlu.
- 2. PC Hardware trouble shooting made easy, TMH.

Appendix-CE-02

Year/Sem	III Sem	L	Т	Р	С	COURSE CODE	
Regulation Year	2018-2019	3	1	0	4	V18CET04	
Name of the Course	STRENGTH OF MATERIALS-I						
Branch CIVIL ENGINEERING							

III SEMESTER- SYLLABUS

COURSE OUTCOMES:

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

- Understand the basic materials behavior under the influence of different external loading conditions and the support conditions
- Draw the diagrams indicating the variation of the key performance features like bending moment and shear forces
- Understand bending concepts and calculation of section modulus and for determination of stresses developed in the beams and torsion.
- Assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure using Lame's equation.

SYLLABUS:

<u>UNIT – I:</u>

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

Strain Energy – Resilience – Gradual, sudden, impact and shock loadings – simple applications.

<u>UNIT – II:</u>

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 loads, 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

<u>UNIT – III:</u>

Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/y = E/R, Neutral axis – Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections – Design of simple beam sections. **UNIT –IV:**

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

<u>UNIT – V:</u>

Torsion- Derivation of torsion equation and its assumptions. Applications of the equation of the hollow and solid circular shafts, torsional rigidity, combined torsion and bending of circular shafts, principal stress and maximum shear stresses under combined loading of bending and torsion. Analysis of closed-coiled –helical springs

<u>UNIT – VI:</u>

Thin and Thick Cylinders: Thin cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in diameter, and volume of thin cylinders – Thin spherical shells.

Thick Cylinders: Introduction Lame's theory for thick cylinders – Derivation of Lame's formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders – Necessary difference of radii for shrinkage – Thick spherical shells.

TEXT BOOKS:

- 1. Mechanics of Materials- R. C. Hibbler, Pearson; 10 edition (January 15, 2016)
- 2. Strength of materials -S. S. Bhavakatti, Vikas Publishing House; Fourth edition (2013)
- 3. Strength of Materials -R. K. Rajput, S. Chand Publishing (6th Edition) (2015)

4. Strength of Materials -R.K Bansal,Laxmi Publications; Sixth edition (2018) **REFERENCES:**

- 1. Fundamentals of Solid Mechanics M.L. Gambhir, PHI Learning Pvt. Ltd., New Delhi. (1 December 2009)
- 2. Introduction to Strength of Material by U.C. Jindal, Pearson Education; Second edition (28 September 2017)
- 3. Strength of materials by R. Subramanian, Oxford university press, New Delhi, third edition (15 June 2016)

Year/Sem	III Sem	L	Т	Р	С	COURSE CODE
Regulation Year	2018-2019	3	1	0	4	V18CET36
Name of the Course	BUILDING MAT	ERIALS,	PLAN	NING A	ND C	ONSTRUCTION
Branch	CIVIL ENGINEERING					

COURSE OUTCOMES:

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

- Identify different building materials and their importance in building construction.
- Differentiate brick masonry, stone masonry construction
- Use of lime and cement in various constructions.
- Describe the importance of building components and finishing's.
- Understand building by-laws, ventilation and lightening requirements

<u>UNIT – I:</u>

Stones, Bricks and Tiles: Building stones – classifications and quarrying – properties –structural requirements and dressing. Bricks – Composition of Brick earth – manufacture and structural requirements, Fly ash, Ceramics, Timber, Aluminum, Glass, Paints and Plastics: Wood - structure – types and properties–seasoning – defects; alternate materials for Timber–GI/ fibre – reinforced glass bricks, steel & aluminum, Plastics.

<u>UNIT – II:</u>

Cement & Admixtures: Ingredients of cement – manufacture – Chemical composition – Hydration - field & lab tests. Admixtures – mineral & chemical admixtures – uses.

Lime: Various ingredients of lime – Constituents of lime stone – classification of lime – various methods of manufacture of lime

<u>UNIT – III:</u>

Mortars: Lime and Cement Mortars.

Masonry: Brick masonry – types – bonds; Stone masonry – types; Composite masonry – Brick- stone composite; Concrete, Reinforced brick. Cavity and partition walls.

Finishing's: Plastering, Pointing, Painting, Claddings – Types – Tiles – ACP. <u>UNIT-IV:</u>

Aggregates: Classification of aggregate – Coarse and fine aggregates- particle shape and texture – Bond and Strength of aggregate – Specific gravity – Bulk Density, porosity and absorption – Moisture content of Aggregate- Bulking of sand – Sieve analysis.

Miscellaneous materials: Bitumen and asphaltic materials, structural steel and other metals, geo textiles, carbon composites including properties and uses. **UNIT V:**

Building Byelaws and Regulations: Introduction- terminology- objectives of building byelaws- floor area ratio- floor space index- principles under laying building bye laws- classification of buildings- open space requirements – built up area limitations- height of buildings– lightening and ventilation requirements.

Residential buildings: Minimum standards for various parts of buildings requirements of different rooms and their grouping- characteristics of various types of residential buildings, relationship between plan, elevation, Climate influence on Orientation of Buildings.

<u>UNIT – VI:</u>

Building Components: Lintels, Arches, walls, vaults – stair cases – types of floors, types of roofs – flat, curved, trussed. Foundations – types; Damp Proof Course; Joinery – doors – windows – materials – types.

Form work: Types: Requirements – Standards – Scaffolding – Design; Shoring, Underpinning.

TEXT BOOKS:

- 1. Building Materials and Construction Arora & Bindra, Dhanpat Roy Publications. 2010,5th edition.
- Building Materials, M. L. Gambhir, Tata McGraw Hill Publishing Co. Ltd. New Delhi. 2014, 5th edition,.
- 3. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi. 2016,11th edition.
- 4. Building Materials, S. S. Bhavikatti, Vikas publications House private ltd. 2012, 1st edition.
- 5. Building Construction, S. S. Bhavikatti, Vikas publications House private ltd. 2012, 1st edition.
- 6. Building planning and drawing, Dr.N.Kumara swamy, A.kameswara Rao,

2012, 6th edition.

REFERENCES:

- Building Materials and Construction by G C Sahu, Joygopal Jena McGraw hill Pvt Ltd 2017, 1st edition.
- 2. Building Materials by Duggal, New Age International. 2012, 4th edition.
- 3. Building Materials by P. C. Varghese, PHI. 2015, 2nd edition.
- 4. Building Construction by PC Varghese PHI. 2007, 1st edition.
- 5. Construction Technology Vol I & II by R. Chubby, Longman UK.1987, 2nd edition.
- 6. Alternate Building Materials and Technology, Jagadish, Venkatarama Reddy and others; New Age Publications.2017 ,2nd edition.

Year/Sem	III Sem	L	Т	Р	С	COURSE CODE
Regulation Year	2018-2019	3	1	0	4	V18CET10
Name of the Course	INTRODUCTION TO FLUID MECHANICS					
Branch CIVIL ENGINEERING						

COURSE OUTCOMES:

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

- Understand the physical properties of fluids and their influences on fluid motion
- Calculate the forces acting on plane and curved surfaces and solve fluid flow problems in kinematics.
- Solve a variety of problems in fluid dynamics
- Solve various pipe flow problems
- Solve various laminar flow problems
- Assess fluid flow through pipes using different devices

<u>UNIT I:</u>

INTRODUCTION : Dimensions and units – Physical properties of fluid specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion, pressure at a point, Pascal's law, hydrostatic law, atmospheric, gauge and vacuum pressure, measurement of pressure. Pressure gauges, Manometers: Differential and Micro Manometers.

<u>UNIT – II:</u>

`HYDROSTATICS: Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces – Center of pressure, derivations and problems.

<u>UNIT – III:</u>

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.

<u>UNIT – IV:</u>

FLUID DYNAMICS: Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, Momentum principle, Momentum equation and its application – forces on pipe bend.

<u>UNIT – V:</u>

CLOSED CONDUIT FLOW: Laws of Fluid friction – Darcy's equation, Minor losses – pipes in series – pipes in parallel, Total energy line and hydraulic gradient line, Pipe network problems, Variation of friction factor with Reynold's number, Moody's Chart.

<u>UNIT – VI:</u>

MEASUREMENT OF FLOW: Pitot tube, Venturi meter and Orifice meter, classification of orifices, small orifice and large orifice, flow over rectangular, triangular and trapezoidal and Stepped notches, Broad crested weirs.

TEXT BOOKS:

 Hydraulics and Fluid Mechanics including Hydraulic Machines by Dr. P.N. Modi and Dr. S.N. Seth, Standard Book house, Rajsons Pvt. Ltd., 21st Edition, 2017 A textbookof Fluid Mechanics and Hydraulic Machines by Dr. R.K. Bansal, Laxmi Publications (P) Ltd., New Delhi, 10th Edition, 2018

REFERENCES:

- Introduction to Fluid Mechanics and Fluid Machines by S.K. Som, G. Biswas, Suman Chakraborthy, Mc Graw Hill Education, 3rd Edition, 2017.
- 2. Fluid Mechanics by A.K. Mohanty, Prentice Hall of India Pvt. Ltd., New Delhi, 2nd Edition, 1994.
- 3. Fluid Mechanics and Hydraulic Machines by K. Subramanya, Mc Graw Hill Education, 1st Edition, 2010.

Year/Sem	III Sem	L	Т	Р	С	COURSE CODE	
Regulation Year	2018-2019	2	0	0	2	V18CET35	
Name of the Course	PRINCIPLES OF ENVIRONMENTAL SCIENCE &						
Name of the course	ENGINEERING						
Branch CIVIL ENGINEERING							

Course Outcomes:

Upon successful completion of the course, the student will be able to

- Outline the global environmental challenges and environmental legislations.
- Interpret various natural resources and associated problems.
- Discuss various attributes of environmental pollution.
- Interpret quality of water.
- Operate sewage water treatment plants.
- Illustrate various solid waste management practices.

UNIT I: FUNDAMENTALS OF ENVIRONMENTAL STUDIES AND ACTS

Definition and components of environment, Global Environmental Challenges: Global warming and climate change, Acid rains, Ozone layer depletion -Population explosion and effects.

Environmental Protection Act, 1986 - Air (Prevention and Control of Pollution) Act, 1981 – Water (Prevention and Control of Pollution) Act, 1974 -Wildlife (Protection) Act, 1972 - Forest (Conservation) Act.

UNIT II: NATURAL RESOURCES AND ASSOCIATED PROBLEMS

Forest resources: Use and over exploitation - Deforestation: Timber extraction, Mining, dams and other effects on forest and tribal people. Water resources: Use and over utilization of surface and ground water – Floods, drought, conflicts over water - Dams: Benefits and problems. Effects of extracting and using mineral resources. Energy resources: Renewable and Non-renewable energy sources. Land resources: Land degradation, Wasteland reclamation.

UNIT III: ENVIRONMENTAL POLLUTION

Definition, Causes, effects and control measures of Air pollution, Water pollution,

Soil pollution, Noise pollution and Nuclear Pollution.

UNIT IV: WATER QUALITY AND DESIGN OF WATER TREATMENT UNITS

Impurities in water -Water borne diseases – Protected water supply – Water quality and testing – Drinking water standards- Layout and general outline of water treatment units – Sedimentation – principles – Design factors – Coagulation, flocculation, clarifier design – Coagulants – Feeding arrangements.

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, other disinfection practices-Desalination processes.

UNIT V: SEWAGE QUALITY AND DESIGN OF SEWAGE TREATMENT UNITS

Conservancy and water carriage systems– Characteristics of sewage– BOD – COD equations. Dilution –Self purification of rivers - 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.

UNIT -VI: SOLID WASTE MANAGEMENT

Municipal Solid Wastes: Characteristics-Generation- collection- Methods of collection-Equipment types of vehicles-Man power requirement-Collection routes. Need for Transfer operations-Transfer Stations-Selection of location of transfer station-Transport means and methods - Engineered systems for solid waste management - Recycle energy recovery treatment and disposal.

TEXT BOOKS:

- 1. Principles of environmental science and engineering by P. Venugopala Rao by Prentice Hall India Learning Private Limited, 1St Edition edition (2006), new Delhi.
- 2. Principles of environmental sciences by Jan J. Boersea and Lucas reijnders , Springer; 2010 edition (May 27, 2010).
- **3.** Environment Studies by Anubha Kaushik, C P Kaushik, New Age International Private Limited; Five edition (1 August 2018).
- 4. A Textbook of Environmental Studies, Shaashi Chawla, Tata McGraw Hill Education Private Limited (26 April 2012), New Delhi.
- 5. Fundamentals of Environment Studies, DD Mishra S Chand & Company (1 December 2010).
- 6. Water supply engineering byS.K.Garg Khanna publishers(2017),33 rd edition.
- 7. Sewage disposal and air pollution by S.K.Garg, Khanna publishers(2017),39th edition
- 8. Water supply engineering by B.C .punmia,Ashok Kumar jain and Arun K jain, Laxmi Publications (December 1, 2005) ,2nd edition.
- **9.** Management of municipal solid waste by T.N.Ramachandra, The Energy and Resources Institute, TERI (1 December 2009).
- **10.** Solid waste management by K. Sasi kumar,S.G. Krishna, Prentice Hall India Learning Private Limited (2009)
Sri Vasavi Engineering College (Autonomous), Pedatadepalli

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Year/Sem	III & IV Sem	L	Т	Р	С	COURSE CODE		
Regulation Year	2018-2019	3	1	-	4	V18MAT04		
Name of the Course	PROBABILITY AND STATISTICS							
Branches	CIVIL, EEE, ME & CSE							

Pre requisites: Probability, Conditional Probability, Baye's theorem on probability

COURSE OUTCOMES:

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

CO1: Find measures of central tendency and dispersion for real data sets.

CO2: Find parameters of given function

CO3: Apply probability distribution to real time problems

CO4: Plot a best fit curve to an experimental data and find the correlation and regression

CO5: Create good estimators to various parameters

CO6: Apply the principles of Statistical Inference to practical problems

Unit-I: Basic Statistics

Measures of Central Tendency: Mean, Median, Mode

Measures of Dispersion: Variance, Standard deviation, Skewness and Kurtosis

Unit-II: Basic Probability

Random Variables: Discrete and continuous - Probability function – density and distribution function, Expectation of a Random Variable, Moments, Chebychev's Inequality (Without proof).

Unit-III: Probability Distributions

Probability distributions: Binomial, Poisson and Normal - Evaluation of statistical parameters: Mean, Variance and their properties, Introduction to Exponential, Gamma and Weibull distributions.

Unit-IV: Bivariate Distributions

Curve fitting by the method of Least squares- Fitting of straight line, parabola and exponential curves, Simple Correlation and Regression – Rank correlation.

Unit-V: Sampling Distributionand Estimation

Introduction –Sampling distribution of means with known and unknown standard deviation

Estimation: Criteria of a good estimator, point and interval estimators for means and proportions

Unit-VI: Tests of Hypothesis

Introduction-Type-I, Type-II Errors, Maximum Error, one-tail, two-tail tests,Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means.

Test of significance: Small sample test for single mean, difference of means and test of ratio of variances (F-Test) - Chi-square test for goodness of fit and independence of attributes.

Text Books:

- 1. V. Ramana, A text Book of Engineering Mathematics, Tata Mc Graw Hill.
- 2. Miller & Freund's, Probability & Statistics for Engineers Eighth Edition, Richard. A. Johnson

References Books:

- 1. S. Ross, –A First Course in Probability||, Pearson Education India, 2002.
- 2. Dr.T.S.R.Murthy, Probability and Statistics for Engineers, BS Publications.
- 3. T. Veerarajan, —Engineering Mathematics ||, Tata McGraw-Hill, New Delhi, 2010.

Year/Sem	III Sem	L	Т	Р	С	COURSE CODE		
Regulation Year	2018-2019	3	1	0	4	V18EET01		
Name of the Course	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING							
Branches	CIVIL, CSE&ME							

Module 1 : DC Circuits

Electrical circuit elements (R, L and C), Kirchoff's current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Maximum Power Transfer, Thevenin and Norton Theorems.

Module 2: AC Circuits

Representation of sinusoidal waveforms, peak and RMS values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance.

Module 3: DC Machines

Introduction-Working principle of DC generator–Magnetization characteristics of D.C. Shunt generator –Types of DC motors– applications – three point starter.

Transformers-Classification, working principle of ideal and practical transformer, losses in transformers, regulation and efficiency, OC& SC test on single phase transformer.

Module 4: AC Machines

Construction and working of a three-phase induction motor, torque-slip characteristics. Loss components and efficiency, starting and speed control of induction motor.Construction and Principle of operation of synchronous generators.

Module 5: Semiconductor Devices and Rectifiers

Introduction – Classification – PN junction diode characteristics a) Forward bias b) Reverse bias - Diode acts as a switch - Half-wave and Full-wave rectifiers – Concepts of ripple factor, voltage regulation and efficiency - Simple problems.

Module 6: Transistors

Types of Transistors - Transistor acts as an amplifier - CB, CE and CC configurations and characteristics- feedback amplifier.

Text Books

- 1. T. K. Nagsarkar, M. S. Sukhija, —Basic Electrical Engineering||, Oxford University Press, 2005
- 2. D. P. Kothari and I. J. Nagrath, —Basic Electrical Engineering||, Tata McGraw Hill, 2010.
- 3. D. C. Kulshreshtha, –Basic Electrical Engineering||, McGraw Hill, 2009.

4. E. Hughes, –Electrical and Electronics Technology||, Pearson, 2010.

Reference Books

- 1. L. S. Bobrow, —Fundamentals of Electrical Engineering||, Oxford University Press, 2011.
- 2. E. Hughes, —Electrical and Electronics Technology||, Pearson, 2010.

- 3. V. D. Toro, —Electrical Engineering Fundamentals||, Prentice Hall India, 1989.
- 4. S. K. Bhattacharya, —Basic Electrical and Electronics Engineering||, Pearson Education India, 2011
- 5. S. K. Sahdev, —Fundamentals of Electrical Engineering & Electronics||, DhanpatRai& Company, 2001

Year/Sem	III Sem	L	Т	Р	С	COURSE CODE		
Regulation Year	2018-2019	0	0	3	1.5	V18CEL02		
Name of the Course	MATERIAL TESTING LAB							
Branch	CIVIL							

COURSE OUTCOMES:

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

- Identify the engineering properties of materials in the laboratory
- Assess torsion test to determine elastic constants
- Assess spring test to determine elastic constants
- Assess flexural test to determine elastic constants
- Determine hardness of metals
- Determine Impact strength of metals

List of Experiments

- 1. Tension test on Steel bar
- 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. 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. Setup for spring tests
- 7. Compression testing machine
- 8. Izod Impact machine
- 9. Shear testing machine
- 10. Beam setup for Maxwell's theorem verification.
- 11. Continuous beam setup

Year/Sem	III Sem	L	Т	Р	С	COURSE CODE
Regulation Year	2018-2019	0	0	2	1	V18EEL01
Name of the Course	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING					
Name of the Course	LAB					
Branches	CIVIL, CSE & MI	-				

Any 10 of the following experiments are to be conducted

- 1. Verification of Superposition Theorem.
- 2. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct test.
- 3. Verification of maximum power transfer theorem.
- 4. Series and Parallel Resonance Timing, Resonant frequency, Bandwidth and Q-factor determination for RLC network.
- 5. Magnetization characteristics of D.C. Shunt generator. Determination of critical field resistance and speed.
- 6. Speed control of D.C. Shunt motor by Armature & flux control methods
- 7. Brake test on DC shunt motor. Determination of performance characteristics.
- 8. OC & SC tests on Single-phase transformer (Predetermination of efficiency and regulation at given power factors and determination of equivalent circuit).
- 9. Brake test on 3-phase Induction motor (performance characteristics).
- 10. PN junction diode characteristics a) Forward bias b) Reverse bias (Cut in voltage and resistance calculations)
- 11. Transistor CE characteristics (Input and output)
- 12. Half wave rectifier with and without filters.
- 13. Full wave rectifier with and without filters.
- 14. CE amplifiers.

IV SEMESTER- SYLLABUS

Year/Sem	IV Sem	L	Т	Р	С	COURSE CODE		
Regulation Year	2018-2019	3	0	0	3	V18CET13		
Name of the Course	STRENGTH OF MATERIALS – II							
Branch	CIVIL ENGINEERING							

COURSE OUTCOMES:

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

- Understand the basic concepts of Principal stresses developed in a member when it is subjected to stresses along different axes and design the sections.
- Asses stresses in different engineering applications like shafts, springs, columns and struts subjected to different loading conditions
- Assess forces in different types of trusses used in Construction.

UNIT I

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'scircle of stresses – Principal stresses and strains – Analytical and graphical solutions.

Theories of failures: Various Theories of failures such as Maximum Principal stress theory – Maximum Principal strain theory – Maximum shear stress theory – Maximum strain energy theory –Maximum shear strain energy theory.

UNIT II

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 III

Columns and Struts: Introduction – Types of columns – Short, medium and long columns –Axially loaded compression members – Crushing load – Euler"s theorem for long columns –assumptions – derivation of Euler"s critical load formulae for various end conditions – Equivalent length of a column – Slenderness ratio –Euler"s critical stress – Limitations of Euler"s theory – Rankine– Gordon formula – Long columns subjected to effentric loading – Secant formula –Empirical formulae – Straight line formula – Prof. Perry"s formula. **UNIT – IV**

Direct and Bending stresses: Stresses under the combined action of directloading and B.M. Core of a section – determination of stresses in the case of chimneys, retaining walls and dams – conditions for stability – stresses due to direct loading and B.M.about both axis.

UNIT V

Unsymetrical bending: Introduction – Centroidal principal axes of section – Graphical method for locating principal axes – Moments of inertia referred to any set of rectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axes – Resolution of bending moment into two rectangular axes through the centroid - Location of neutral axis – Deflection of beams under unsymmetrical bending.

UNIT – VI

Analysis of pin-jointed plane frames: Determination of Forces in members of plane pin-jointed perfect trusses by (i) tension co efficient method (ii) method of sections. Analysis of various types of cantilever and simply supported trusses by tension co efficient method, method of sections.

TEXT BOOKS:

- 1. Mechanics of Materials- R. C. Hibbler, Pearson; 10 edition (January 15, 2016)
- 2. Strength of materials -S. S. Bhavakatti, Vikas Publishing House; Fourth edition (2013)
- 3. Strength of Materials -R. K. Rajput, S. Chand Publishing (6th Edition) (2015)

4. Strength of Materials - R.K Bansal,Laxmi Publications; Sixth edition (2018) **REFERENCES:**

- 1. Fundamentals of Solid Mechanics M.L. Gambhir, PHI Learning Pvt. Ltd., New Delhi. (1 December 2009)
- Introduction to Strength of Material by U.C. Jindal, Pearson Education; Second edition (28 September 2017)
- 3. Strength of materials by R. Subramanian, Oxford university press, New Delhi, third edition (15 June 2016)

Year/Sem	IV Sem	L	Т	Р	С	COURSE CODE		
Regulation Year	2018-2019	2	0	0	2	V18CET08		
Name of the Course	ENGINEERING GEOLOGY							
Branch	CIVIL ENGINEE	RING						

COURSE OUTCOMES:

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

- Relate the features of geological agents.
- Review the types of minerals and rocks
- Interpret hazard zonation with reference to secondary structures
- Review the landslides and their resulting subsidence.
- Assess the ground conditions using geophysical explorations
- Examine the engineering geological conditions of the strata and its suitability to major projects like Dams, Tunnels and Reservoirs etc.

UNIT-I

Introduction: Branches of geology, Importance of geology in Civil engineering with case studies.

Physical Geology: Geological processes, Weathering, Erosion and Civil engineering importance of weathering and Erosion

UNIT- II

Mineralogy: Definition of mineral, Importance of study of minerals, Significance of different physical properties in mineral identification, Study of physical properties, Structure and chemical composition of common rock forming and economic minerals viz. Feldspar, Quartz, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Apatite , Kyanite, Garnet, Beryl, Talc, Calcite, Dolomite, Pyrite, Hematite, Magnetite, Galena, Graphite, Magnesite, Bauxite and Clay minerals Petrology: Introduction, Civil Engineering importance of petrology, Definition of Rock, Rock cycle, Geological Classification of rocks Igneous Rocks: Forms, Structures and textures of igneous rocks, Megascopic description and civil engineering uses of Granite, Basalt, Dolerite, Pegmatite and Charnockite Sedimentary Rocks: Formation, Structures and textures of sedimentary rocks, Megascopic description and civil engineering uses of Laterite, Conglomerate, Sand stone, Lime stone and Shale

Metamorphic Rocks: Types of metamorphism, Structures and textures of metamorphic rocks, Megascopic Description and Civil engineering uses of Gneiss, Schist, Quartzite, Marble and Slate

UNIT-III

Structural Geology: Introduction, Out crop, Strike and dip, Causes for development of secondary structures, Classification of Structures associated with Folds, Faults, Joints, Unconformities and their Civil engineering importance

UNIT- IV

Earthquakes: Classification and causes, Intensity and magnitude and their measuring scales, Effects of earthquakes, Seismic belts, Civil Engineering considerations in seismic areas, Seismic zones of India

Land Slides: Classification, Causes and effects, Preventive measures of landslides Ground water: Introduction, Classification of rocks based on porosity and permeability, Types of aquifers, Effects of groundwater over draft

UNIT- V

Geophysics: Importance of Geophysical methods, Classification, Principles of Geophysical study by Gravity method, Magnetic method, Electrical methods, Seismic methods, Radiometric method and Electrical resistivity, Seismic refraction methods

UNIT- VI

Dams: Types of Dams, Geological considerations for the selection of dam sites, Stages of investigation, Case histories of few dam failures, Geology of few Indian dam sites

Tunnels: Purpose of Tunneling, Geological considerations for tunneling, Effects of tunneling, Over break, Geology of some tunnel sites

TEXTBOOKS:

- 1. A text Book of Engineering Geology by N. Chenna Kesavulu, Macmillan India Ltd., Delhi, second edition, 2009.
- 2. Principles of Engineering Geology by K M Bangar, Standard Publishers and Distributers, 2009.
- 3. Principles of Engineering Geology- K Gokhale, B. S. Publication, Revised Edition, 2010.

REFERENCE BOOKS:

- 1. Fundamentals of Engineering Geology, F.G.Bell, published by Butterworth-Heinemann, 1983.
- 2. Principles of Engineering Geology and Geotechnics by D P Krynine and W R Judd, CBS Publishers & Distribution, first edition, 2005.
- 3. Engineering Geology for Civil Engineers by D. Venkata Reddy, Oxford & IBM Publishing Company Pvt. Ltd., New Delhi, second edition, 2017.
- 4. Engineering and General Geology by Parbin Singh, Published by S. K. Kataria & Sons, New Delhi, 2013.
- 5. Engineering Geology and Rock Mechanics by Dr B.P.Varma, Khanna Publishers, Delhi, 1998.

Year/Sem	IV Sem	L	Т	Р	С	COURSE CODE		
Regulation Year	2018-2019	3	1	0	4	V18CET09		
Name of the Course	CONCRETE TECHNOLOGY							
Branch	CIVIL ENGINEERI	NG						

COURSE OUTCOMES:

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

- Understand the basic concepts of concrete.
- Realize the importance of quality of concrete.
- Familiarize the basic ingredients of concrete and their role in the production of concrete and its behavior in the field.
- Test the fresh concrete properties and the hardened concrete properties.
- Evaluate the ingredients of concrete through lab test results and design the concrete mix by BIS method.
- Familiarize the basic concepts of special concrete and their production and applications and understand the behavior of concrete in various environments.

<u>UNIT I:</u>

Introduction of Concrete, Cements and Admixtures: Portland cement – Chemical composition – Hydration, Setting of cement, Fineness of cement, Structure of hydrated cement–Test for physical properties – Different grades of cements (opc-33,opc-43,opc-53) – Admixtures – Mineral and chemical admixtures – accelerators, retarders, air entrainers, plasticizers, super plasticizers, fly ash and silica fume.

Aggregates: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregates – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand –Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis –Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded and well graded aggregate as per relevant IS code – Maximum aggregate size - Quality of mixing water.

<u>UNIT – II:</u>

Fresh Concrete: Steps in Manufacture of Concrete-proportion, mixing, placing, compaction, finishing, curing – including various types in each stage. Properties of 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.

<u>UNIT – III:</u>

Hardened Concrete: Water / Cement ratio – Abram's Law – Gel space ratio – Nature of strength of concrete –Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength – Curing, Testing of Hardened Concrete: Compression tests – Tension tests – Flexure tests –Split tension tests – Non-destructive testing methods – codal provisions for NDT.

<u>UNIT – IV:</u>

Elasticity, Creep & Shrinkage, Modulus of elasticity, Dynamic modulus of elasticity, Poisson's ratio, Creep of concrete, Factors influencing creep, Relation between creep & time, Nature of creep, Effects of creep – Shrinkage – types of shrinkage, Factors affecting shrinkage.

<u>UNIT – V:</u>

Mix Design: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Concepts proportioning of concrete mixes by BIS method of mix design.

<u>UNIT – VI:</u>

Special Concretes: Ready mixed concrete, Shotcrete, Light weight aggregate concrete, Cellular concrete, No-fines concrete, High density concrete, Fibre reinforced concrete, Different types of fibres, Factors affecting properties of Fibre reinforced concrete, Polymer concrete, Types of Polymer concrete, Properties of polymer concrete, High performance concrete –Self consolidating concrete, SIFCON, self healing concrete.

Text Books:

- 1. Concrete Technology, M. S. Shetty. S. Chand & Company
- 2. Concrete Technology, A. R. Santha Kumar, Oxford University Press, New Delhi

References:

- 1. Properties of Concrete, A. M. Neville PEARSON 4th edition
- 2. Concrete Technology, M.L. Gambhir. Tata Mc. Graw Hill Publishers, New Delhi

Codal Provisions:

- 1. IS 269:1989 Ordinary Portland Cement, grade 33
- 2. IS 4031:1988 methods of physical tests for hydraulic cement.
- 3. IS 383:1970 Specification for coarse and fine aggregate from natural sources for concrete.
- 4. IS 456:2000 Code of practice for plain and reinforced concrete.
- 5. IS 10262:2009 Guideline for concrete mix proportioning.
- 6. SP 16:1980 Design aids for reinforced concrete to IS 456:1978

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Year/Sem	IV Sem	L	Т	Р	С	COURSE CODE		
Regulation Year	2018-2019	3	1	0	4	V18CET14		
Name of the Course	HYDRAULIC ENGINEERING							
Branch	CIVIL ENGINEER	ING						

COURSE OUTCOMES:

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

- Solve uniform open channel flow problems
- Solve Non-uniform open channel flow problems
- Apply the principles of dimensional analysis and similitude in hydraulic model Testing
- Estimate the impact of jet on plane and curved surfaces using momentum Principle.
- Develop performance characteristics of turbines using velocity triangles

• Calculate work done and efficiency of centrifugal and reciprocating pumps <u>UNIT – I:</u>

OPEN CHANNEL FLOW: Types of flows, Type of channels, Velocity distribution, energy and momentum correction factors, Chezy's, Manning's and Bazin formulae for uniform flow, Most Economical sections.

Critical flow: Specific energy-critical depth – computation of critical depth – critical, sub-critical and super critical flows.

UNIT II:

NON UNIFORM FLOW: Dynamic equation for G.V.F., Mild, Critical, Steep, horizontal and adverse slopes, surface profiles, direct step method, Rapidly varied flow, hydraulic jump, energy dissipation.

<u>UNIT – III:</u>

HYDRAULIC SIMILITUDE: Dimensional analysis - Rayleigh's method and Buckingham's pi theorem, study of Hydraulic models – Geometric, kinematic and dynamic similarities, dimensionless numbers, model laws, scale effect.

<u>UNIT – IV:</u>

MOMENTUM PRINCIPLES: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency, Angular momentum principle.

<u>UNIT – V:</u>

BASICS OF HYDRAULIC MACHINERY: Layout of hydropower installation, Heads and efficiencies, classification of turbines.

HYDRAULIC TURBINES: Pelton wheel, Francis turbine, Kaplan turbine working, proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and function efficiency, Governing of turbines, surge tanks, unit and specific turbines, unit speed, unit quantity, unit power, specific speed, performance characteristics, geometric similarity, cavitation.

<u>UNIT – VI:</u>

CENTRIFUGAL PUMPS: Pump installation details, classification, work done, manometric head, minimum starting speed, losses and efficiencies, specific

speed, multistage pumps, pumps in parallel, performance of pumps, characteristic curves, NPSH, Cavitation.

RECIPROCATING PUMPS: Introduction, classification of reciprocating pumps, main components of reciprocating pumps, working of a reciprocating pumps, discharge through pumps, indicator diagram, work done by reciprocating pumps, slip of reciprocating pumps.

TEXT BOOKS:

- 1. A textbook of Fluid Mechanics and Hydraulic Machines by Dr. R.K. Bansal, Laxmi Publications (P) Ltd., New Delhi, 10th Edition, 2018
- 2. Hydraulics and Fluid Mechanics including Hydraulic Machines by Dr. P.N. Modi and Dr. S.N. Seth, Standard Book house, Rajsons Pvt. Ltd., 21st Edition, 2017
- 3. A text book of Fluid mechanics and Hydraulic machines by Er. R. K. Rajput, S. Chand & company, 6th Edition, 2016

REFERENCES:

- 1. Flow in Open Channels by K. Subramanya, Mc Graw Hill Education, 4th Edition, 2015.
- 2. Fluid Mechanics and Hydraulic Machines by K. Subramanya, Mc Graw Hill Education, 1st Edition, 2010.

Year/Sem	IV Sem	L	Т	Р	С	COURSE CODE		
Regulation Year	2018-2019	2	1	0	3	V18CET11		
Name of the Course	SURVEYING AND GEOMATICS							
Branch	CIVIL ENGINEERING							

COURSE OUTCOMES:

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

- Demonstrate the basic surveying skills
- Use various surveying instruments.
- Perform different methods of surveying
- Compute various data required for various methods of surveying.
- Integrate the knowledge on surveying to the new frontiers of science like Global positioning System, Remote sensing

<u>UNIT- I:</u>

Introduction: Definition-Uses of surveying- overview of plane surveying (chain, Compass and plane table), Objectives, Principles and classifications – Errors in survey Measurements

<u>UNIT – II:</u>

Compass survey and traversing: Electronic distance measurements (EDM)principles of electro optical EDM-Errors and corrections to linear measurements-Compass survey-Meridians, Azimuths and Bearings, declination, computation of angle. Traversing-Purpose-types of traverse-traverse computation-traverse adjustments-Introduction omitted measurements

UNIT-III:

Leveling, Contouring and Curves::Concept and Terminology, Leveling Instrument and their Temporary and permanent adjustments- method of leveling. Characteristics and Uses of contours- methods of conducting contour surveys.Types of curves, design and setting out – simple and compound curves **UNIT – IV:**

Theodolite, Description, principles-uses and adjustments – temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite – Introduction to Trigonometrically leveling,.

Tachometric Surveying: Stadia and tangential methods of Tacheometry. Distance and-Elevation formulae for Staff vertical position

<u>UNIT-V:</u>

Computation of Areas and Volumes: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

<u>UNIT-VI</u>: Introduction to Geo matic, Total Station and Global positioning system, Electromagnetic spectrum, Visual image interpretation, Digital image processing.

Text Books:

- 1. Surveying, Vol No.1, 2 &3, B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain –
- 2. Laxmi Publications Ltd, New Delhi, seventeenth edition (2016)
- 3. 2 Text book of Surveying, S.K. Duggal (Vol No. 1&2), Tata McGraw Hill Publishing
- 4. Co. Ltd. New Delhi.Fourth edition (1 July 2017)
- 5. Text book of Surveying, Arora (Vol No. 1&2), STANDARD BOOK HOUSE SINCE 1960; Edition: Year-2015 edition (2015)
- 6. Anji Reddy, M., Remote sensing and geographical information system, BS Publications/BSP Books (2012)

Reference Books:

- 1. Text book of Surveying, C. Venkataramaiah, universities Press (India) Pvt. Ltd. (12 January 2011)
- Surveying and levelling, R. Subramanian, Oxford University Press; 2 edition (30 June 2012)

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Year/Sem	IV Sem	L	Т	Р	С	COURSE CODE		
Regulation Year	2018-2019	0	0	3	1.5	V18CEL03		
Name of the Course	Name of the Course CONCRETE TECHNOLOGY LAB							
Branch	CIVIL ENGINEER	RING						

COURSE OUTCOMES:

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

- Find some properties of cement by consistency, fineness, setting times, specific gravity, soundness and compressive strength.
- Determine the workability of cement concrete by compaction factor, slump and Vee Bee tests.
- Determine properties of self-compacting concrete by Slump cone, V funnel, L Box
- Determine the specific gravity of coarse aggregate and fine aggregate by Sieve analysis.
- Determine the flakiness and elongation index of coarse aggregates.
- Determine the bulking of sand.
- Understand the non-destructive testing procedures on concrete

I. Tests on Cement

- 1. Normal Consistency and fineness of cement.
- 2. Initial setting time and final setting time of cement.
- 3. Specific gravity of cement
- 4. Soundness of cement.
- 5. Compressive strength of cement.

II. Tests on Aggregate

- 1. Sieve Analysis and gradation chairs
- 2. Bulking of sand.
- 3. Bulk and compact densities of fine and coarse aggregates

III. Tests on Fresh Concrete

- 1. Slump test
- 2. Compact factor test
- 3. Vee-bee Test
- 4. Flow Table Test

Tests on Self Compacting Concrete

- 1. Slump cone
- 2. V funnel
- 3. L Box

IV. Tests on hardened concrete

- 1. Compression test on cubes & Cylinders
- 2. Flexure test
- 3. Splitting Tensile Test
- 4. Modulus of Elasticity

V. Non Destructive tests of concrete

- 1. Rebound hammer
- 2. Ultrasound pulse Velocity (UPV)

Text Books:

1. Concrete Technology, M. S. Shetty. – S. Chand & Company

References:

1. Concrete Technology, M.L. Gambhir. – Tata Mc. Graw Hill Publishers, **New Delhi.**

Codes for reference:

- 1. IS: 4031 chemical analysis and tests on cement.
- 2. IS 650:1991 Standards and testing
- 3. IS 383:1970- Specification for coarse & fine aggregate
- 4. IS 2386 (Part III) 1963- Methods of test for aggregate for specific gravity, density, voids, absorption & bulking
- 5. IS 516:1959- Specification for compressive strength, Flexural strength
- 6. IS 5816:1999-Method of test for splitting tensile strength of concrete.
- IS 13311(Part 1):1992 Methods of non-destructive testing of concrete: Part 1 Ultrasonic pulse velocity.
- 8. IS 13311(Part 2):1992 Methods of non-destructive testing of concrete: Part 2 Rebound hammer.
- 9. IS 6461(Part 7):1973 Glossary of terms relating to cement concrete: Part 7 Mixing, laying, compaction, curing and other construction aspects.

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Year/Sem	IV Sem	L	Т	Р	С	COURSE CODE	
Regulation Year	2018-2019	0	0	3	1.5	V18CEL04	
Name of the Course	SURVEYING LAB						
Branch	CIVIL ENGINEER	RING					

COURSE OUTCOMES:

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

- Use different Survey instruments to collect filed data
- Calculate distances, levels and angles from collected data
- Transfer points on ground to drawing sheet
- Interpret survey data to compute areas and volumes by using different methods
- Prepare profile of land from the collected survey data

List of experiments

- 1. Survey by chain survey of road profile with offsets in case of road widening.
- 2. Finding the area of the given boundary using compass (Closed Traverse)
- 3. Plane table survey; finding the area of a given boundary by the method of Radiation
- 4. Plane table survey; finding the area of a given boundary by the method of intersection.
- 5. Fly leveling : Height of the instrument method (differential leveling)
- 6. Fly leveling: Rise and Fall method.
- 7. Theodolite Survey: Determining the Horizontal and Vertical Angles by the method of repetition method.
- 8. Theodolite Survey: Finding the distance between two inaccessible points.
- 9. One Exercise on Curve setting.
- 10. One Exercise on contours.
- 11. Determination of area using total station
- 12. Determination distance between two inaccessible points.
- 13. Introduction to GPS.

Text/ References Books:

- 1. Surveying Vol No.1, 2 &3 by Dr.B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain –LaxmiPublications, seventeenth edition (2016), New Delhi.
- 2. Text book of Surveying by S.K. Duggal (Vol No. 1&2), McGraw Hill Education; Fourth edition (1 July 2017), New Delhi.
- 3. Text book of Surveying, Dr.K.R.Arora (Vol No. 1&2), STANDARD BOOK HOUSE SINCE 1960; Edition: Year-2015 edition (2015), Delhi.

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Year/Sem	IV Sem	L	Т	Р	С	COURSE CODE		
Regulation Year	2018-2019	0	0	3	1.5	V18CEL05		
Name of the	ELUID MECHANICS AND HYDDAULIC MACHINEDY LAD							
Course	FLUID MECHANICS AND HIDRAULIC MACHINERY LAB							
Branch	CIVIL ENGINEE	RING						

COURSE OUTCOMES:

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

- Show the verification of Bernoulli's equation
- Find the discharge through an orifice and mouth piece by using constant head and variable head methods.
- Calculate coefficient of discharge for Venturimeter and Orificemeter
- Find loss of head due to friction and minor losses in pipes
- Calculate the force exerted by the jet on the vanes.
- Calculate efficiency and sketch performance curves for turbines and pumps.

List of Experiments

- 1. Verification of Bernoulli's equation.
- 2. Calibration of Venturimeter and Orifice meter
- 3. Determination of Coefficient of discharge for a small orifice by a constant head method.
- 4. Determination of Coefficient of discharge for an external mouth piece by variable head method.
- 5. Characterization of laminar and turbulent flows by Reynold's apparatus.
- 6. Calibration of contracted Rectangular Notch and /or Triangular Notch
- 7. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
- 8. Impact of jet on vanes
- 9. Study of Hydraulic jump.
- 10. Performance studies on Pelton wheel turbine
- 11. Performance studies on Francis turbine/Kaplan turbine.
- 12. Performance studies on single stage centrifugal pump.
- 13. Performance studies on reciprocating pump.

List of Equipment:

- 1. Venturimeter setup.
- 2. Orifice meter setup.
- 3. Small orifice setup.
- 4. External mouthpiece setup.
- 5. Reynold's apparatus
- 6. Rectangular and Triangular notch setups.
- 7. Friction factor test setup.
- 8. Bernoulli's theorem setup.
- 9. Impact of jets.
- 10. Hydraulic jump test setup.
- 11.Pelton wheel and Francis turbines.
- 12. Centrifugal and Reciprocating pumps.

TEXT BOOKS:

- 1. A textbook of Fluid Mechanics and Hydraulic Machines by Dr. R.K. Bansal, Laxmi Publications (P) Ltd., New Delhi, 10th Edition, 2018
- Hydraulics and Fluid Mechanics including Hydraulic Machines by Dr. P.N. Modi and Dr. S.N. Seth, Standard Book house, Rajsons Pvt. Ltd., 21st Edition, 2017

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Year/Sem	IV Sem	L	Т	Р	С	COURSE CODE		
Regulation Year	2018-2019	0	0	2	1	V18CEL06		
Name of the	ENGINEERING GEOLOGY LAB							
Course								
Branch	CIVIL ENGINEERING							

COURSE OUTCOMES:

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

- Understand the importance of geology in civil engineering
- Identify the geological process of any region to carry civil engineering works
- Evaluate the formation and properties of minerals, rocks and soil
- Develop the ability to prepare geological maps and sections to interpret site conditions

LIST OF EXPERIMENTS

- 1. Physical properties of minerals and their megascopic identification
- 2. Rock forming minerals: Quartz group, Feldspar group, Garnet group, Mica group, Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmelene, Calcite, Gypsum etc.
- 3. Ore forming minerals: Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite etc.
- 4. Megascopic description and identification of rocks
- 5. Igneous rocks: Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite Poryphery, Basalt, etc.
- 6. Sedimentary rocks: Sand stone, Ferrugineous sand stone, Lime stone, Shale, Laterite, Conglamorate, etc.
- 7. Metamorphic rocks: Biotite, Granite Gneiss, Slate, Muscovite & Biotiteschist, Marble, Khondalite, etc.
- 8. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc.
- 9. Simple Structural Geology problems
- 10. Bore hole data
- 11. Strength of the rock using laboratory tests
- 12. Field work to identify Minerals and Rocks, Geomorphology and Structural Geology

REFERENCES

- 1. Applied Engineering Geology Practicals by M T Maruthesha Reddy, New Age International Publishers, Second Edition, 2007.
- 2. Foundations of Engineering Geology by F G Bell, B S Publications, first edition, 2005.

ANNEXURE-CE-II

SYLLABI OF V SEMESTER OF B.TECH COURSES

V SEMESTER - SYLLABUS

Year/Sem	V Sem	L	Т	Р	С	COURSE CODE
Regulation / Year	V18 / 2020-2021	3	0	0	3	V18CET15
Name of the Course	STRUCTURAL ANALY	SIS — I				
Branch	CIVIL ENGINEERING					

Course Outcomes:

Upon successful completion of this course the student will be able to

- Illustrate Shear Force, Bending Moment and Deflection of Propped Cantilevers for different fixity conditions (K3)
- Calculate Shear Force, Bending Moment and Deflections of fixed beams for different fixity conditions (K3)
- Calculate Shear Force, Bending Moment and Deflections of Continuous beams for different fixity conditions (K3)
- Apply Slope Deflection Equation to Continuous beams (K3)
- Understand the concepts of Energy Theorems (K2)
- Assess Maximum Shear Force, Bending Moment and Deflections at a given section when loads of varying spans are passing over truss (K3)

SYLLABUS

UNIT – I

Propped Cantilevers: Analysis of propped cantilevers-shear force and bending moment diagrams-Deflection of propped cantilevers.

UNIT – II

Fixed Beams: Introduction to statically indeterminate beams with U. D. load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - shear force and Bending moment diagrams-Deflection of fixed beams including effect of sinking of support, effect of rotation of a support.

UNIT – III

Continuous Beams: Introduction-Clapeyron's theorem of three moments- Analysis of continuous beams with constant moment of inertia with one or both ends fixed continuous beams with overhang, continuous beams with different moment of inertia for different spans-Effects of sinking of supports-shear force and bending moment diagrams.

UNIT-IV

Slope-Deflection Method: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

UNIT – V

Energy Theorems: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces - Castigliano's first theorem-Deflections of simple beams and pin jointed trusses.

UNIT – VI

Moving Loads And Influence Lines: Introduction, influence line diagrams, influence line diagrams for simply supported beams, cantilever beams, overhanging beams, double overhanging beams, balanced cantilever beams, girder supporting floor beams, use of influence line diagrams, maximum SF and BM values for moving loads, Train of concentrated loads

Text Books:

- 1. Basic Structural Analysis, C. S. Reddy Tata Mc.Graw-Hill, New Delhi.
- 2. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi.
- 3. Analysis of Structures- Vol. I and II, V. N. Vazirani and M. M. Ratwani, Khanna Publishers, New Delhi.
- 4. Structural Analysis Vol. I and II,S.S.Bhavikatti,Vikas Publishing House,New Delhi.

References:

- 1. Theory of Structures, B. C Punmia, A. K Jain & Arun K. Jain, Lakshmi Publications.
- 2. Theory of Structures, R.S. Khurmi, S. Chand Publishers.
- 3. Structural analysis by R.C. Hibbeler, Pearson, New Delhi.
- 4. Structural Analysis-I, Hemanth Patel, Yogesh Patel, Synergy Knowledgeware, Mumbai
- 5. Structural Analysis I Analysis of Statically Determinate Structures, P. N. Chandramouli. Yesdee Publishing Pvt Limited, Chennai

Year/Sem	V Sem	L	Т	Р	С	COURSE CODE
Regulation / Year	V18 / 2020-2021	3	0	0	3	V18CET16
Name of the Course	GEOTECHNICAL ENG	GINEERIN	G –I			
Branch	CIVIL ENGINEERING					

Course Outcomes:

Upon successful completion of this course the student will be able to

- Show the inter-relationships of various parameters related to soil mechanics (K1)
- Describe various index properties of soils and classify them (K2)
- Assess the permeability of different soils having different properties (K3)
- Employ different methods to know the stress distribution in soils (K3)
- Interpret different parameters related to consolidation of soil (K3)
- Examine the stress strain behavior of different soils under various drainage conditions (K3)

SYLLABUS

UNIT I

Introduction: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass- volume relationship –Relative density, Mechanism of compaction – factors affecting – effects of compaction on soil properties - compaction control.

UNIT II

Index Properties of Soils:Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – Various Types of soil Classifications – Unified soil classification and I.S. Soil classification.

UNIT III

Permeability:Soil water – capillary rise – One dimensioned flow of water through soils – Darcy's law- permeability – Factors affecting –laboratory determination of coefficient of permeability –Permeability of layered systems. Total, neutral and effective stresses – quick sand condition – 2-D flow and Laplace's equation - Seepage through soils – Flow nets: Characteristics and Uses.

UNIT IV

Stress Distribution in Soils:Stresses induced by applied loads - Boussinesq's and Westergaard's theories for point loads and areas of different shapes–Newmark'sinfluence chart – 2:1 stress distribution method.

UNIT V

Consolidation: Compressibility of soils – e-p and e-log p curves – Stress history – Concept of consolidation - Spring Analogy - Terzaghi's theory of one-dimensional Consolidation – Time rate of consolidation and degree of consolidation – Determination of coefficient of consolidation (c_v) - Over consolidated and normally consolidated clays.

UNIT VI

Shear Strength of Soils: Basic mechanism of shear strength - Mohr – Coulomb Failure theories – Stress-Strain behavior of Sands - Critical Void Ratio – Stress-Strain behavior of clays – Shear Strength determination- various drainage conditions.

TEXTBOOKS:

- 1. "Basic and Applied Soil Mechanics", Gopal Ranjan and A. S. R. Rao, New Age International Publishers.
- 2. "Soil Mechanics and Foundation Engineering", V. N. S. Murthy, CBS publishers.
- 3. "Soil Mechanics and Foundations", B.C. Punmia, Laxmi Publications.

REFERENCE BOOKS:

- 1. "Fundamentals of Soil Mechanics", D. W. Taylor, Wiley.
- 2. "An introduction to Geotechnical Engineering", Holtz and Kovacs; Prentice Hall.
- 3. "Fundamentals of Geotechnical Engineering", B M Das, Cengage Learning, New Delhi.

Year/Sem	V Sem	L	Т	Р	С	COURSE CODE		
Regulation / Year	V18 / 2020-2021	3	0	0	3	V18CET17		
Name of the Course	HYDROLOGY & WATER RESOURCES ENGINEERING							
Branch	CIVIL ENGINEERING							

Course Outcomes:

Upon successful completion of this course the student will be able to

- Identify the physical processes in hydrology and components of the hydrologic cycle.(K2)
- Estimate the different components of the hydrologic cycle.(K2)
- Compute the runoff of a catchment using Hydrographs. (K3)
- Compute the flood frequency, design flood, flood routing. (K3)
- Discuss the concepts of groundwater movement and well hydraulics.(K2)
- Describe the advanced concepts of Runoff modeling .(K2)

SYLLABUS

UNIT I

Introduction: Engineering hydrology and its applications, Hydrologic cycle, hydrological data-sources of data. Precipitation: Types and forms, measurement, rain gauge network, presentation of rainfall data, average rainfall, continuity and consistency of rainfall data, frequency of rainfall, Intensity-Duration-Frequency (IDF) curves, Depth-Area-Duration (DAD) curves, Probable Maximum Precipitation (PMP), design storm.

UNIT II

Abstractions from Precipitation: Initial abstractions. Evaporation: factors affecting, measurement, reduction Evapotranspiration: factors affecting, measurement, control Infiltration: factors affecting, Infiltration capacity curve, measurement, infiltration indices.

UNIT III

Runoff:Catchment characteristics, Factors affecting runoff, components, computationempirical formulae, tables and curves, stream gauging, rating curve, flow mass curve and flow duration curve. Hydrograph analysis: Components of hydrograph, separation of base flow, effective rainfall hyetograph and direct runoff hydrograph, unit hydrograph, assumptions, derivation of unit hydrograph, unit hydrographs of different durations, principle of superposition and S-hydrograph methods, limitations and applications of unit hydrograph, synthetic unit hydrograph.

UNIT IV

Floods: Causes and effects, frequency analysis- Gumbel's and Log-Pearson type III distribution methods, Standard Project Flood (SPF) and Probable Maximum Flood (MPF), flood control methods and management. Flood Routing: Hydrologic routing, channel and reservoir routing- Muskingum and Puls methods of routing.

UNIT V

Groundwater: Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, types of wells, Darcy's law, Dupuit's equation- steady radial flow to wells in confined and unconfined aquifers, yield of a open well-recuperation test.

UNIT VI

Advanced Topics in Hydrology:Rainfall-runoff Modelling, instantaneous unit hydrograph (IUH) – conceptual models – Clark and Nash models, general hydrological models- Chow – Kulandaiswamy model.

TEXTBOOKS:

1. "Engineering Hydrology", Subramanya K., Tata Mc Graw-Hill Education Pvt. Ltd, New Delhi,

2013.

- 2. "Engineering Hydrology", Jayarami Reddy P., Laxmi Publications Pvt. Ltd., New Delhi, (2013)
- 3. "Applied hydrology", Chow V.T., D.R Maidment and L.W. Mays, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2011.

REFERENCE BOOKS:

- 1. "Water Resources Engineering", Mays L.W, Wiley India Pvt. Ltd, 2013.
- 2. "Hydrology", Raghunath. H.M., New Age International Publishers, 2010.
- "Engineering Hydrology Principles and Practice" Ponce V.M., Prentice Hall International, 1994.
- 4. "Hydrology and Water Resources Engineering", Patra K.C., Narosa Publications, 2011.
- 5. "Engineering Hydrology", Ojha C.S., Berndtsson P.R and Bhunya. P., Oxford University Press,

2010.

Year/Sem	V Sem	L	Т	Р	С	COURSE CODE		
Regulation / Year	V18 / 2020-2021	3	0	0	3	V18CET18		
Name of the Course	DESIGN OF REINFORCED CONCRETE STRUCTURES							
Branch	CIVIL ENGINEERING							

Course Outcomes:

Upon successful completion of this course the student will be able to

- Understand the concepts and methods for elements design (K2)
- Solve the elements of structure like flexural members (K3)
- Illustrate the design concepts structures subjected to shear, bond and torsion (K3)
- Apply design principles in the design of slabs (K3)
- Choose suitable design principle in the design of columns (K3)
- Apply suitable design procedure in the design of foundations (K3)

SYLLABUS

UNIT I

Introduction of Reinforced concrete: Structural elements- Loads on structures- Strength and serviceability - Methods of design - Working stress method- design constants - neutral axis - moment of resistance for different sections- Design of singly and doubly reinforced beams- Concepts of limit state design - Partial load and safety factors -stress-strain curves for cold worked deformed bars and mild steel bars. Assumptions in limit state design – stress - block parameters – limiting moment of Resistance. Codes of practice.

UNIT II

Design for Flexure: Limit state analysis and design of singly reinforced sections- effective depth- Moment of Resistance- Doubly reinforced and flanged (T and L) beam sections-Minimum depth for a given capacity- Limiting Percentage of Steel- Minimum Tension Reinforcement-Maximum Flexural Steel- Design of Flanged Sections (T&L)- Effective width of flange –Behavior- Analysis and Design.

UNIT III

Design for Shear, Torsion and Bond: Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions.

Design examples in simply supported and continuous beams, detailing. Limit state design for serviceability: Deflection, cracking and code provision.

UNIT IV

Slabs: Classification of slabs, design of one - way slabs, one way continuous slab using IS Coefficients (Conventional) – Design of two - way slabs-simply supported and various edge conditions using IS Coefficients, Design of Stair Case.

UNIT V

Design of Compression members: Effective length of a column, Design of short and long columns – under axial loads, uniaxial bending and biaxial bending – IS Code provisions.

UNIT VI

Footings: Different types of footings – Design of isolated footings – pedestal, square, rectangular and circular footings subjected to axial loads, uni-axial and bi-axial bending moments.

NOTE:

All units i.e. from unit II to unit VI are to be taught in Limit State Design.

Following sheets should be prepared by the students.

- Sheets-1 Reinforcement detailing of T-beams, L-beams and continuous beams.
- Sheets-2 Reinforcement detailing of beam with all details.
- Sheets-3 Detailing of one-way, two-way and continuous slabs.
- Sheets-4 Reinforcement detailing of columns.
- Sheets-5 Reinforcement detailing of isolated footings.

EXAMINATION PATTERN:

Internal Examination Pattern:

The total internal marks are distributed in three components as follows:

Descriptive (subjective type) examination	: 15 marks
Detailing sheets(For above)	: 10 marks
Assignment	: 05 marks

TEXTBOOKS:

- 1. "Limit State Design", A. K. Jain
- 2. "Design of Reinforced concrete Structures", N. Subrahmanyian.
- 3. "Reinforced concrete", Vol.1., H. J. Shah, Charotar publishing house Pvt. Ltd.

REFERENCE BOOKS:

- 1. "R C C Design", B.C Punmia, A. K. Jain and A. K Jain. Lakshmi Publications
- 2. "Reinforced Concrete Structures", N. Krishna Raju and R. N. Pranesh, New Age Publications.
- 3. "Reinforced Concrete Structures", S. Unnikrishna Pillai and Devdas Menon, Tata Mc.Graw Hill, New Delhi.
- 4. IS 456-2000, Code of practice for Reinforced Concrete Structures.
- 5. IS 875, Code of Practice for Design Loads.
- 6. SP-16, Design Aids for Reinforced Concrete.

Minutes of the 4th Academic Council Meeting **2020** Sri Vasavi Engineering College(Autonomous)

Year/Sem	V Sem	L	Т	Р	С	COURSE CODE		
Regulation / Year	V18 / 2020-2021	3	0	0	3	V18 CET 19		
Name of the Course	TRANSPORTATION ENGINEERING – I							
Branch	CIVIL ENGINEERING							

Course Outcomes:

Upon successful completion of this course the student will be able to

- Identify engineering surveys and can decide the alignment(K2)
- Analyze and design highway geometric elements.(K3)
- Analyze and design of traffic infrastructure(K3)
- Analyze and design of flexible, rigid pavements (K3)
- Examine pavement construction activities and also conduct quality control at site(K3)
- Evaluate pavement condition and can identify and suggest remedial measures(K3)

SYLLABUS

UNIT I

Highway Planning and Alignment: Highway development in India; Classification of Roads; Necessity for Highway Planning; Different Road Development Plans

First, second, third road development plans, road development vision 2021; Highway
Alignment-Factors affecting Alignment- Engineering Surveys.

UNIT II

Highway Geometric Design: Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distance Elements- Design of Horizontal

Alignment- Design of Transition Curves-Design of Vertical alignment.

UNIT III

Traffic Engineering: Basic Parameters of Traffic-Volume, Speed and Density Traffic Volume Studies; Speed studies – spot speed and speed & delay studies; Parking

Studies; Road Accidents-Causes and Preventive measures - Condition Diagram and Collision Diagrams; PCU Factors, Capacity of Highways – Factors Affecting; LOS Concepts; Road Traffic Signs; Road markings; Types of Intersections; At-Grade Intersections –Design of Traffic Signals – Webster Method .

UNIT IV

Design of Pavements: Types of pavements; Functions and requirements of different components of pavements; Design Factors

Flexible Pavements: Design factors – Flexible Pavement Design Methods Mechanistic method.

Rigid Pavements: Design Considerations - wheel load stresses - Temperature stresses -

Frictional stresses – Combination of stresses – Design of slabs – IRC method – Rigid pavements

UNIT V

Highway Construction

Types of Highway Construction, Earthwork, Construction of Embankments, subgrade stabilization, Construction of Bituminous Pavements and Construction of Cement Concrete Pavements

UNIT VI

Highway Maintenance: Pavement Failures, Pavement condition survey, Maintenance of Highways, Pavement evaluation, strengthening of existing pavements

TEXTBOOKS:

1. "Highway Engineering", Khanna S. K., Justo C. E. G and Veeraragavan A, Nem Chand

Bros.,Roorkee.

2. "Traffic Engineering and Transportation Planning", Kadiyali L. R, Khanna Publishers,

New Delhi.

REFERENCE BOOKS:

1. "Principles of Transportation Engineering", Partha Chakroborthy and Animesh Das, PHI

Learning Private Limited, Delhi.

- 2. "Principles of Highway Engineering, Kadiyali L. R, Khanna Publishers, New Delhi
- 3. "Transportation Engineering An Introduction", Jotin Khisty C, Prentice Hall, Englewood

Cliffs, New Jersey.

4. "Transportation Engineering and Planning", Papacostas C.S. and Prevedouros, P.D., Prentice

Hall of India Pvt.Ltd; New Delhi.

- 5. IRC37–2018: Guidelines for the Design of Flexible Pavements, Indian Road Congress Publications, New Delhi.
- 6. IRC58–2015: Guidelines for the Design of Plain Jointed Rigid Pavements for Highways, Indian Road Congress Publications, New Delhi.
- 7. MORTH Specifications for Road and Bridge works, Indian Road Congress Publication, New Delhi, Latest Edition
- 8. IRC 67 2012: Code of Practice for Road Signs, Indian Road Congress Publication, New Delhi
- 9. IRC 35 2015: Code of Practice for Road Markings, Indian Road Congress Publication, New Delhi

Year/Sem	V Sem	L	Т	Р	С	COURSE CODE	
Regulation / Year	V18 / 2020-2021	2	0	0	2	V18CET33	
Name of the Course	REMOTE SENSING AND GEOGRAPHICAL INFORMATION						
Name of the Course	SYSTEM						
Branch	CIVIL ENGINEERING						

Course Outcomes:

Upon successful completion of this course the student will be able to

- Define the basic principles of Remote Sensing and GIS, including ground, air and satellite based sensor platforms (K1)
- Interpret the aerial photographs and satellite imageries (K2)
- Relate the process of input spatial data entry and its types (K3)
- Examine the Spatial Data for a variety of applications (K3)
- Employ RS and GIS for diverse applications (K3)
- Apply RS and GIS concepts in water resources engineering (K3)

SYLLABUS

UNIT I

Introduction to Remote Sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere, energy interaction with the earth surfaces, Characteristics of remote sensing systems.

Sensors and platforms: Introduction, types of sensors, airborne remote sensing, space borne remote sensing, image data characteristics, digital image data formats-band interleaved by pixel, band interleaved by line, band sequential, IRS, LANDSAT, SPOT, MODIS, ASTER, RISAT and CARTOSAT.

UNIT II

Image analysis: Introduction, elements of visual interpretations, digital image processingimage preprocessing, image enhancement, image classification, supervised classification, unsupervised classification.

UNIT III

Geographic Information System: Introduction, key components, application areas of GIS, map projections.

Data entry and preparation: spatial data input, raster data models, vector data models.

UNIT IV

Spatial data analysis: Introduction, overlay function-vector overlay operations, raster overlay operations, arithmetic operators, comparison and logical operators, conditional expressions, overlay using a decision table, network analysis-optimal path finding, network allocation, network tracing and buffer analysis.

UNIT V

RS and GIS Applications: Land cover and land use, agriculture, forestry, geology, geomorphology, urban applications.

UNIT VI

Applications of Hydrology, Water Resources and Disaster Management: Food zoning and mapping, groundwater prospects and potential recharge zones, watershed management and disaster management with case studies.

TEXTBOOKS:

- 1. "Remote sensing and GIS", Bhatta, B., Oxford University Press, 2008.
- 2. "Remote Sensing and Geographical Information Systems", Anji Reddy, M., B S Publications,

2008.

3. "Basics of Remote Sensing and GIS" Kumar. S., Laxmi Publications,

REFERENCE BOOKS:

- 1. "Fundamentals of Remote Sensing", George Joseph, Universities Press, 2013.
- 2. "Concepts and Techniques of Geographical Information System", Chor Pang Lo and Yeung, A.K.W., Prentice Hall, India, 2006.
- 3. "Remote Sensing and its Applications", Narayan L.R.A, Universities Press, 2012.
- 4. "Introduction to Geographic Information Systems", Kand Tsung Chang, McGraw Hill Higher Education, 2009.
- 5. "Basics of Remote sensing & GIS", Kumar, S., Laxmi Publications, New Delhi, 2005.

- 6. "Principals of Geographical Information Systems", Burrough, P.A and McDonnell, R.A.Oxford University Press, 1998.
- 7. "Remote Sensing", Schowenger, R. A., Elsevier publishers, 2006.
- 8. "Remote Sensing and Image Interpretation", Lillesand, T.M, Kiefer, R.W. and Chipman, J.W., Wiley India Pvt. Ltd., New Delhi, 2013.
- "Fundamentals of Geographic Information Systems", Demers, M.N, Wiley India Pvt. Ltd, 2013.
| Year/Sem | V Sem | L | Т | Р | С | COURSE CODE | |
|--------------------|--------------------------------|---|---|---|-----|-------------|--|
| Regulation / Year | V18 / 2020-2021 | 0 | 0 | 3 | 1.5 | V18CEL07 | |
| Name of the Course | TRANSPORTATION ENGINEERING LAB | | | | | | |
| Branch | CIVIL ENGINEERING | | | | | | |

Upon successful completion of this course, the student will be able to

- Assess the suitability of different materials for the road construction(K3)
- Examine the given bitumen samples and judge their suitability for road construction(K3)
- Find the Optimum Bitumen content for the Bituminous mix (K3)
- Develop the gradation of Bituminous mix for stability and flow properties (K3)

LIST OF EXPERIMENTS

I. ROAD AGGREGATES:

- 1. Aggregate Crushing value
- 2. Aggregate Impact Test.
- 3. Specific Gravity and Water Absorption.
- 4. Abrasion Test.
- 5. Shape tests

II. BITUMINOUS MATERIALS:

- 6. Penetration Test.
- 7. Ductility Test.
- 8. Softening Point Test.
- 9. Flash and fire point tests.
- 10. Viscosity Test.

III. BITUMINOUS MIX:

11. Marshall Stability test.

LIST OF EQUIPMENT

- 1. Apparatus for aggregate crushing test.
- 2. Aggregate Impact testing machine
- 3. Pycnometers.
- 4. Los angles Abrasion test machine
- 5. Length and elongation gauges
- 6. Bitumen penetration test setup.

- 7. Bitumen Ductility test setup.
- 8. Ring and ball apparatus
- 9. Flash and Fire Apparatus

10.Viscometer.

11. Marshal Stability apparatus.

REFERENCES:

1. "Highway Material Testing Manual", S.K. Khanna, C.E.G Justo and A.Veeraraghavan, Neam

Chan Brothers New Chand Publications, New Delhi.

- 2. IRC Codes of Practice
- 3. Asphalt Institute of American Manuals
- 4. Code of Practice of B.I.S.

Year/Sem	V Sem	L	Т	Р	С	COURSE CODE	
Regulation / Year	V18 / 2020-2021	0	0	3	1.5	V18CEL08	
Name of the Course	GEOTECHNICAL ENGINEERING LAB						
Branch	CIVIL ENGINEERING						

Upon successful completion of this course the student will be able to

- Employ index properties required for classification of soils (K3)
- Find the permeability of different soils using different tests (K3)
- Predict the compaction, consolidation and swelling characteristics of the soils (K3)
- Compute the strength properties of soils (K3)

LIST OF EXPERIMENTS

- 1. Specific gravity, G
- 2. Atterberg's Limits.
- 3. Field density-Core cutter and Sand replacement methods
- 4. Grain size analysis by sieving
- 5. Hydrometer Analysis Test
- 6. Permeability of soil Constant and Variable head tests
- 7. Compaction test
- 8. Consolidation test (to be demonstrated)
- 9. Direct Shear test
- 10. Triaxial Compression test (UU Test)
- 11. Unconfined Compression test
- 12. Vane Shear test
- 13. Differential free swell (DFS)
- 14. CBR Test

LIST OF EQUIPMENTS

- . Casagrande's liquid limit apparatus.
- 2. Apparatus for plastic and shrinkage limits
- 3. Field density apparatus for

- a) Core cutter method
- b) Sand replacement method
- 4. Set of sieves: 4.75 mm, 2 mm, 1 mm, 0.6 mm, 0.42 mm, 0.3 mm, 0.15 mm, and 0.075 mm.
- 5. Hydrometer
- 6. Permeability apparatus for
 - a) Constant head test
 - b) Variable head test
- 7. Universal auto compactor for I.S light and heavy compaction tests.
- 8. Shaking table, funnel for sand raining technique.
- 9. Apparatus for CBR test
- 10. 10 tons loading frame with proving rings of 0.5 tons and 5 tons capacity
- 11. One dimensional consolation test apparatus with all accessories.
- 12. Triaxial cell with provision for accommodating 38 mm dia specimens.
- 13. Box shear test apparatus
- 14. Laboratory vane shear apparatus.
- 15. Hot air ovens (range of temperature 500 1500C

REFERENCES

- 1. Determination of Soil Properties, J. E. Bowles.
- 2. IS:2720 Relevant Parts of Bureau of Indian Standards, New Delhi.

VI SEMESTER – SYLLABUS

Year/Sem	VI Sem	L	Т	Р	С	COURSE CODE	
Regulation / Year	V18 / 2020-2021	3	1	0	3	V18CET20	
Name of the Course	STRUCTURAL ANALYSIS - II						
Branch	CIVIL ENGINEER	CIVIL ENGINEERING					

Course Outcomes:

Upon successful completion of this course the student will be able to

- Illustrate the concepts of Arches (K3)
- Solve the structure for Lateral loads using approximate methods (K3)
- Illustrate the concepts Cables and Suspension bridges (K3)
- Employ Moment distribution method for analyzing beams/frames (K3)
- Employ Kanni's method for analyzing beams/frames (K3)
- Compute the moments/forces using matrix methods (K3)

SYLLABUS

UNIT I

Three Hinged Arches: Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature. Hinges with supports at different levels.

Two Hinged Arches: Determination of horizontal thrust, bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, Tied arches – Fixed arches – (No analytical question).

UNIT II

Lateral Load Analysis Using Approximate Methods: application to building frames.

(i) Portal Method (ii) Cantilever Method.

UNIT III

Cable Structures and Suspension Bridges: Introduction, characteristics of cable, analysis of cables subjected to concentrated and uniformly distributed loads, anchor cable, temperature stresses, analysis of simple suspension bridge, three hinged and two hinged stiffening girder suspension bridges.

UNIT IV

Moment Distribution Method: Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports – Portal frames – including Sway-Substitute frame analysis by two cycle.

UNIT V

Kani's Method: Analysis of continuous beams – including settlement of supports and single bay portal frames with and without side sway.

UNIT VI

Introduction to Matrix Methods: Flexibility methods: Introduction, application to continuous beams (maximum of two unknowns) including support settlements. Stiffness method: Introduction, application to continuous beams (maximum of two unknowns) including support settlements.

TEXT BOOKS:

- 1. Structural Analysis, T. S. Thandavamoorthy, Oxford university press, India.
- 2. Structural Analysis, R.C. Hibbeler, Pearson Education, India
- 3. Theory of Structures II, B. C. Punmia, Jain & Jain, Laxmi Publications, India.
- 4. Structural Analysis, C.S. Reddy, Tata Mc-Graw hill, New Delhi.

REFERENCES:

- 1. Intermediate Structural Analysis, C. K. Wang, Tata McGraw Hill, India
- 2. Theory of structures, Ramamuratam, Dhanpatrai Publications.
- 3. Analysis of structures, Vazrani & Ratwani Khanna Publications.
- 4. Comprehensive Structural Analysis-Vol. I & 2, R. Vaidyanathan & P. Perumal- Laxmi Publications Pvt. Ltd., New Delhi
- 5. Structural Analysis I, P.N. Chandramouli. Yesdee Publishing Pvt Limited
- 6. Structural Analysis, Aslam Kassimali, Cengage Learning
- 7. Matrix Methods of Structural Analysis, P.N. Godbole, R. S. Sonaparote, PHI Learning Pvt Limited

Year/Sem	VI Sem	L	Т	Р	С	COURSE CODE	
Regulation / Year	V18 / 2020-2021	3	0	0	3	V18CET21	
Name of the Course	GEOTECHNICAL ENGINEERING-II						
Branch	CIVIL ENGINEER	CIVIL ENGINEERING					

Upon successful completion of this course the student will be able to

- Use the field test data and arrive at the bearing capacity(K3)
- Examine the stability of slope and find earth pressures in layered soils(K3)
- Determine the bearing capacity of shallow foundations using analytical methods(K3)
- Compute the magnitude of foundation settlement and decide on the size of the foundation accordingly(K3)
- Apply the principles of bearing capacity of piles and design them accordingly(K3)
- Demonstration of the well foundations and their construction (K3)

SYLLABUS

UNIT I

Soil Exploration: Need, Methods of soil exploration – Boring and Sampling methods, Field tests, Penetration Tests, Pressure meter, planning of programme and preparation of soil investigation report.

UNIT II

Slope Stability: Infinite and finite earth slopes in sand and clay, types of failures, factor of safety of infinite slopes, stability analysis by Swedish arc method, standard method of slices ,Taylor's Stability Number, Stability of slopes of dams and embankments – different conditions.

Earth-Pressure theories: Rankine's & Coulomb's theory of earth pressure, Culmann's graphical method, earth pressures in layered soils.

UNIT III

Shallow Foundations – Bearing Capacity Criteria: Types of foundations and factors to be considered in their location, Bearing capacity – criteria for determination of bearing capacity – factors influencing bearing capacity, analytical methods to determine bearing capacity – Terzaghi's theory ,IS Methods.

UNIT IV

Shallow Foundations – Settlement Criteria: Safe bearing pressure based on N- value, allowable bearing pressure; safe bearing capacity and settlement from plate load test – Types of foundation settlements and their determination - allowable settlements of structures.

UNIT V

Pile Foundation: Types of piles, Load carrying capacity of piles based on static pile formulae, Dynamic pile formulae, Pile load tests, Load carrying capacity of pile groups in sands and clays.

UNIT VI

Well Foundations: Types, Different shapes of well, Components of well – functions, forces acting on well foundations, Design Criteria – Determination of staining thickness and plug - construction and Sinking of wells, Tilt and shift.

TEXTBOOKS:

- 1. Principles of Foundation Engineering, Das, B.M., (2011), 6th edition Cengage learning.
- 2. Basic and Applied Soil Mechanics, Gopal Ranjan & A.S.R. Rao, New Age International Pvt. Ltd, (2004).
- 3. Soil Mechanics and Foundations, B.C.Punmia, Laxmi Publictions.

REFERENCE BOOKS:

- 1. Foundation Analysis and Design, Bowles, J.E., McGraw-Hill Publishing Company, Newyork.
- 2. Theory and Practice of Foundation Design, N.N.SOM & S.C.DAS PHI Learning Private limited.

Year/Sem	VI Sem	L	Т	Р	С	COURSE CODE
Regulation / Year	V18 / 2020-2021	3	1	0	3	V18CET22
Name of the Course	DESIGN OF STEEL STRUCTURES					
Branch	CIVIL ENGINEERING					

Upon successful completion of this course the student will be able to

- Estimate the strength of the riveted and welded joints (K3)
- Select suitable flexural member by using concept of design (K3)
- Understand the design concepts of tension and compression members in roof trusses (K3)
- Apply design principles in the design of columns and built up columns (K3)
- Choose suitable design principle in the design of column bases (K3)
- Apply suitable design procedure in the design of plate and gantry girder (K3)

SYLLABUS

UNIT I

Connections: Introduction - Properties of structural steel - IS Rolled sections - I.S Specifications - Lap and Butt connections (Revited and Bolted connections) - Eccentric connections.

Welded connections: Introduction - Advantages and disadvantages of welding- Strength of welds - Butt and fillet welds - Permissible stresses - IS Code requirements - Design of Butt and fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints.

UNIT II

Beams: Allowable stresses - Design requirements as per IS Code-Design of simple and compound beams - Curtailment of flange plates - Beam to beam connection - check for deflection, shear, buckling, and bearing - Design of laterally unsupported beams.

UNIT III

Tension Members: Introduction to different modes of failures - gross section yielding - Net Section rupture and block shear failure - Determine the design strength due to yielding of gross section - rupture of critical section and block shear - Design of tension members.

Compression Members: Effective length of columns - Slenderness ratio -permissible stresses - Design of compression members.

UNIT IV

Built up compression members – Design of lacings and battens. Design Splicing of columns.

UNIT V

Design of Column Foundations: Introduction - Design of slab base - Design of gusset base-Column bases subjected to moment.

UNIT VI

Design of Plate Girder: Introduction - Design consideration - IS Code recommendations - Design of plate girder - Welded -curtailment of flange plates and stiffeners - splicing and connections.

Design of Gantry Girder: Introduction - Impact factors - longitudinal forces- Design of Gantry girders.

TEXT BOOKS:

- 1. Design of steel structures, S.K. Duggal, Tata McGraw Hill, and New Delhi.
- 2. Design of steel structures, S.S.Bavakatti, I.K.International Publishing House Pvt. Ltd.
- 3. Steel Structures Design and Practice, N.Subramanian, Oxford University Press.
- 4. Design of Steel Structures, Ramachandra, Scientific Publishers Journals Dept.

REFERENCE BOOKS:

- 1. Structural Design in Steel, Sarwar Alam Raz, New Age International Publishers, New Delhi.
- 2. Design of Steel Structures, P. Dayaratnam, S. Chand Publishers.
- 3. Design of Steel Structures, M.Raghupathi, Tata Mc. Graw-Hill.
- 4. Structural Design and Drawing, N. Krishna Raju, University Press.
- 5. IS: 800- 2007, General construction in steel-Code of practice.
- 6. IS: 875-1987, Code of Practice for Design Loads.
- 7. Steel Tables

Year/Sem	VI Sem	L	Τ	Р	С	COURSE CODE	
Regulation / Year	V18 / 2020-2021	3	0	0	3	V18 CET 23	
Name of the Course	TRANSPORTATION ENGINEERING – II						
Branch	CIVIL ENGINEER	CIVIL ENGINEERING					

Upon successful completion of this course the student will be able to

- Understand the Historical development of Railways in India (K2)
- Analyze and Design the Railway Track Geometric Elements (K3)
- Apply turnouts and controllers on Railway Track (K3)
- Analyze and design geometric elements of Airport Runway and Taxiway (K3)
- Analyze design of flexible and Rigid Highway pavements (K3)
- Classify the various components of Dock & Harbors (K2)

SYLLABUS

UNIT I

Components of Railway Engineering: Historical development of railways in India – Advantages of Railways – Classification of Indian Railways – Permanent way – Components and their functions – Rail joints – Welding of Rails – Creep of Rails – Rail fixtures & Fastenings.

UNIT II

Geometric Design of Railway Track: Track Geometric design – Points & Crossings –Track drainage – Layout of Railway stations and yards – Signals – Interlocking – Track circuiting–Track Maintenance.

UNIT III

Turnouts & Controllers: Track layouts – Switches – Crossings – Turnouts – Signal Objectives – Classification – Fixed signals – Stop signals – Signaling systems – Mechanical signaling system – Electrical signaling system.

UNIT IV

Airport Planning: Airport Master plan – Airport site selection – Air craft characteristics –Airport classification – Runway orientation – Wind rose diagram – Runway length – Taxiway – Terminal area.

UNIT V

Runway Design Methods: Various Design factors – Design methods for Flexible pavements – Design methods for Rigid pavements – LCN system of Pavement Design – Airfield Pavement Failures

UNIT – VI

Docks & Harbors: Layout of Port components – Functions –Classification of Ports – Site selection – Natural Phenomenon – Tides, Winds, Waves, Currents – Drift – Navigational aids.

TEXTBOOKS:

1. Railway Engineering, Satish Chandra and Agarwal M. M., Oxford University Press, New

Delhi.

- 2. Airport Engineering, Khanna & Arora, Nemchand Bros, New Delhi.
- 3. Docks and Harbor Engineering, Bindra S.P., Dhanpathi Rai & Sons, New Delhi.

REFERENCE BOOKS:

- 1. Railway Engineering, Saxena & Arora, Dhanpat Rai, New Delhi.
- 2. Airport Engineering, Virendra Kumar, Dhanpat Rai Publishers, New Delhi.
- 3. Airport Engineering Planning & Design, Subhash C. Saxena, CB Publishers, New Delhi.
- 4. Transportation Engineering Planning Design, Wright P. H. & Ashfort N. J., John Wiley & Sons.
- 5. Transportation Engineering Volume II, Venkatramaiah, C., Universities Press, Hyderabad.
- 6. Transportation Engineering, Railways, Airports, Docks & Harbors, Srinivasa Kumar R, University Press, Hyderabad.
- 7. Highway, Railway, Airport and Harbor Engineering, Subramanian K. P, Scitech Publications (India) Pvt. Limited, Chennai.

Year/Sem	VI Sem	L	Τ	Р	С	COURSE CODE	
Regulation / Year	V18 / 2020-2021	3	0	0	3	V18CET24	
Name of the Course	ENVIRONMENTAL ENGINEERING-I						
Branch	CIVIL ENGINEERING						

Upon successful completion of this course the student will be able to

- Describe the importance of protected water supply (K1)
- Identify the water source and select proper intake structure (K2)
- Examine the Characteristics of water (K3)
- apply a suitable process to treat raw water collected from source (K3)
- Select suitable Disinfection methods to treat water from primary treatment units (K3)
- Demonstrate various appurtenances used in the water supply (K3)

UNIT I

Protected Water Supply systems: Importance and Necessity, Water borne diseases, Flow chart of public water supply system, Role of Environmental Engineer, Agency activities. Water Demand and Quantity Estimation: Estimation of water demand for a town or city, Per capita Demand and factors influencing it - Types of water demands and its variations- factors affecting water demand, Design Period, Factors affecting the Design period, Population Forecasting

UNIT II

Sources of Water: Lakes, Rivers, Impounding Reservoirs, comparison of sources with reference to quality, quantity and other considerations- Capacity of storage reservoirs, Mass curve analysis. Groundwater sources of water: Types of water bearing formations, springs, Wells and Infiltration galleries, Yields from infiltration galleries. Collection and Conveyance of Water: Factors governing the selection of the intake structure, Types of Intakes. Conveyance of Water: Gravity and Pressure conduits.

UNIT III

Quality and Analysis of Water: Characteristics of water–Physical, Chemical and Biological-Analysis of Water – Physical, Chemical and Biological characteristics. Comparison of sources with reference to quality-I.S. Drinking water quality standards and WHO guidelines for drinking water

UNIT IV

Primary Treatment of Water: Flowchart of water treatment plant, Treatment methods: Theory and Design of Sedimentation, Coagulation, Sedimentation with Coagulation, Filtration.

UNIT V

Secondary Treatment (Disinfection): Theory of disinfection-Chlorination and other Disinfection methods, Softening of Water, Removal of color and odours - Iron and Manganese removal – Adsorption-fluoridation and deflouridation–aeration– Reverse Osmosis-Iron exchange–Ultra filtration.

UNIT VI

Distribution of Water: Requirements- Methods of Distribution system, Layouts of Distribution networks, Pressures in the distribution layouts, Analysis of Distribution networks: Hardy Cross and equivalent pipe methods -Components of Distribution system: valves such as sluice valves, air valves, scour valves and check valves, hydrants, water meters and Pipes –Laying and testing of pipe lines- selection of pipe materials, pipe joints.

TEXTBOOKS:

- 1. Elements of Environmental Engineering by K.N. Duggal, S. Chand Company Ltd., New Delhi, 2012.
- 2. Water Supply Engineering by Dr. P.N. Modi, Standard book house, 4th edition (2015)
- 3. Water Supply Engineering by B.C. Punmia, Laxmi publications, volume-1
- 4. Water supply and sanitary engineering by S. C. Rangwala, Charotar publishing house, 29th edition (2016)

REFERENCE BOOKS:

- 1. Water supply engineering by S. K. Garg , Khanna publishers, ,33rd edition (2010)
- 2. Environmental Engineering by Howard S. Peavy, Donald R. Rowe (2017) Mc-Graw-Hill Book Company, New Delhi, 1985.
- 3. IS 10500:2012, Drinking water specification.
- 4. IS :3052 (Part-08), Methods of sampling and Test(physical and chemical) for water and waste Water.

Syllabi for the Courses proposed in V & VI Semesters, 3rd BoS, Dept. of Civil Engineering, SVEC

	-				<i>cpt. 0</i> j	CIVIL Engliteering, 5VI	
Year/Sem	VI Sem	L	Т	Р	С	COURSE CODE	
Regulation / Year	V18 / 2020-2021	0	0	2	1	V18CEL09	
Name of the Course	ENVIRONMENTAL ENGINEERING LAB						
Branch	CIVIL ENGINEERING						

Course outcomes:

Upon successful completion of this course the student will be able to

- Find some important characteristics of water and waste water in the laboratory (K3)
- Prepare some conclusion and decide whether the water is potable or not (K3)
- Examine whether the water body is polluted or not with reference to the state parameters in the list of experiments (K3)
- Find the strength of the sewage in terms of BOD and COD (K3)

LIST OF EXPERIMENTS

- 1. Sampling of water for testing (Demonstration)
- 2. Determination of alkalinity or acidity
- 3. Determination of chlorides in water and soil
- 4. Determination and estimation of total solids, organic and inorganic solids, settle able solids
- 5. Determination of Iron
- 6. Determination of pH and Electrical Conductivity of water and soil
- 7. Determination of Optimum coagulant dose
- 8. Determination of Chlorine demand
- 9. Determination and estimation of total hardness calcium and magnesium
- 10. Determination of N, P, K values in solid waste
- 11. Physical parameters Temperature, colour, odour, turbidity, taste.
- 12. Presumptive Coliform test
- 13. Determination of Dissolved Oxygen and BOD
- 14. Determination of COD

LIST OF EQUIPMENTS

- 1. pH Meter
- 2. Turbidity Meter
- 3. Conductivity Meter
- 4. Hot Air Oven
- 5. Muffle Furnace
- 6. Dissolved Oxygen Meter
- 7. U-V Visible Spectrophotometer
- 8. COD Reflux Apparatus
- 9. Jar Test Apparatus
- 10. BOD Incubator
- 11. Autoclave
- 12. Hazens Apparatus
- 13. Imhoff Cone

REFERENCES

- 1. "Standard methods for analysis of water and waste water", APHA.
- 2. "Chemical analysis of water and soil", Murali Krishna, KVSG., Reem publications, New Delhi.

Year/Sem	VI Sem	L	Т	Р	С	COURSE CODE
Regulation / Year	V18 / 2020-2021	0	0	2	1	V18CEL10
Name of the Course	CAD & GIS LAB					
Branch	CIVIL ENGINEER	ING				

Upon successful completion of this course the student will be able to

- Employ structural analysis software to analyze and design 2D and 3D frames (K3)
- Prepare design and analyze retaining wall and simple towers using CADD software (K3)
- Demonstrate to digitize and create thematic map and extract important features (K3)
- Develop digital elevation models using GIS software (K3)

COMPUTER AIDED DESIGN AND DRAWING

SOFTWARE:

- STAAD PRO
- STRAAP
- STUDDS

LIST OF EXPERIMENTS

- 2-D Frame Analysis and Design
- Steel Tabular Truss Analysis and Design
- 3-D Frame Analysis and Design
- Retaining Wall Analysis and Design
- Simple Tower Analysis and Design.

GEOGRAPHICAL INFORMATION SYSTEM

SOFTWARE:

- Arc GIS 9.0
- ERDAS 8.7
- Mapinfo 6.5

LIST OF EXPERIMENTS

- Digitization of Map/Toposheet
- Creation of thematic maps.
- Estimation of features and interpretation
- Estimation of features and interpretation
- Simple applications of GIS in water Resources Engineering & Transportation Engineering.

REFERENCES

1. Concept and Techniques of GIS' by C.P.L.O. Albert, K.W. Yong, Printice Hall Publishers.

Sl.No.	Name of the Course	Suggestions in Syllabi
	V	Semester
1	Structural Analysis - I	
2	Geotechnical Engineering - I	
3	Hydrology & Water Resources Engineering	
4	Design of Reinforced Concrete Structures	
5	Transportation Engineering - I	
6	RS & GIS	
7	Transportation Engineering Lab	
8	Geotechnical Engineering Lab	
	V	I Semester
9	Structural Analysis - II	
10	Geotechnical Engineering – II	
11	Design of Steel Structures	
12	Transportation Engineering – II	
13	Environmental Engineering - I	
14	Environmental Engineering Lab	
15	CAD & GIS Lab	

ANNEXURE - III <u>COURSES OFFERED UNDER OPEN ELECTIVE – I IN VI SEMESTER TO ALL</u> <u>OTHER BRANCHES</u>

Sl.No.	Course Code	Name of the Course	Suggestions regarding the course offered and its Syllabus
1	V18CET30	Repair and Rehabilitation of Structures	
2	V18CET33	Remote Sensing and GIS	

Year/Sem	VI Sem	L	Т	Р	С	COURSE CODE
Regulation / Year	V18 / 2020-2021	3	0	0	3	V18CET30
Name of the Course	REPAIR AND REHABILITATION OF STRUCTURES					
Branch	CIVIL ENGINEER	ING				

Upon successful completion of this course the student will be able to

- Describe the deterioration of concrete in structures (K1)
- Estimate the degree of deterioration using Non Destructive Test methods (K2)
- Assess the failures and causes of failures in structures (K3)
- Relate different materials used for repair and rehabilitation of structures (K3)
- Employ and suggest suitable retrofitting techniques (K3)
- Organize the case studies and report the condition of structures (K3)

UNIT I

Deterioration of concrete in structures: Physical processes of deterioration like Freezing and Thawing, Wetting and Drying, Abrasion, Erosion, Pitting.

Chemical processes of deterioration like Carbonation, Chloride ingress, Corrosion, Alkali aggregate reaction, Sulphate attack, Acid attack, temperature and their causes, Mechanism, Effect, preventive measures.

Cracks: Cracks in concrete, types, pattern, quantification, measurement and preventive measures.

UNIT II

Non Destructive Testing: Non destructive test methods for concrete like Rebound hammer, Ultrasonic pulse velocity, Rebar locator, Corrosion meter, Penetration resistance and Pull out tests. Methods for corrosion measurement and assessment, including half-cell potential and resistivity, mapping of data.

UNIT III

Failure of buildings: Definition of building failure, types of failures, Causes of Failures, Faulty Design, Accidental over Loading, Poor quality of material, Poor Construction practices and Fire damage. Investigation of failures, diagnostic testing methods and equipments required. Repair of cracks in concrete.

UNIT IV

Materials for repair and rehabilitation: Admixtures, types of admixtures, purposes of using admixtures, chemical composition, Natural admixtures, Fibres, wraps, Glass and Carbon fibre wraps, Steel Plates. Concrete behavior under corrosion, disintegrated mechanisms, moisture effects and thermal effects. Visual investigation, Acoustical emission methods, Corrosion activity measurement, chloride content, Depth of carbonation, Impact echo methods, Ultrasound pulse velocity methods, Pull out tests.

UNIT V

Repair Techniques: Grouting, Jacketing, Shotcreting, Externally bonded plates, Nailing, Underpinning and under water repair. Materials, Equipments, Precautions and Processes.

UNIT VI

Investigation of structures: Distress, observation and preliminary test methods. Case studies related to rehabilitation of bridge piers, dams, canals, heritage structures, corrosion and erosion damaged structures.

TEXT BOOKS:

- 1. "Maintenance & Repair of Civil Structures", Gupta, B.I., and Amit Gupta, Standard Publishers and Distributors, 2015.
- 2. "Rehabilitation of Concrete Structures", Vidivelli, B., Standard Publishers and Distributors, 2007.
- 3. "Concrete Bridge Practice, Construction, Maintenance & Rehabilitation", Raina. V.K., Shroff Publishers and Distributors, 2010.

REFERENCES:

- 1. "Concrete Structures- protection Repair and Rehabilitation", Doodge, R. Woodson., BH Publishers.
- 2. "Concrete technology", Neville, A.M and Brooks, J.J. Prentice Hall, 2010.
- 3. "Special Structural concrete", Rafat Siddique, Galgotia Publications, 2000.
- 4. "Concrete repair and maintenance illustrated", Peter H Emmons, R S Means Publishers, 1993.
- 5. "Concrete technology", Shetty, M.S., S Chand publishers, 1982.
- 6. "Repair and protection of concrete structures", Noel P.Mailvaganam, CRC press, London, 1992.

Year/Sem	V Sem	L	Т	Р	С	COURSE CODE	
Regulation / Year	V18 / 2020-2021	2	0	0	2	V18CET33	
Nama of the Course	REMOTE SENSING AND GEOGRAPHICAL INFORMATION						
Name of the Course	SYSTEM						
Branch	CIVIL ENGINEERING						

Upon successful completion of this course the student will be able to

- Define the basic principles of Remote Sensing and GIS, including ground, air and satellite based sensor platforms (K1)
- Interpret the aerial photographs and satellite imageries (K2)
- Relate the process of input spatial data entry and its types (K3)
- Examine the Spatial Data for a variety of applications (K3)
- Employ RS and GIS for diverse applications (K3)
- Apply RS and GIS concepts in water resources engineering (K3)

SYLLABUS

UNIT I

Introduction to Remote Sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere, energy interaction with the earth surfaces, Characteristics of remote sensing systems.

Sensors and platforms: Introduction, types of sensors, airborne remote sensing, space borne remote sensing, image data characteristics, digital image data formats-band interleaved by pixel, band interleaved by line, band sequential, IRS, LANDSAT, SPOT, MODIS, ASTER, RISAT and CARTOSAT.

UNIT II

Image analysis: Introduction, elements of visual interpretations, digital image processing- image preprocessing, image enhancement, image classification, supervised classification, unsupervised classification.

UNIT III

Geographic Information System: Introduction, key components, application areas of GIS, map projections.

Data entry and preparation: spatial data input, raster data models, vector data models.

UNIT IV

Spatial data analysis: Introduction, overlay function-vector overlay operations, raster overlay operations, arithmetic operators, comparison and logical operators, conditional expressions, overlay using a decision table, network analysis-optimal path finding, network allocation, network tracing and buffer analysis.

UNIT V

RS and GIS Applications: Land cover and land use, agriculture, forestry, geology, geomorphology, urban applications.

UNIT VI

Applications of Hydrology, Water Resources and Disaster Management: Food zoning and mapping, groundwater prospects and potential recharge zones, watershed management and disaster management with case studies.

TEXTBOOKS:

- 1. "Remote sensing and GIS", Bhatta, B., Oxford University Press, 2008.
- 2. "Remote Sensing and Geographical Information Systems", Anji Reddy, M., B S Publications, 2008.
- 3. "Basics of Remote Sensing and GIS" Kumar. S., Laxmi Publications,

REFERENCE BOOKS:

- 1. "Fundamentals of Remote Sensing", George Joseph, Universities Press, 2013.
- 2. "Concepts and Techniques of Geographical Information System", Chor Pang Lo and Yeung, A.K.W., Prentice Hall, India, 2006.
- 3. "Remote Sensing and its Applications", Narayan L.R.A, Universities Press, 2012.
- 4. "Introduction to Geographic Information Systems", Kand Tsung Chang, McGraw Hill Higher Education, 2009.
- 5. "Basics of Remote sensing & GIS", Kumar, S., Laxmi Publications, New Delhi, 2005.
- 6. "Principals of Geographical Information Systems", Burrough, P.A and McDonnell, R.A. Oxford University Press, 1998.
- 7. "Remote Sensing", Schowenger, R. A., Elsevier publishers, 2006.
- 8. "Remote Sensing and Image Interpretation", Lillesand, T.M, Kiefer, R.W. and Chipman, J.W., Wiley India Pvt. Ltd., New Delhi, 2013.
- 9. "Fundamentals of Geographic Information Systems", Demers, M.N, Wiley India Pvt. Ltd, 2013.

ANNEXURE – II <u>SYLLABI OF VII & VIII SEMESTER OF B.TECH COURSES FOR THE</u> <u>ACADEMIC YEAR 2021-2022</u>

VII SEMESTER – SYLLABUS

Year/Sem	VII Sem	L	Т	Р	С	COURSE CODE		
Regulation Year	V18 / 2021-2022	3	0	0	3	V18CET25		
Name of the Course	ESTIMATION, SPECIFICATION & CONTRACTS							
Branch	CIVIL ENGINEER	ING						

Course Outcomes:

Upon successful completion of this course the student will be able to

- Explain to student for understanding different construction works and can estimate approximate cost required for a building (K2)
- Develop the student to a position for finding the cost of various building components (K3)
- Illustrate the calculation of quantities for earthwork of roads and canals to students (K3)
- Discuss to students about contracts and their types ,value a property(K2)
- Describe the students in calculating the approximate costs of building using various techniques(K2)
- Demonstrate the students in determining the quantities of different components of buildings(K3)

SYLLABUS

UNIT I

Introduction: General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates.

UNIT II

Rate Analysis: Working out data for various items of work over head and contigent charges.

UNIT III

Earthwork: Introduction to earthwork, Lead and lift, Earthwork volume calculation by midsectional area method, Mean sectional area method, Trapezoidal rule, Prismoidal rule estimation of quantities for canals

UNIT IV

Contracts: Types of contracts – Contract Documents – Conditions of contract, Valuation of buildings- Standard specifications for different items of building construction.

UNIT V

Approximate estimation of building: Introduction to approximate estimation of building, Advantages of estimating building by approximate estimation- Types of approximate estimation – problems on approximate estimation

UNIT VI

Detailed Estimation of Buildings: Estimation of quantities for one roomed building, Two roomed building.

Text Books:

- 1. Estimating and Costing' by B.N. Dutta, UBS publishers, 2000.
- 2. Civil Engineering Contracts and Estimates' by B. S. Patil, Universities Press (India) Pvt.Ltd., Hyd.
- 3. Construction Planning and Technology' by Rajiv Gupta, CBS Publishers & Distributors Pvt.Ltd. New Delhi.
- 4 Estimating and Costing' by G.S. Birdie.

- 1. 1'Standard Schedule of rates and standard data book' by public works department.
- 2. IS 1200 (Parts I to XXV-1974/ Method of Measurement of Building & Civil Engg Works B.I.S.)
- 3. 'Estimation, Costing and Specifications' by M. Chakraborthi; Laxmi publications.
- 4. National Building Code

Syllabi for the Courses proposed in VII & VIII Semesters, 4th BoS, Dept. of Civil Engineering, SVEC

Year/Sem	VII Sem	L	Т	Р	С	COURSE CODE		
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET26		
Name of the Course	ENVIRONMENTAL ENGINEERING-II							
Branch	CIVIL ENGINEERING							

Course Outcomes:

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

- Estimate the sewage and storm water flow and design the sewerage system (K3)
- Relate the appropriate pumps in the sewerage systems (K3)
- Analyze sewage quality and design suitable primary treatment units (K3)
- Employ the secondary treatment units (K3)
- Employ miscellaneous treatment units (K3)
- Identify suitable disposable method with respect to effluent standards.(K2)

SYLLABUS

UNIT I

Introduction: Sanitation – Systems of sanitation – relative merits & demerits – collection and conveyance of waste water – sewerage – classification of sewerage systems- Estimation of sewage flow and storm water drainage – fluctuations – types of sewers - Hydraulics of sewers and storm drains– design of sewers – appurtenances in sewerage – cleaning and ventilation of sewers

UNIT II

Pumping of Wastewater: Pumping stations – location – components– types of pumps and their suitability with regard to wastewaters – Problems in sewage pumping.

House Plumbing: Systems of plumbing-sanitary fittings and other accessories–one pipe and two pipe systems – Design of building drainage

UNIT III

Characteristics and Treatment of sewage : Sampling and analysis of wastewater - Physical, Chemical and Biological Examination-Measurement of BOD and COD - BOD equations

Primary treatment of sewage - Screens-grit chambers-grease traps-floatation- sedimentation - design of preliminary and primary treatment units.

UNIT IV

Secondary Treatment: Aerobic and anaerobic treatment process-comparison. Suspended growth process: Activated Sludge Process, principles, designs, and operational problems, modifications of Activated Sludge Processes, Oxidation ponds, Aerated Lagoons, Fluidized bed reactors.

Attached Growth Process: Trickling Filters-mechanism of impurities removalclassification-design-operation and maintenance problems, Rotating Biological Contactors.

UNIT V

Miscellaneous Treatment Methods: Nitrification and Denitrification – Removal of Phosphates –UASB–Membrane reactors-Integrated fixed film reactors. Anaerobic Processes: Septic Tanks and Imhoff tanks- working Principles and Design–Reuse and disposal of septic tank effluent.

UNIT VI

Sludge Management: Characteristics-SVI, handling and treatment of sludge-thickening – anaerobic digestion of sludge, Sludge Drying Beds. Centrifuge.

Disposal of sewage: Methods of disposal – disposal into water bodies-Oxygen Sag Curve-Disposal into sea, disposal on land- sewage sickness.

Text Books:

- 1. Wastewater Engineering Treatment and Reuse, Metcalf & Eddy, Tata McGraw-Hill edition.
- 2. Industrial Water and Wastewater Management, K.V.S.G. Murali Krishna.
- 3. Elements of Environmental Engineering, K. N. Duggal, S. Chand & Company Ltd. New Delhi, 2012.

- 1. Environmental Engineering, Howard S. Peavy, Donald R. Rowe, Teorge George Tchobanoglus Mc-Graw-Hill Book Company, New Delhi, 1985
- 2. Wastewater Treatment for Pollution Control and Reuse, Soli. J Arceivala, Sham R Asolekar, Mc-GrawHill, NewDelhi; 3rd Edition
- 3. Environmental Engineering –II: Sewage disposal and Air Pollution Engineering, Garg, S. K., Khanna Publishers
- 4. Sewage treatment and disposal, P. N. Modi & Sethi.
- 5. Environmental Engineering, Ruth F. Weiner and Robin Matthews 4th Edition Elsevier, 2003
- 6. Environmental Engineering, D. Srinivasan, PHI Learning Private Limited, New Delhi, 2011.

Year/Sem	VII Sem	L	Т	Р	С	COURSE CODE		
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET27		
Name of the Course	PAVEMENT ANALYSIS AND DESIGN							
Branch	CIVIL ENGINEERING							

Upon successful completion of this course the student will be able to

- Understand the factors influencing the design methodologies.(K2)
- Analyze stresses and strains in a flexible pavement using multi-layered elastic theory (K3)
- Analyze stresses and strains in a rigid pavement using Westergaard's theory (K3)
- Design a flexible pavement using IRC, Asphalt Institute, and AASHTO methods (K3)
- Design a rigid pavement using IRC, and AASHTO methods (K3)
- Design of joints, Dowel & tie bars.(K3)

SYLLABUS

UNIT I

Factors Affecting Flexible Pavement Design: Variables Considered in Pavement Design, Types of Pavements, Functions of Individual Layers, EAL and ESWL Concepts, Traffic Analysis: ADT, AADT, Truck Factor, Growth Factor, Lane Distributions & Vehicle Damage Factors, Effect of Transient & Moving Loads.

UNIT II

Factors Affecting Rigid Pavement Design : Rigid pavement layers, Classification of Axle Types of Rigid Chassis and Articulated Commercial Vehicles, Legal Axle and Gross Weights on Single and Multiple Units, Tire Pressure, Contact Pressure,

UNIT III

Stresses in Flexible Pavement: Vehicle-Pavement Interaction: Transient, Random & Damping Vibrations, Steady State of Vibration, Experiments on Vibration, Stress Inducing Factors in Flexible and Rigid pavements; Stress In Flexible Pavements: Visco-Elastic Theory and Assumptions, Layered Systems Concepts, Stress Solutions for One, Two and Three Layered Systems, Fundamental Design Concepts;.

UNIT IV

Stresses in Rigid Pavements: Westergaard's Theory and Assumptions, Stresses due to Curling, Stresses and Deflections due to Loading, Frictional Stresses, and Stresses in Dowel Bars & Tie Bars

UNIT V

Design of Flexible Pavements: Factors effecting Design. Deflection studies in Flexible Pavements. Present Serviceability Index.IRC guidelines for Flexible Pavements. Pavement Performance and methods- AASHTO and Asphalt Institute Method. Need for Overlays, Overlays design methods for Flexible and Rigid pavements.

UNIT VI

Design of Rigid Pavements: Factors effecting Design – Wheel load & its repetition, subgrade strength & proportion, strength of concrete- modulus of elasticity. Reinforcement in slab. Design of joints. Design of Dowel bars. Design of Tie bars. IRC and AASHTO methods of Rigid Pavement design.

Text Books:

- 1. Principles of Pavement Design, Yoder.J. &Witzorac Mathew, W. John Wiley & Sons Inc
- 2. Pavement Analysis & Design, Yang H. Huang, Prentice Hall Inc.
- 3. AASHTO Pavement Design Guide (1993)

- 1. Design of Functional Pavements, Nai C. Yang, McGraw Hill Publications
- 2. Concrete Pavements, AF Stock, Elsevier, Applied Science Publishers.
- 3. Pavement and Surfacing for Highway & Airports, Micheal Sargious, Applied Science Publishers Limited.
- 4. IRC: 37 & 58 Codes for Flexible and Rigid Pavements Design.

Syllabi for the Courses proposed in VII & VIII Semesters, 4th BoS, Dept. of Civil Engineering, SVEC

Year/Sem	VII Sem	L	Т	Р	С	COURSE CODE	
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET28	
Name of the Course	AIR POLLUTION AND CONTROL						
Branch	CIVIL ENGINEERING						

Course Outcomes:

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

- Understand the ambient air quality based on the analysis of air pollutants(K1)
- Employ particulate and gaseous control measures for an industry(K3)
- Illustrate the plume behavior in a prevailing environmental condition(K3)
- Estimate carbon credits for various day to day activities(K2)
- Operate air pollution gases methods(K3)
- Classify the air pollution controlling methods(K4)

SYLLABUS

UNIT I

Air Pollution: Sampling and analysis of air pollutants, conversion of ppm into $\mu g/m_3$. Definition of terms related to air pollution and control - secondary pollutants – Indoor air pollution – Ozone holes and Climate Change and its impact - Carbon Trade.

UNIT II

Thermodynamics and Kinetics of Air-pollution: Applications in the removal of gases like SOx, NOx, CO and HC - Air-fuel ratio- Computation and Control of products of combustion, Automobile pollution. Odour pollution control, Flares.

UNIT III

Meteorology and Air Pollution: Properties of atmosphere: Heat, Pressure, Wind forces, Moisture and relative Humidity, Lapse Rates - Influence of Terrain and Meteorological phenomena on plume behaviour and Air Quality - Wind rose diagrams and Isopleths Plume Rise Models

UNIT IV

Ambient Air Quality Management: Monitoring of SPM - RPM SO2; NOx and CO - Stack Monitoring for flue gases - Micro-meteorological monitoring – Noise Monitoring - Weather Station. Emission Standards- Gaussian Model for Plume Dispersion

UNIT V

Air Pollution Control: Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control Equipments – Settling Chambers, Cyclone separators –Fabric filters–Scrubbers, Electrostatic precipitators

UNIT VI

Air Pollution Control Methods: Control of NOx and SOx emissions – Environmental friendly fuels - In-plant Control Measures, process changes, methods of removal and recycling. Environmental criteria for setting industries and green belts.

Text Books:

- 1. Air Pollution and Control, K.V.S.G. Murali Krishna, Laxmi Publications, New Delhi, 2015
- 2. Air Pollution, M. N. Rao and H. V. N. Rao, Tata McGraw Hill Company.
- 3. Environmental Science and Engineering by J.G. Henry and G.W. Heinke Pearson Education.

- 1. An Introduction to Air pollution, R. K. Trivedy and P.K. Goel, B.S. Publications.
- 2. Air Pollution by Wark and Warner Harper & Row, New York.

Syllabi for the Courses proposed in VII & VIII Semesters, 4th BoS, Dept. of Civil Engineering, SVEC

Year/Sem	VII Sem	L	Т	Р	С	COURSE CODE	
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET29	
Name of the Course	IRRIGATION ENGINEERING						
Branch	CIVIL ENGINEER	ING					

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

- Explain the importance, type and quality of Irrigation Water (K2)
- Estimate the Irrigation water requirements (K2)
- Asses different parameters needed for the design of irrigation canal networks (K3)
- Asses different irrigation canal structures (K3)
- Asses different diversion head works (K3)
- Assess the stability of gravity and earth dams (K3)

SYLLABUS

UNIT I

Introduction: Definition – Importance of Irrigation in India – Advantages and Dis advantages – Types of Irrigation – Quality of Irrigation water- Different types techniques used for water distribution in field.

UNIT II

Irrigation and Water Requirement of Crops: Different types of crops and crop seasons-Soil, water and plant relationship- Irrigation efficiencies- Consumptive use –Estimation of consumptive use-Crop water requirement-Duty and Delta-Factors affecting duty-Depth and Frequency of Irrigation-Water logging and Drainage-crop rotation.

UNIT III

Canals: Classification-Alluvial and Non Alluvial canals-Design of non-erodible canals-Different command areas-Methods of economic section and maximum permissible velocity-Design of erodible canals-Kennedy's silt theory and Lacey's regime theory.

UNIT IV

Canal structures: Falls-Types and location- Design principle of Sarda type wall and straight glacis wall

Regulators: Head and cross regulators –design principles

Cross Drainage works: Design principles of aqueduct- siphon aqueduct-super passage

Outlets: Types-proportionality-sensitivity and flexibility

UNIT V

Diversion Head Works: Types of diversion head works-Weirs and Barrages-Layout of diversion head works-components- causes and failures of weirs on permeable foundations-Bligh's creep theory-Khosla's theory-exit gradient.

UNIT VI

Reservoir planning: Site selection-zones of storage-yield and storage capacity of reservoir and reservoir sedimentation-Types of dams- selection of type of dam-selection of site for a dam.

Gravity Dams: Forces acting on gravity dam-causes of failure of gravity dam-elementary profile and practical profile of gravity dam-limiting height of dam-stability analysis-drainage galleries-grouting.

Earthen Dams: Types of earthen dams-causes of failure-criteria for safe design-seepagemeasures of control of seepage filters.

Text Books:

- 1. Irrigation Engineering and Hydraulic structures, Santosh Kumar Garg, Khanna Publishers.
- 2. Irrigation and Water power Engineering, B.C. Punmia, Pande B.B. Lal, Ashok Kumar Jain, Arun Kumar Jain, Lakshmi Publications Ltd.
- 3. Water resources and Irrigation engineering by Sri Krishna publications.

- 1. Irrigation and Water Resources Engineering, Asawa G L (2013), New Age International Publishers.
- 2. Irrigation Water Resources and Water Power Engineering, Modi P N (2011), Standard book House, New Delhi.
- 3. Irrigation and Drainage Engineering" by Peter Waller and Muluneh Yitayew

Syllabi for the Courses proposed in VII & VIII Semesters, 4th BOS, Dept. of Civil Engineering, SVEC

Year/Sem	VII Sem	L	Т	Р	С	COURSE CODE		
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET30		
Name of the Course	BRIDGE ENGINEERING							
Branch	CIVIL ENGINEERING							

Course Outcomes:

Upon successful completion the course the student will be able to

- Generalize different types of Bridges with diagrams and Loading standards (K2)
- Asses the moments in the girders (K3)
- Illustrate different sub structural works of bridges (K3)
- Illustrate different parameters of Well Foundations (K3)
- Report the effectiveness of different Bearings of a Bridge (K2)
- Generalize the suspension bridge and cable stayed bridge (K2)

SYLLABUS

UNIT I

Introduction: Bridges- Types- Slab bridges, T Beam, Arch bridges, Cable Stayed bridges, prestressed concrete bridges, Truss Bridges, Culverts, - Nomenclature- Selection of Bridge Site- Economical span- Abutments pier and end connections- types of foundations- Open, Pile, Well Foundations, Bearings – Types- Introduction to Loading standards- Railway and IRC Loading

UNIT II

T-Beam Bridge: Pigeaud's method for computation of slab moments; Courbon's method for computation of moments in girders; Design of simply supported T-beam bridge.

UNIT III

Sub Structure for Bridges: Pier and abutment caps; Materials for piers and abutments, Design of pier; Design of abutment; Backfill behind abutment; approach slab.

UNIT IV

Foundations For Bridges: scour at abutments and piers; Grip length; Types of foundations; Design of well foundation.

Box Culverts: Loading - Analysis and Design- Reinforcement detailing

UNIT V

Bearings for Bridges: Importance of bearings; bearings for slab bridge; bearings for girder bridges; Expansion bearings; Fixed bearings; Design of elastomeric pad bearing.

UNIT VI

Cable Supported Bridge: Different types of cable supported bridge, difference between suspension bridge and cable stayed bridge. Different components and factors considered for design of a) suspension bridge, b) cable stayed bridge.

Text Books:

- 1. Essentials of Bridge Engineering by Dr. Johnson Victor; Oxford & IBH publishing Co. Pvt.Ltd
- 2. Cable supported bridges, concepts and design by N J Gimsing. John Willey and Sons
- 3. Design of Bridges, N. Krishna Raju, Tata McGraw Hill

- 1. Design of Bridge Structures by T. R Jagadeesh, M.A Jayaram, Prentice Hall of India Pvt. Ltd.
- 2. Design of Concrete Bridges, Aswini, Vazirani, Ratwani
- 3. Bridge Engineering by S.Ponnuswamy

Year/Sem	VII Sem	L	Т	Р	С	COURSE CODE	
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET31	
Name of the Course	ADVANCED FOUNDATION ENGINEERING						
Branch	CIVIL ENGINEERI	NG					

Upon successful completion of this course, the student will be able to

- Illustrate the safe bearing capacity of footings subjected to different types of loading on varied soil strata using different methods (K3)
- Compute the settlements of foundations using advanced methods (K3)
- Employ different techniques for proportioning of foundations laid on different soils strata (K3)
- Assess the forces acting on Earth Retaining Structures using different Earth Pressure Theories (K3)
- Predict the load carrying capacity, pull-out capacity, negative skin friction of piles and their settlements (K3)
- Interpret different foundation practices in expansive soils (K3)

SYLLABUS

UNIT I

Bearing capacity of Foundation susing general bearing capacity equation–Meyerhof's, Brinch Hansen's and Vesic's methods-Bearing capacity of Layered Soils:Strong layer over weak layer, Weak layer on strong layer – Bearing capacity of foundations on at opof slope– Bearing capacity of foundations at theedge of the slope.

UNIT II

Settlement analysis: Immediate settlement of footings resting on granular soils – Schmertmann& Hartman method – De Beer and Martens method - Immediate settlement inclays–Janbu'smethod–

correctionforconsolidationsettlementusingSkemptonandBjerrum'smethod – Correction forconstruction period

UNIT III

Mat foundations – Purpose and types of isolated and combined footings – Mats/Rafts – Proportioning of footings – Ultimate bearing capacity of mat foundations – allowable bearing capacity of mats founded in clays and granular soils– compensated rafts.

UNIT IV

Earth-retaining structures – cantilever sheet piles – anchored bulkheads – fixed and free earth support methods – design of anchors – braced excavations – function of different components– forces in ties – stability against bottom heave.

UNIT V

Pile foundations – single pile versus group of piles – load-carrying capacity of pile groups – negative skin friction (NSF) -settlement of pile groups in sands and clays – laterally loaded piles in granular soils – Reese and Matlock method – laterally loaded piles in cohesive soils– Davisson and Gill method – Broms'analysis.

UNIT VI

Foundationsinexpansivesoils-definitionsofswellpotentialandswellingpressure – determination of free swell index – factors affecting swell potential and swelling pressure – foundation practices – sand cushion method – CNS layer - drilled piers and belled piers– under-reamed piles – moisture control methods.

Text Books:

- 1. Principles of Foundation Engineering, B M Das, CENTAG Learning
- 2. Soil Mechanics and Foundation Engineering, V N S Murthy, CBS Publishers
- 3. Basic and applied soil mechanics by Gopal Ranjan and ASR Rao, New Age Publishers

- 1. Foundation Analysis and Design, J.E.Bowles, JohnWiley
- 2. Foundation Design, W.C.Teng, PrenticeHallPublishers
- 3. Analysis and Design of Foundations and Retaining Structures by Prakash S edited by Saritha Prakashan
| Year/Sem | VII Sem | L | Т | Р | С | COURSE CODE | | |
|--------------------------|---------------------------------------|-----|---|---|---|-------------|--|--|
| Regulation / Year | V18 / 2021-2022 | 3 | 0 | 0 | 3 | V18CET32 | | |
| Name of the Course | arse TRAFFIC ENGINEERING & MANAGEMENT | | | | | | | |
| Branch | CIVIL ENGINEER | ING | | | | | | |

Upon successful completion of the course the student will be able to:

- Understand basics principles of Traffic Engineering(K2)
- Analyze parking data and model accidents(K3)
- Determine capacity and LOS(K3)
- Design of Signalized systems at congested intersections(K3)
- Design of interchanges and Rotary Intersections(K3)
- To provide engineering techniques to achieve Safe and efficient movement of people and goods on roadways(K2)

SYLLABUS

UNIT I

Traffic Studies (Part- I) : Basic principles of Traffic, Volume, Speed and Density; Definitions and their interrelationships; Traffic Volume studies - Objectives, Methods of Volume counts, Presentation of Volume Data; Speed studies- Types of Speeds, Objectives, Methods of speed studies, Statistical Methods for speed data Analysis, Presentation of speed data. Delay Studies; Head ways and Gap Studies - Headway and Gap acceptance, Origin and Destination Studies.

UNIT II

Traffic Studies (Part-II) : Parking Studies: parameters of parking, definitions, Parking inventory study, Parking survey by Patrolling method; Analysis of Parking Survey data; Accident studies- Causative factors of Road accidents, Accident data collection: Accident analysis and modeling;, Road Safety Auditing, Measures to increase Road safety.

UNIT III

Capacity and LOS Analysis: Introduction to Traffic capacity, Analysis concepts, Level of Service, Basic definitions, Factors affecting Capacity and LOS, Capacity of Urban/Rural Highway, With or without access control, Basic freeway segments - Service flow rate of LOS, Lane width or Lateral clearance adjustment; Heavy vehicle adjustment; Driver population adjustment.

UNIT IV

Signal Designing: Fixed Time signals, Determination of Optimum Cycle length and Signal setting for Fixed Time signals, Warrants for Signals, Time Plan Design for Pre-Timed Control- Lane group analysis, Saturation flow rate, and Adjustment factors, Uniform and Incremental Delay, Vehicle Actuated Signals, Signal Coordination.

Design of Intersections: Rotary Design, Weaving angles, Entry width, Exit Radius, Capacity of Rotary, Types of interchanges, Implementation.

UNIT VI

Transportation System Management: Measures for Improving vehicular flow – one way Streets, Signal Improvement, Transit Stop Relocation, Parking Management, Reversible lanes- Reducing Peak Period Traffic - Strategies for working hours, Congestion Pricing, Differential Toll Policies.

Text Books:

- 1. Traffic Engineering and Transportation Planning L.R. Kadiyali, Khanna Publishers
- 2. Principles of Highways Engineering and Traffic Analysis Fred Mannering & Walter Kilareski, John Wiley & Sons Publication.
- 3. Transportation Engineering An Introduction C. Jotin Khisty, Prentice Hall Publication.

- 1. Fundamentals of Transportation Engineering C. S. Papacostas, Prentice Hall India.
- 2. Traffic Engineering Theory & Practice Louis J. Pignataro, Prentice Hall Publication.
- 3. Traffic Engineering by Roger P. Roess, William R. Mc. Shane, Elena S. Prassas, Prentice Hall, 1977.
- 4. Relevant IRC Codes

Year/Sem	VII Sem	L	Т	Р	С	COURSE CODE		
Regulation Year	V18 / 2021-2022	3	0	0	3	V18CET34		
Name of the Course	e CONSTRUCTION PROJECT PLANNING & SYSTEMS							
Branch	CIVIL ENGINEERI	NG						

Upon successful completion of this course the student will be able to

- Identify the importance of Project Manager, Project Planning & scheduling and different charts (K3)
- Solve the networks by using different network analysis methods such as PERT & CPM (K2)
- Discuss the functioning of various Construction equipment & Earthwork equipment (K2)
- Discuss the functioning of various Hoisting equipment (K2)
- Discuss the methods of production of Aggregate products and concreting (K2)
- Describe the Quality control, Safety Engineering and construction techniques (K2)

SYLLABUS

UNIT I

Introduction: Construction project management and its relevance – qualities of a project manager – project planning – coordination –scheduling - monitoring – bar charts – milestone charts

UNIT II

PERT & CPM: Project Evaluation and Review Technique – Critical Path Method – Applications- cost analysis - updating – crashing for optimum cost – crashing for optimum resources – allocation of resources

UNIT III

Construction & Earthwork equipment: Economical considerations – earthwork equipment – Trucks and handling equipment – rear dump trucks – capacities of trucks and handling equipment – calculation of truck production – compaction equipment – types of compaction rollers.

UNIT IV

Hoisting Equipment: Hoists – cranes – tractors - bulldozers – graders – scrapers– draglines - clamshell buckets

UNIT V

Concreting Equipment: Crushers – jaw crushers – gyratory crushers – impact crushers – selection of crushing equipment - screening of aggregate – concrete mixers – mixing and placing of concrete – consolidating and finishing

Construction methods: Earthwork – piling – placing of concrete – form work – fabrication and erection – quality control and safety engineering

Textbooks:

- 1. Construction Planning Equipment and Methods, Peurifoy and Schexnayder, Shapira, Tata Mcgrawhill
- 2. Construction Project Management Theory and Practice, Kumar Neeraj Jha (2011), Pearson.
- 3. Construction Technology, Subir K. Sarkar and Subhajit Saraswati, Oxford University press.
- 4. Project Planning and Control with PERT and CPM, B. C. Punamia and K K Khandelwal, Laxmi Publications Pvt Ltd. Hyderabad.

- 1. Construction Project Management An Integrated Approach, Peter Fewings, Taylor and Francis
- 2. Construction Management Emerging Trends and Technologies, Trefor Williams, Cengage learning.
- 3. Hand Book of Construction Management, P. K. Joy, Trinity Press Chennai, New Delhi.

Year/Sem	VII Sem	L	Т	Р	С	COURSE CODE		
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET37		
Name of the Course	se SOLID WASTE MANAGEMENT							
Branch	CIVIL ENGINEERING							

Upon successful completion of this course, the students will be able to

- Generalize Solid Waste and its management (K2)
- Assess different elements for managing Solid Waste (K3)
- Employ different methods for transfer and transport of solid waste (K3)
- Employ different methods for Separation and Transformation of Solid waste (K3)
- Organize different methods for processing and treatment of municipal solid waste (K3)
- Identify suitable disposal methods with respect to solid waste (K2)

SYLLABUS

UNIT I

Introduction to Solid Waste Management: Goals and objectives of solid waste management, Classification of Solid Waste – Factors Influencing generation of solid waste – sampling and characterization –Future changes in waste composition, major legislation, monitoring responsibilities.

UNIT II

Basic Elements In Solid Waste Management: Elements and their inter relationship – principles of solid waste management- onsite handling, storage and processing of solid waste Collection of Solid Waste: Types and methods of waste collection systems, analysis of collection system – optimization of collection routes.

UNIT III

Transfer and Transport: Need for transfer operation, compaction of solid waste – transport means and methods, transfer station types and design requirements.

UNIT IV

Separation and Transformation of Solid Waste: Unit operations used for separation and transformation: shredding – materials separation and recovery, source reduction and waste minimization.

UNIT V

Processing and Treatment: Processing of solid waste – Waste transformation through combustion and composting, anaerobic methods for materials recovery and treatment – Energy recovery – biogas generation and cleaning– Incinerators.

UNIT VI

Disposal of Solid Waste: Methods of Disposal, Landfills: Site selection, design and operation, drainage and leachate collection systems –designated waste landfill remediation. **Text Books:**

- 1. George Techobanoglous "Integrated Solid Waste Management", McGraw Hill Publication, 1993
- 2. Gerard Kiely "Environmental Engineering", McGraw Hill Publication, 2007
- 3. J Glynn Henry, Gary W.Heinke "Environmental Science and Engineering", Prentice-Hall of India Pvt Ltd, 1996

- 1. Vesilind, P.A., Worrell, W., Reinhart, D. "Solid Waste Engineering", Cenage learning, New Delhi, 2004
- 2. Charles A. Wentz; "Hazardous Waste Management", McGraw Hill Publication, 1995.
- 3. Mackenzie L Davis, David A.Cornwell :Introduction to Environmental Engineering" McGraw Hill Publication, 2017

Year/Sem	VII Sem	L	Т	Р	С	COURSE CODE		
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET38		
Name of the Course	e GROUND WATER DEVELOPMENT							
Branch	CIVIL ENGINEERING							

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

- Analyse radial flow towards wells in confined and unconfined aquifers (K3)
- Design wells and understand the construction practices (K5)
- Construct the wells and development of ground water (K2)
- Determine the process of artificial recharge for increasing groundwater potential (K4)
- Employ different geo physical methods to explore ground water (K3)
- Apply appropriate measures for groundwater management (K3)

SYLLABUS

UNIT I

Introduction: Groundwater in the hydrologic cycle, groundwater occurrence, aquifer parameters and their determination, general groundwater flow equation.

Well Hydraulics Steady radial flow and unsteady radial flow to a well in confined and unconfined aquifers, Theis solution, Jocob and Chow's methods, Leaky aquifers.

UNIT II

Well Design: Water well design-well diameter, well depth, well screen-screen length, slot size, screen diameter and screen selection, design of collector wells, infiltration gallery.

UNIT III

Well Construction and Development: Water wells, drilling methods-rotary drilling, percussion drilling, well construction-installation of well screens-pull-back method, openhole, bail- down and wash-down methods, well development-mechanical surging using compressed air, high velocity jetting of water, over pumping and back washing, well completion, well disinfection, well maintenance.

UNIT IV

Artificial Recharge: Concept of artificial recharge of groundwater, recharge methods-basin, stream-channel, ditch and furrow, flooding and recharge well methods, recharge mounds and induced recharge

Saline Water Intrusion: Occurrence of saline water intrusion, Ghyben- Herzberg relation, Shape of interface, control of saline water intrusion.

UNIT V

Geophysics: Surface methods of exploration of groundwater – Electrical resistivity and Seismic refraction methods, Sub-surface methods – Geophysical logging and resistivity logging. Aerial Photogrammetry applications.

Groundwater Modeling and Management: Basic principles of groundwater modelling-Analog models-viscous fluid models and membrane models, digital models-Finite difference and finite element models, Concepts of groundwater management, basin management by conjunctive use-case studies.

Text Books:

- 1. Groundwater, Raghunath H M, New Age International Publishers, 2005.
- 2. Groundwater Hydrology, Todd D. K., Wiley India Pvt Ltd., 2014.
- 3. Groundwater Hydrology, Todd D K and L W Mays, CBS Publications, 2005.

- 1. Groundwater Assessment and Management, Karanth K R, Tata McGraw Hill Publishing Co., 1987.
- 2. Groundwater Hydrology, Bouwer H, McGraw Hill Book Company, 1978.
- 3. Groundwater Systems Planning and Management, Willis R and W.W.G. Yeh, Prentice Hall Inc., 1986.
- 4. Groundwater Resources Evaluation, Walton W C, McGraw Hill Book Company, 1978.

Year/Sem	VII Sem	L	Т	Р	С	COURSE CODE		
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET39		
Name of the Course	e EARTHQUAKE ENGINEERING							
Branch	CIVIL ENGINEER	ING						

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

- Differentiate types of lodes and it's characteristic(K2)
- Recognize foundations of many basic engineering concepts related earthquake engineering(K2)
- Examine the strong ground motion and seismic hazard(K3)
- Assess the frequency of wave propagation in different mediums(K3)
- Find the behavior of structures during earthquake and earthquake resistant Features of structure(K3)
- Relate the properties of liquefaction and soil improvement for remediation of seismic hazards(K3)

SYLLABUS

UNIT I

Introduction to Dynamic Loads: Static Load v/s Dynamic Load, Types of Dynamic forces, Force Control and Displacement Control.

UNIT II

Seismology and Earthquakes: Introduction, Seismic Hazards, seismic waves, internal structure of earth, Continental drift and plate tectonics, faults, elastics rebound theory, geometric notations, location of earthquakes, size of earthquakes.

UNIT III

Strong Ground Motion: Strong ground motion measurement, ground motion parameters, estimation of ground motion parameters.

Seismic Hazard Analysis: Identification and Evaluation of Earthquake Sources, deterministic seismic hazard analysis, probabilistic seismic hazard analysis.

UNIT IV

Wave Propagation: Waves in unbounded media, waves in a semi – infinite body, waves in a layered media, attenuation of stress waves.

Artificial Ground Motion Generation: Modification of actual ground motion records, time –domain generation, frequency domain generation.

Behavior of Structures: During Earthquake and Earthquake Resistant Features of Structure Inertia forces in structures, Behavior of Masonry Structures, Behavior of RC Structures

UNIT VI

Liquefaction: Flow liquefaction, cyclic mobility, evaluation of liquefaction hazards, liquefaction susceptibility, initiation of liquefaction, effects of liquefaction.

Soil Improvement for Remediation of Seismic Hazards: Densification techniques, Reinforcement Techniques, Grouting and Mixing techniques, Drainage techniques.

Text Books:

- 1. Earthquake Resistant Design of Structures By Pankaj Agarwal & Manish Shrikhande, PHI Publications
- 2. S. K. Duggal; Earthquake Resistance Design of Structures; Oxford University Press, New Delhi.
- 3. K. Chopra; Dynamics of Structures, Pearson, New Delhi
- 4. Park & Pauly; Behavior of R.C Structures
- 5. Geotechnical Earthquake Engineering by Steven L. Kramer, prentice Hall

Reference Books:

- 1. IS: 1893 (Part-I) 2002, Criteria for Earthquake Resistant Design General Provision to Building.
- 2. S: 13920 (1993), Code of Practice for Ductile Detailing of RC Structures
- 3. IS: 4326 (1993), Code of Practice for Earthquake Resistant Design and Construction of Buildings
- 4. IS: 13827 (1993), Improving Earthquake Resistance of Earthen Buildings
- 5. IS: 13828 (1993), Guide lines for Improving Earthquake Resistance of low Strength Masonry Buildings.
- 6. S S Rao; Mechanical Vibration; Pearson, New Delhi.

<u>VIII SEMESTER – SYLLABUS</u>

Year/Sem	VIII Sem	L	Т	Р	С	COURSE CODE		
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET40		
Name of the Course	HIGHWAY CONSTRUCTION & MANAGEMENT							
Branch	CIVIL ENGINEER	ING						

Course Outcomes:

Upon the successful completion of course students will be able to

- Understand the concepts of PMS and evaluate strategies for pavement maintenance (K2)
- Evaluate the pavements based on the functional and structural characteristics(K3)
- Understand constructions of Construction methods of Base, Subbase, Shoulders and drains(K2)
- Understand constructions of bituminous pavements(K2)
- Understand the concepts of construction of cement concrete pavements(K2)
- Evaluate the concepts of maintenance of cement concrete pavements(K3)

SYLLABUS

UNIT I

Pavement management system: Components of PMS and their activities; Major steps in implementing PMS; Inputs; Design, Construction and Maintenance; Rehabilitation and Feedback systems; Examples of HDM and RTIM packages; Highway financing; Fund generation; Evaluating alternate strategies and Decision criteria ; Pavement Maintenance Management Components of Maintenance Management and Related Activities – Network and Project Level Analysis; Prioritization Techniques and Formulation of Maintenance Strategies.

UNIT II

Pavement Inventories, Quality Control and Evaluation: Serviceability Concepts; Visual Rating; Pavement Serviceability Index; Roughness Measurements; Distress Modes – Cracking Rutting Etc; Pavement Deflection – Different Methods and BBD, Skid Resistance, Roughness, Safety – Aspects; Inventory System. Causes of Deterioration, Traffic and Environmental Factors, Pavement Performance Modeling Approaches and Methods of Maintaining WBM, Bitumen and Cement Concrete Roads, Quality Assurance; Quality Control – ISO 9000, Sampling Techniques – Tolerances and Controls related to Profile and Compaction.

UNIT III

Construction of Base, Subbase, Shoulders and Drain: Roadway and Drain Excavation, Excavation and Blasting, Embankment Construction, Construction of Gravel Base, Cement Stabilised Sub- Bases, WBM Bases, Wet Mix Construction; Crushed Cement Bases, Shoulder Construction; Drainage Surface, Turfing Sand Drains; Sand Wicks; Rope Drains, Geo- Textile Drainage; Preloading Techniques.

UNIT IV Bituminous Construction: Preparation and Laying of Tack Coat; Bituminous Macadam, Penetration Macadam, Built up Spray Grout, Open Graded Premix, Mix Seal, Semi-Dense Asphalt Concrete-Interface Treatments and Overlay Construction, IRC Specifications.

UNIT V Cement Concrete pavement Construction: Cement Concrete Pavement Analysis - Construction of Cement Roads, Manual, and Mechanical Methods, Joints in Concrete and Reinforced Concrete Pavement and Overlay Construction.

UNIT VI Bituminous and Cement Concrete pavement Maintenance: Repair of surface layer, Base layer, sub base layer, Sub grade. Maintenance of Concrete slab, Dry Lean concrete sub base layer and Subgrade in concrete pavement.

Text Books :

- 1. Highway Engineering, Khanna S. K., Justo C. E. G and Veeraragavan A, Nem Chand Bros., Roorkee.
- 2. Principles of Highway Engineering, Kadiyali L. R, Khanna Publishers, New Delhi.
- 3. MORTH Specifications.

- 1. Principles of Transportation Engineering, Partha Chakroborthy and Animesh Das, PHI Learning Private Limited, Delhi.
- 2. Transportation Engineering An Introduction, JotinKhisty C, Prentice Hall, Englewood Cliffs, New Jersey.
- 3. Transportation Engineering and Planning, Papacostas C.S. and P.D. Prevedouros, Prentice Hall of India Pvt.Ltd; New Delhi.

Year/Sem	VIII Sem	L	Т	Р	С	COURSE CODE		
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET41		
Name of the Course	Irse REPAIR AND REHABILITATION OF STRUCTURES							
Branch	CIVIL ENGINEER	ING						

Upon the successful completion of course students will be able to

- Develop various maintenance and repair strategies(K2)
- Evaluate the existing buildings through field investigations(K2)
- Understand and use the different techniques for structural rehabilitation(K2)
- To assess damage to structures and various repair techniques(K2)
- To understand the importance of maintenance of structures(K2)
- Understand the importance of advanced concretes mixes(K2)

SYLLABUS

UNIT I

Introduction : Deterioration of Structures – Distress in Structures – Causes and Prevention. Mechanism of Damage – Types of Damage.

UNIT II

Non Destructive Testing: Corrosion of Steel Reinforcement – Causes – Mechanism and Prevention. Damage of Structures due to Fire – Fire Rating of Structures – Inspection and Testing – Symptoms and Diagnosis of Distress – Damage assessment –

UNIT III

Materials for repair and rehabilitation: Admixtures- types of admixtures-purposes of using admixtures- chemical composition- Natural admixtures- Fibres- wraps- Glass and Carbon fibre wraps- Steel Plates

UNIT IV

Strengthening and stabilization: Techniques- design considerations-Beam shear capacity strengthening- Shear Transfer strengthening-stress reduction techniques- Column strengthening-flexural strengthening- Connection stabilization and strengthening, Crack stabilization

UNIT V

Fibre reinforced concrete: Properties of constituent materials- Mix proportions, mixing and casting methods-Mechanical properties of fiber reinforced concrete- applications of fibre reinforced concretes-Light weight concrete- properties of light weight concrete- No fines concrete- design of light weight concrete- Flyash concrete-Introduction- classification of flyash- properties and reaction mechanism of flyash- Properties of flyash concrete in fresh state and hardened state-Durability of flyash concretes.

High performance concretes: Introduction- Development of high performance concretes-Materials of high performance concretes- Properties of high performance concretes- Self Consolidating concrete-properties- qualifications.

Text Books:

- 1. Maintenance and Repair of Civil Structures, B.L. Gupta and Amit Gupta, Standard Publications.
- 2. Concrete Technology by A.R. Santa Kumar, Oxford University press
- 3. Concrete technology by Neville and J J Brooks, Pearson publications, 2nd edition

- 1. Concrete technology by M S Shetty, S. Chand publications (2006).
- 2. Defects and Deterioration in Buildings, EF & N Spon, London
- 3. Non-Destructive Evaluation of Concrete Structures by Bungey Surrey University Press
- 4. Concrete Repair and Maintenance Illustrated, RS Means Company Inc W.H.Ranso, (1981)
- 5. Building Failures: Diagnosis and Avoidance, EF & N Spon, London, B.A. Richardson, (1991)

Syllabi for the Courses proposed in VII & VIII Semesters, 4th BoS, Dept. of Civil Engineering, SVEC

Year/Sem	VIII Sem	L	Т	Р	С	COURSE CODE	
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET42	
Name of the Course	RURAL WATER SUPPLY AND ONSITE SANITATION						
Name of the Course	SYSTEMS						
Branch	CIVIL ENGINEERING						

Course Outcomes:

Upon the successful completion of course students will be able to

- Relate various approaches for planning the water supply systems in rural areas (K3)
- Apply suitable methods of water treatment for rural areas(K3)
- Develop distribution system in rural areas (K3)
- Apply the sanitary engineering concept and principals(K3)
- Apply the different public sanitation methods in rural areas(K3)
- Apply different solid waste methods in rural areas(K3)

SYLLABUS

UNIT I

Concept of environmental and scope of sanitation in rural areas: Magnitude of problem of water supply and sanitation – population to be covered and difficulties National policy. Various approaches for planning of water supply systems in rural areas. Selection and development of preferred sources of water, springs, wells and infiltration galleries, collection of raw water from surface source.

UNIT II

Specific problems: Specific problems in rural water supply and treatment e.g. iron, manganese, fluorides etc. Low cost treatment, appropriate technology for water supply and sanitation. Improvised method and compact system of treatment of surface and ground waters such as MB settlers, slow and sand filter, chlorine diffusion cartridge etc. Water supply through spot sources, hand pumps, open dug –well.

UNIT III

Planning of distribution system in rural areas: Water supply during fairs, festivals and emergencies. Treatment and disposal of wastewater/sewage. various method of collection and disposal of night soil.

UNIT IV

On site sanitation system and community latrines: Simple wastewater treatment system for rural areas and small communities such as stabilization ponds, septic tanks, soakage pits etc.

Industrial Hygiene And Sanitation: Occupational Hazards- Schools- Public Buildings-Hospitals- Eating establishments- Swimming pools – leanliness and maintenance and comfort- Industrial plant sanitation

UNIT VI

Solids Waste : Collection, Transfer, Transport and deposit of solid waste management, composting, land filling.

Text Books:

- 1. Low cost on site sanitation option, Hoffman & Heijno Occasional Nov.1981 paper No.
- 2. 21, P.O. Box 5500 2280 HM Rijswijk, the Netherlands offices, J.C. Mokeniaan, 5
- 3. Rijswijk (the Haque). Wagner, E.G. and Lanoik, J.N. water supply for rural areas and Small Communities, Geneva: W.H.O.1959.

- 1. Manual of water supply and treatment, 3rd edition, CPHEEO, GOI, New delhi.
- 2. Vesilind, P.A., Worrell, W., Reinhart, D. "Solid Waste Engineering", Cenage learning, New Delhi, 2004

Syllabi for the Courses proposed in VII & VIII Semesters, 4th BoS, Dept. of Civil Engineering, SVEC

Year/Sem	VIII Sem	L	Т	Р	С	COURSE CODE		
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET43		
Name of the Course	PRESTRESSED CONCRETE							
Branch	CIVIL ENGINEER	ING						

COURSE OUTCOMES:

Upon the successful completion of course students will be able to

- Generalize the basic concepts of prestressed concrete (K2)
- Compute prestress and bending stresses (K3)
- Estimate effective prestress including the short- and long-term losses (K2)
- Analyze and design prestressed concrete beams under flexure (K4)
- Analyze and design prestressed concrete beams under Shear and torsion (K4)
- Generalize the end zone of prestressed concrete members (K2)

SYLLABUS

UNIT I

Introduction: Basic concepts of prestressing; Need for High strength steel and High strength concrete. Terminology; Advantages and Applications of Prestressed Concretes. Materials For Prestressed Concrete: High strength concrete; High tensile steel.

UNIT II

Prestressing Systems: Prestressing Systems- Introduction, Tensioning devices, Pretensioning Systems, Post tensioning Systems

Analysis of Prestress and Bending Stresses: Basic assumptions; Analysis of prestress; Resultant stresses at a section; Pressure (Thrust) line and internal resisting couple; Concept of Load balancing.

UNIT III

Losses of Prestress: Nature of losses of prestress; Loss due to elastic deformation of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, friction and anchorage slip; Total losses allowed for in design.

UNIT IV

Deflections of Prestressed Concrete Members: Importance of control of deflections; Factors influencing deflections; Short term deflections of un-cracked members; Effect of tendon profile on deflections.

Limit State of Collapse: Flexural Strength of Prestressed Concrete Sections: Ultimate flexural strength of rectangular sections and T-sections using simplified IS code recommendations.

UNIT V

Limit State of Collapse :Shear Resistance of Prestressed Concrete Members: Shear and principal stresses; Shear- IS Code recommendations: Ultimate shear resistance of prestressed concrete members; Design of shear reinforcement.

Torsional Resistance of Prestressed Concrete Members: Design of reinforcements for torsion, shear and bending.

Design of End Blocks: Transmission of prestress in pretensioned members; Transmission length; Anchorage stress in post tensioned members; Bearing stress and bursting tensile force stresses in end blocks-Methods. IS Code provision for the design of end block reinforcement.

Text Books: (supplemented with IS: 1343)

- 1. Prestressed Concrete by N. Krishna Raju; Tata Mc.Graw Hill Publishing Company Limited, New Delhi.
- 2. Pre-stressed Concrete- P. Dayarathnam: Oxford and IBH Publishing Co.
- 3. Prestressed Concrete, S. Ramamrutham

- 1. Prestressed concrete by N. Rajagopalan; Narosa Publishing House.
- 2. Design of pre-stressed concrete structures- T.Y. Lin and Ned H. Burns John Wiley & Sons, New York.
- 3. Fundamental of pre-stressed concrete- N.C. Sinha & S.K. Roy
- 4. Prestressed Concrete, T. Y. Lin & Burns, Wiley Publications

Year/Sem	VIII Sem	L	Τ	Р	С	COURSE CODE		
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET44		
Name of the Course	ENGINEERING WITH GEO-SYNTHETICS							
Branch	CIVIL ENGINEER	ING						

Upon successful completion of this course, the students will be able to

- Relate the need and demand of geo-synthetic materials in the field of geotechnical construction works (K3)
- Employ various parameters related to the use and application of geotextiles, geogrids (K3)
- Examine the use and field testing of geo-synthetics in road construction (K3)
- Design reinforced earth retaining walls with strip, sheet and gird reinforcement (K5)
- Distinguish survivability requirements of geo-composites and could design geowebs, geocells, and moisture barriers and natural geotextiles etc. (K4)
- Employ other methods to use the natural geotextiles like jute fibres, coir, bamboo and their combination (K3)

SYLLABUS

UNIT I

Geosynthetics: Introduction to Geosynthetics – Basic description – Polymeric materials– Uses and Applications. Properties of Geotextiles – Geogrids – Geomembranes – Geocomposites.

UNIT-II

Geotextiles: Design criteria for Separation – Reinforcement – Stabilization – Filtration – Drainage and Moisture barriers.

Geogrids: Designing for Reinforcement – Stabilization – Designing Gabions – Construction methods.

UNIT-III

Use of Geosynthetics in Roads: Geosynthetics in road ways- applications role of subgrade conditions-design criteria-survivability-application in paved roads.

UNIT-IV

Reinforced Earth Retaining Walls: Components - External stability – Internal stability-Design of reinforced earth walls with strip, sheet and grid reinforcement.

UNIT-V

Geomembranes: Pond Liners – Covers for Reservoirs – Canal Liners – Landfill Liners– Caps and closures, moisture barriers.

Geocomposites: An added advantage – Geocomposites in Separation – Reinforcement – Filtration – Geocomposites as Geowebs and Geocells.

UNIT-VI

Natural Geotextiles: Natural fibres as geotextiles- factors governing the use jute fibres-coir geotextiles-bamboo/timber-combination of geotextiles.

Text Books:

- 1. Designing with Geosynthetics by Robert M. Koerner, Prantice Hall, Eaglewood Cliffs, NJ.
- 2. An Introduction to Soil Reinforcement and Geosynthetics' by G.L.Sivakumar Babu (2009), Universities Press (India) Pvt. Ltd.
- 3. Engineering with Geosynthetics', by G. Venkatappa Rao and GVS Suryanarayana Raju Tata McGraw Hill Publishing Company Limited New Delhi.

- 1. 'Construction and Geotechnical Engineering using Synthetic Fabries' by Robert M. Koerner and Josoph P. Welsh. John Willey and Sons, New York.
- 2. 'Foundation Analysis and Design' by J.E. Bowles McGraw Hill Publications.

Syllabi for the Courses proposed in VII & VIII Semesters, 4th BoS, Dept. of Civil Engineering, SVEC

Year/Sem	VIII Sem	L	Т	Р	С	COURSE CODE		
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET45		
Name of the Course	e URBAN HYDROLOGY & HYDRAULICS							
Branch	CIVIL ENGINEER	ING						

Course Outcomes:

Upon successful completion of this course, the students will be able to

- Generalize the effect of urbanization on hydrological cycle (K2)
- Develop intensity duration frequency curves for urban drainage systems (K3)
- Calculate runoff parameters in urban drainage system (K3)
- Develop design storms to size the various components of drainage systems (K3)
- Apply best management practices to manage urban flooding (K3)
- Prepare master drainage plan for an urbanized area (K3)

SYLLABUS

UNIT I

Introduction: Urbanization and its effect on water cycle – urban hydrologic cycle – Trends in urbanization – Effect of urbanization on hydrology

UNIT II

Precipitation Analysis: Importance of short duration of rainfall and runoff data, methods of estimation of time of concentration for design of urban drainage systems, Intensity-Duration - Frequency (IDF) curves, design storms for urban drainage systems.

UNIT III

Approaches to urban drainage: Time of concentration, peak flow estimation approaches, rational method, NRCS curve number approach, runoff quantity and quality, wastewater and storm water reuse, major and minor systems.

UNIT IV

Elements of drainage systems: Open channel, underground drains, appurtenances, pumping, source control.

UNIT V

Analysis and Management: Storm water drainage structures, design of storm water network- Best Management Practices–detention and retention facilities, swales, constructed wetlands, models available for storm water management.

UNIT VI

Master drainage plans: Issues to be concentrated upon – typical urban drainage master plan, interrelation between water resources investigation and urban planning processes, planning objectives, comprehensive planning, use of models in planning.

Text Books:

- 1. Manual on Drainage in Urbanised area, Geiger W. F., J Marsalek, W. J. Rawls and F. C. Zuidema, (1987 2 volumes), UNESCO,
- 2. Urban Hydrology, Hall M J (1984), Elsevier Applied Science Publisher.
- 3. Hydrology Quantity and Quality Analysis, Wanielista M P and Eaglin (1997), Wiley and Sons
- 4. Urban Hydrology, Hydraulics and Storm water Quality: Engineering Applications and Computer Modelling, Akan A.O and R.L. Houghtalen (2006), Wiley International.

- 1. Storm water Detention for Drainage, Stahre P and Urbonas B (1990), Water Quality and CSO Management, Prentice Hall.
- 2. Urban water cycle processes and interactions, Marsalek et. al. (2006), Publication No. 78, UNESCO, Paris(http://www.bvsde.paho.org/bvsacd/cd63/149460E.pdf)
- 3. Frontiers in Urban Water Management Deadlock or Hope, by Maksimovic C and J A Tejada-Guibert (2001), IWA Publishing

Year/Sem	VIII Sem	L	Т	Р	С	COURSE CODE	
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET46	
Name of the Course	ENVIRONMENTAL IMPACT ASSESSMENT AND						
Name of the Course	'se MANAGEMENT						
Branch	CIVIL ENGINEERING						

Upon successful completion of the course, the student will be able to

- Prepare EMP, EIS, and EIA report (K3)
- Select the an appropriate EIA methodologies (K2)
- Assess the Impact of development activities and land use (K3)
- Employ in procuring the natural resources for assessing the environment (K3)
- Assess the ecosystem (K3)
- Develop the EIA notifications and reports (K3)

SYLLABUS

UNIT I

Basic concept of EIA: Elements of EIA-factors affecting EIA-Initial environmental Examination-life cycle analysis preparation of Environmental Base map-Classification of environmental parameters role of stakeholders in the EIA preparation stages in EIA

UNIT II

E I A Methodologies: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods, cost/benefit Analysis – EIS and EMP

UNIT III

Impact of Developmental Activities and Land use: Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives-application of remote sensing and GIS for EIA.

UNIT IV

Procurement of natural resources: Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures - E I A with reference to surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, generalized approach for assessment of Air pollution Impact.

Assessment of ecosystem: Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation. Environmental Risk Assessment and Risk management in EIA: Risk assessment and treatment of uncertainty-key stages in performing an Environmental Risk Assessment advantages of Environmental Risk Assessment

UNIT VI

EIA notification: EIA notification by Ministry of Environment and Forest (Govt. of India): Provisions in the EIA notification, procedure for environmental clearance, and procedure for conducting environmental impact assessment report- evaluation of EIA report. Environmental legislation objectives, evaluation of Audit data and preparation of Audit report. Post Audit activities, Concept of ISO and ISO 14000. Case studies and preparation of Environmental Impact assessment statement for various Industries.

Text Books:

- 1. Environmental Impact Assessment, Canter Larry W., McGraw-Hill education Edi (1996)
- 2. Environmental Impact Assessment Methodologies, Y.Anjaneyulu, B. S. Publication, Sultan Bazar, Hyderabad.
- 3. Environmental Impact Assessment and Management, B B Hosetti, A.Kumar, Daya Publishing House (2014)

- 1. Environmental Science and Engineering, J. Glynn and Gary W. Hein Ke PrenticeHall Publishers
- 2. Environmental Science and Engineering, Suresh K. Dhaneja, S. K. ,Katania& Sons Publication., New Delhi.
- 3. Environmental Pollution and Control, H. S. Bhatia, Galgotia Publication (P) Ltd, Delhi

Year/Sem	VIII Sem	L	Т	Р	С	COURSE CODE	
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET47	
Name of the Course	ADVANCED CONCRETE TECHNOLOGY						
Branch	CIVIL ENGINEERING						

Upon successful completion of course the students will be able to

- Relate material characteristics and their influence on microstructure of concrete(K3)
- Predict concrete behavior based on its durability properties(K3)
- Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes(K3)
- Select a suitable type of concrete based on specific application(K3)
- Employ suitable concreting methods to place the concrete based on requirement(K3)
- Illustrate different types of concrete tests for hardened properties(K3)

SYLLABUS

UNIT I

Ingredients of Concrete: Cement –chemical composition and their importance, hydration of cement, types of cement. Testing of cement.

Fine aggregate: Functions, requirement, Alternatives to River sand, M-sand introduction and manufacturing.

Coarse aggregate: Importance of size, shape and texture. Grading and blending of aggregate. Testing on aggregate, requirement. Recycled aggregates Water – qualities of water.

Chemical admixtures: Plasticizers, accelerators, retarders and air entraining agents. Mineral admixtures – Pozzolanic and cementitious materials, Fly ash, GGBS, silica fumes, Metakaolin and rice huskash.

UNIT II

Durability of Concrete: Durability, Transport mechanism of fluids and gases in concrete, cracking in concrete - corrosion and carbonation induced cracking, Alkali Aggregate Reaction, degradation by freeze and thaw, chloride attack, sulphate and sea water attack (marine conditions). Hot and cold weather concreting.

UNIT III

Concrete Mix Design: Design of concrete mixes by IS code method - ACI method Design of high strength concrete mixes, design of fly-ash cement concrete mixes, design of high density concrete mixes.

UNIT IV

Special Concrete: Lightweight concrete, autoclaved aerated concrete, no-fines concrete, lightweight aggregate concrete and foamed concrete, High strength concrete, refractory concrete, high density and radiation-shielding concrete, polymer concrete, fibre-reinforced concrete, mortars, renders, recycled concrete, Ferro Cement, Self Compacting Concrete.

Special processes and technology for particular types of structure: Sprayed concrete, underwater concrete, grouts, grouting and grouted concrete, mass concrete, slip form construction, pumped concrete, concrete for liquid retaining structures, vacuum process

UNIT VI

Testing of Concrete: Test methods: Analysis of fresh concrete, Accelerated testing methods, Tests on hardened concrete, Core cutting and testing, partially destructive testing, Non-destructive testing of concrete structure

Text Books:

- 1. Neville, A.M., Properties of Concrete, Pearson Education Asia (P) Ltd, England, 2000.
- 2. Concrete Technology, Gambhir M.L, Tata McGraw Hill
- 3. Concrete Technology, M.S.Shetty, S.Chand& Company New Delhi
- 4. Concrete microstructure, properties & materials, P.KumarMehata, Paulo & J.M. Monteiro,
- 5. Light Weight Concrete, Short & Kenniburg, Asia Publishing House, Bombay

- 1. N. V. Nayak, A. K. Jain Handbook on Advanced Concrete Technology, ISBN: 978-81-8487-186-9
- 2. Job Thomas, "Concrete Technology", CENGAGE Learning, 2015.
- 3. IS 4926 (2003): Code of Practice Ready-Mixed Concrete [CED 2: Cement and Concrete] Criteria for RMC Production Control, Basic Level Certification for Production Control of Ready Mixed Concrete BMTPC.
- 4. Specification and Guidelines for Self-Compacting Concrete, EFNARC, Association House.

Year/Sem	VIII Sem	L	Т	Р	С	COURSE CODE		
Regulation / Year	V18 / 2021-2022	3	0	0	3	V18CET48		
Name of the Course	FINITE ELEMENT METHOD							
Branch	CIVIL ENGINEERING							

Upon successful completion of the course, the student will be able to

- Apprise the students about the basics of the Finite Element Technique(K2)
- Describe the finite element method, identify different types of finite elements and apply to respective engineering problems(K3)
- Analyze one dimensional solid elements of various engineering problems(K3)
- Illustrate frame structures of various engineering problems (K3).
- Analyze 2-D and 3-D engineering problems using finite element method(K3)
- Examine finite element for elastic stability, fluid mechanics and dynamic analysis (K3)

SYLLABUS

UNIT I

Introduction to Finite Element Analysis: Basic Concepts of Finite Element Analysis - Introduction to Elasticity -Steps in Finite Element Analysis

UNIT II

Finite Element Formulation Techniques: Virtual Work and Variational Principle -Galerkin Method- Finite Element Method: Displacement Approach -Stiffness Matrix and Boundary Conditions

UNIT III

Element Properties: Natural Coordinates - Triangular Elements - Rectangular Elements - Lagrange and Serendipity Elements - Solid Elements - Isoparametric Formulation - Stiffness Matrix of Isoparametric Elements - Numerical Integration: One Dimensional - Numerical Integration: Two and Three Dimensional- Worked out Examples

UNIT IV

Analysis of Frame Structures: Stiffness of Truss Members - Analysis of Truss - Stiffness of Beam Members - Finite Element Analysis of Continuous Beam -Plane Frame Analysis - Analysis of Grid and Space Frame

UNIT V

FEM for Two and Three Dimensional Solids: Constant Strain Triangle - Linear Strain Triangle - Rectangular Elements - Numerical Evaluation of Element Stiffness - Computation of Stresses, Geometric Nonlinearity and Static Condensation - Axisymmetric Element - Finite Element Formulation of Axisymmetric Element - Finite Element Formulation for 3 Dimensional- Elements Worked out Examples

Additional Applications of FEM: Finite Elements for Elastic Stability - Finite Elements in Fluid Mechanics - Dynamic Analysis

Text Books:

- 1. Introduction to Finite Elements in Engineering, Tirupati R. Chandrupatla, Ashok D. Belgundu, PHI publications.
- 2. A first course in the Finite Element Method, Dary L. Logan, Thomson Publications.
- 3. The Finite Element Method- Zinkiewicz, O.C. and Taylor, R.L, Oxford.
- 4. Finite Element Analysis Theory and Programming- Krishnamoorthy, C.S, Tata McGraw-Hill Education.

- 1. Concepts and applications of Finite Element Analysis, Robert D. Cook, Michael E Plesha, John Wiley & sons Publication .
- 2. Introduction to Finite Element Method, Desai & Abel CBS Publication.
- 3. Introduction to Finite Element Method- P.N. Godbole, I K International Publishing House Pvt. Ltd.
- 4. The Finite Element Method in Engineering- S.S. Rao, Butterworth-Heinemann;
- 5. An Introduction to Finite Element Method- Reddy, J. N., McGraw-Hill Education

Year/Sem	VIII	L	Т	Р	С	COURSE CODE	
Regulation Year	V18 / 2021-2022	3	0	0	3	V18CET49	
Name of the Course	GROUND IMPROVEMENT TECHNIQUES						
Branch	CIVIL ENGINEERING						

Upon successful completion of this course. the student will be able to

- To make the student appreciate the need for different ground improvement methods adopted for improving the properties of remoulded and in-situ soils (K2)
- The student should be in a position to understand the importance of dewatering and different dewatering techniques (K3)
- The student should be in a position to know the importance of stabilization of soils and types of stabilizations (K3)
- To make the student understand how the reinforced earth technology and soil nailing can obviate the problems posed by the conventional retaining walls (K3)
- To enable the students to know how geotextiles and geosynthetics can be used to improve the engineering performance of soils (K2)
- To make the student learn the concepts, purpose and effects of grouting (K2)

SYLLABUS

UNIT I

In situ densification methods: In situ densification of granular soils- vibration at ground surface and at depth, impact at ground and at depth – in situ densification of cohesive soils – pre loading – vertical drains – sand drains and geo drains – stone columns.

UNIT II

Dewatering: Sumps and interceptor ditches – single and multi stage well points – vacuum well points – horizontal wells– electro osmosis

UNIT III

Stabilization of soils: Methods of soil stabilization – mechanical – cement – lime – bitumen and polymer stabilization – use of industrial wastes like fly ash and granulated blast furnace slag.

UNIT IV

Reinforced earth: Principles – components of reinforced earth –stability checks – soil nailing

UNIT V

Geosynthetics: Geotextiles – types – functions, properties and applications – geogrids, geomembranes and gabions – properties and applications.

Grouting: Objectives of grouting – grouts and their applications – methods of grouting – stage of grouting.

Text Books:

- 1. Ground Improvement Techniques, Purushotham Raj, Laxmi Publications, New Delhi.
- 2. Ground Improvement Techniques, Nihar Ranjan Patro, Vikas Publishing House (p) limited, New Delhi.
- 3. An introduction to Soil Reinforcement and Geosynthetics, G. L. Siva Kumar Babu, Universities Press.

- 1. Ground Improvement, M.P.Moseley, Blackie Academic and Professional, USA
- 2. Designing with Geosynethetics, R. M Koerner, Prentice Hall
- 3. Engineering Principles of Ground Modification by Manfred R. Hausmann,McGraw-Hill Inc.,