SCHOOL OF ENGINEERING AND TECHNOLOGY

Program and Course Structure

B. Tech. (Civil Engineering)
Program Code: SET0301
Batch: 2020-2024

1. **Vision, Mission and Core Values of the University**

Vision of the University

To serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship.

Mission of the University

1. **Transformative educational experience.**
2. **Enrichment by educational initiatives that encourage global outlook.**
3. **Develop research, support disruptive innovations and accelerate entrepreneurship.**
4. **Seeking beyond boundaries.**

Core Values

- **Integrity**
- **Leadership**
- **Diversity**
- **Community**

1.1 Vision and Mission of the School

Vision of the School

To become a globally acclaimed institution of higher learning in engineering and technology promoting excellence in research, innovation and entrepreneurship to provide sustainable solution to the needs of the society.

Mission of the School

1. **To impart quality education with strong industry & academic connectivity in the expanding fields of Engineering and Technology in a conductive and enriching learning environment.**
2. **To product technocrats equipped with technical & soft skills and experiential learning required to stay current with the modern tools in emerging technologies to fulfil professional responsibilities and uphold ethical values.**
3. **To inculcate a culture of interdisciplinary research, innovation and entrepreneurship to provide sustainable solutions to meet the growing challenges and societal needs.**
4. **To foster collaborative learning and to play adaptive leadership role in professional career and pursuit of higher education through effective mentoring and counselling.**

Core Values

- **Integrity**
- **Leadership**
- **Diversity**
- **Community**

2. Programme Educational Objectives (PEO)

The Educational Objectives of UG Program in Civil Engineering are:

PEO 1. Graduates will develop into proficient resources in the fundamentals of Engineering & Technology with analytical and quantitative reasoning and design abilities to pursue higher education and research.

PEO 2. Graduates will apply the skills in developing safe, innovative, sustainable, environmentally conscious and economical solutions to Civil Engineering problems with the help of modern tool usage and maintaining the professional integrity and ethics.

PEO 3. Graduates will grow personally and professionally in the careers through continued development of technical and managerial skills and will prepare themselves to take various roles and responsibilities at global level to imprint their presence for the larger good of the society.

PEO 4. Graduates will excel as entrepreneurs, outstanding research graduates through continuous enhancement of communication skills, research capabilities, professional networking and life-long learning.

3. Program Outcomes (PO's)

PO1: **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: **Life-long learning**: Recognize the need forand have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PSO1: Plan, Analyze and Design sustainable infrastructure.

PSO2: Build, manage and maintain construction projects adhering to the highest quality and safety standards.

PSO3: Apply innovative and emerging technologies and tools to solve real world civil engineering problems for society.

Department of Civil Engineering B.TECH (2020-2024)

Course Structure for batches admitted in session 2020-21 and onwards

Semester	Courses									Courses	Labs	L	T	P	Weekly Contact	Credits
I	CVP 102 Introduction to Civil Engineering (0-0-2) 1	CSE 113 Programming for Problem Solving (3-0-2) 4	MTH 141 CALCULUS, ANALYSIS AND LINEAR ALGEBRA (3-1-0) 4	PHY 119 Mechanics (2-1-0) 3	MEP105 Mechanical Workshop (0-0-3) 1.5	CHY112 Engineering Chemistry (3-0-2) 4	ARP101 Communicative English-1 (1-0-2) 2	HMM111 Values and Ethics (2-0-0) 2	PHY 162 Physics Lab-II (0-0-2) 1	8	6	14	2	13	29	22.5
II	CSE 114 Application Based Programming in Python (3-0-2) 4	MTH 144 DIFFERENTIAL EQUATIONS, SPECIAL TRANSFORMS AND STATISTICS (3-1-0) 4	PHY 120 Engineering Physics (2-1-0) 3	EEE112 Principle of Electrical & Electronics Engineering (2-1-2) 4	MEP 106 Computer Aided Design and Drafting (0-0-3) 1.5	ARP102 Communicative English-2 (1-0-2) 2	EVS112 Environmental Science (3-0-0) 3	CVP 103 Material Testing Lab (0-0-2) 1	PHY 161 Physics Lab-I (0-0-2) 1	8	6	14	3	13	30	23.5
	INDUSTRIAL INTERNSHIP (0-0-2) 1 To be Evaluated in III Sem															1.0

III	ARP 203 Logical Skills Building and Soft Skills (1-0-2) 2	BTY 316 Introduction to Biology for Engineers (2-0-0) 2	CVL 232 Numerical Methods in Engineering (2-0-2) 3	CVL 225 Surveying and Levelling (2-1-2) 4	CVL 226 Introduction to Fluid Mechanics (2-1-2) 4	CVL227 Introduction to Solid Mechanics (2-1-0) 3	CVP288 Project Based Learning-1 (0-0-2) 1			8	6	11	3	12	26	19
IV	ARP 204 Quantitative and Qualitative Aptitude Skill Building (1-0-2) 2	CVL 228 Structural Engineering-1 (2-1-2) 4	CVL218 Building Materials (3-0-0) 3	CVL 230 Hydrology and Hydraulics Engineering (2-1-0) 3	CVL311 Environmental Engineering I (3-0-2) 4	HMM305 Management for Engineers (3-0-0) 3	CVP289 Project Based Learning-2 (0-0-2) 1	Open Elective-1 (2-0-0) 2		8	4	16	2	8	26	21
INDUSTRIAL INTERNSHIP (0-0-2) 1 To be Evaluated in V Sem																1
V	ARP 301 Personality Development and Decision Making Skill (1-0-2) 2	CVL325 Geotechnical Engineering (2-1-0) 3	CVL326 Structural Engineering-2 (2-1-0) 3	CVL331 Introduction t GIS (2-0-2) 3	Elective-I (3-0-0) 3	CVP396 Technical Skill Enhancement Course-1 (0-0-2) 1	CVP388 Project Based Learning-3 (0-0-2) 1	Open Elective-2 (3-0-0) 3	Community Connect (0-0-4) 2	9	6	13	2	14	29	21

VI	ARP 302 Campus to Corporate (1-0-2) 2	CVL329 Design of Basic Concrete Structures (3-1-0) 4	CVL330 Introduction to Transportation Engg (3-0-0) 3	CVP397 Technical Skill Enhancement Course-2 (0-0-2) 1	Elective 2 (3-0-2) 4	Elective 3 (2-1-0) 3	CVP389 Project Based Learning-4 (0-0-2) 1	Open Elective-3 (3-0-0) 3	Construction Engineering Management (2-0-0) 2	9	4	16	2	8	26	23
	INDUSTRIAL INTERNSHIP (0-0-2) 1 To be Evaluated in VII Sem															1
VII	Elective 4 (2-1-0) 3	CVL433 Design of Structural Steel Member (2-1-2) 4	CVP496 Major Project- 1 (0-0-6) 3	Comprehensive Examination (0-0-0) 0 Audit	Elective - 5 (3-0-0) 3	Open Elective-4 (3-0-0) 3	Elective - 6 (3-0-0) 3			8	3	13	2	10	25	19
VIII	CVP497 Major Project-2 (0-0-16) 8									1	1	0	0	16	16	8
																160

Elective-1	CVL404 Environmental Engg-II	Elective-3	CVL332 Geotechnical Engg-II	Elective-5	CVL428 Advanced Structural Design
	CVL437 Earthquake Engg		CVL333 Matrix Method		CVL434 irrigation Engg & Hydraulic Structures
Elective-2	CVL441 Fundamentals of Concrete Technology (3-0-2) 4	Elective-4	CVL432 Estimation and contracts	Elective-6	CVL323 Railways, Airport & Harbours
	CVL427 Construction Project Mgmt		CVL410 Design of High-rise buildings		CVL435 Prestressed Concrete

SHARDAUNIVERSITY

School of Engineering & Technology

Batch: 2020-24

Program / Branch: B.Tech. Civil Engineering **Semester: I**

S. No.	Subject Code	Subjects	Teaching Load			Credits	PRE-REQUISITE/ CO-REQUISITE	Type of Course[1]: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
THEORY SUBJECTS								
1	CSE113	PROGRAMMING FOR PROBLEM SOLVING	3	0	0	3	-	AECC
2	MTH141	CALCULUS, ANALYSIS AND LINEAR ALGEBRA	3	1	0	4	-	AECC
3	PHY119	ADVANCED PHYSICS	2	1	0	3	-	AECC
4	CHY112	ENGINEERING CHEMISTRY	3	0	0	3	-	AECC
5	HMM111	VALUES AND ETHICS	2	0	0	2	-	AECC
6	ARP101	COMMUNICATIVE ENGLISH-1	1	0	0	1	-	
PRACTICAL								
7	CSP113	PROGRAMMING FOR PROBLEM SOLVING	0	0	2	1	-	SEC

[1] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

8	PHY162	PHYSICS LAB-II	0	0	2	1	-	
9	CVP102	INTRODUCTION TO CIVIL ENGINEERING	0	0	2	1	-	CC
10	CHP112	ENGINEERING CHEMISTRY	0	0	2	1	-	SEC
11	MEP105	MECHANICAL WORKSHOP	0	0	3	1.5	-	SECC
12	ARP101	COMMUNICATIVE ENGLISH-1	0	0	2	1	-	AECC
					TOTAL	**22.5**		

SHARDA UNIVERSITY

School of Engineering & Technology

Batch: 2020-24

Program / Branch: B.Tech. Civil Engineering **Semester: II**

S. No.	Course Code	Course	Teaching Load			Credits	PRE-REQUISITE/CO-REQUISITE	Type of Course[2]: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
THEORY SUBJECTS								
1.	CSE114	APPLICATION BASED PROGRAMMING IN PYTHON	3	0	0	3	-	AECC
2.	MTH144	DIFFERENTIAL EQUATION, SPECIAL TRANSFORMS AND STATICS	3	1	0	4	-	AECC
3.	PHY120	ENGINEERING PHYSICS	2	1	0	3	-	AECC
4.	EEE112	PRINCIPLE OF ELECTRICAL & ELECTRONICS ENGINEERING	2	1	0	3	-	AECC
5.	EVS112	ENVIRONMENTAL SCIENCE	3	0	0	3	-	AECC
6.	ARP102	COMMUNICATIVE ENGLISH-2	1	0	0	1	-	
PRACTICAL								
7.	CSP114	APPLICATION BASED PROGRAMMING IN PYTHON	0	0	2	1	-	SEC
8.	PHY161	PHYSICS LAB-1	0	0	2	1	-	SEC

[2] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

9.	EEP112	PRINCIPLE OF ELECTRICAL & ELECTRONICS ENGINEERING	0	0	2	1	-	SEC
10.	MEP106	COMPUTER AIDED DESIGN AND DRAFTING	0	0	3	1.5	-	SEC
11.	ARP102	COMMUNICATIVE ENGLISH-2	0	0	2	1	-	AECC
12.	CVP103	MATERIAL TESTING LAB	0	0	2	1	CVP102	CC
TOTAL CREDITS						**23.5**		
INDUSTRIAL INTERNSHIP (TO BE EVALUATED IN THIRD SEMESTER)								

SHARDA UNIVERSITY

School of Engineering & Technology

Batch: 2020-24

Program / Branch:B.Tech. Civil Engineering **Semester: III**

S. No.	Subject Code	Subjects	Teaching Load			Credits	PRE-REQUISITE/CO-REQUISITE	Type of Course[3]: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
THEORY SUBJECTS								
1	BTY223	INTRODUCTION TO BIOLOGY FOR ENGINEERS	2	0	0	2	-	AECC
2	CVL232	NUMERICAL METHODS IN ENGINEERING	2	0	0	2	-	AECC
3	CVL225	SURVEYING AND LEVELLING	2	1	0	3	MTH141	CC
4	CVL226	INTRODUCTION TO FLUID MECHANICS	2	1	0	3	MTH141, PHY119, PHY120	CC
5	CVL227	INTRODUCTION TO SOLID MECHANICS	2	1	0	3	MTH141, PHY119, PHY120	CC
6	ARP203	APTITUDE REASONING BUSINESS COMMUNICATION SKILL	1	0	0	1		

[3] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

PRACTICALS								
1	CVP232	NUMERICAL METHODS IN ENGINEERING LAB	0	0	2	1	-	SEC
2	CVP225	SURVEYING AND LEVELLING LAB	0	0	2	1	CVL225, MTH141	CC
3	CVP226	INTRODUCTION TO FLUID MECHANICS LAB	0	0	2	1	MTH141, PHY119, PHY120	CC
4	ARP203	APTITUDE REASONING BUSINESS COMMUNICATION SKILL	0	0	2	1	-	SEC
5	CVP288	PROJECT BASED LEARNING-I	0	0	2	1	-	SEC
6	CVP195	INDUSTRIAL INTERNSHIP	0	0	2	1	-	SEC
TOTAL						20		

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School of Engineering & Technology

Batch: 2020-24

Program / Branch: B.Tech. Civil Engineering **Semester: IV**

S. No.	Subject Code	Subjects	Teaching Load			Credits	PRE-REQUISITE/ CO-REQUISITE	Type of Course[4]: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
THEORY SUBJECTS								
1	CVL228	STRUCTURAL ENGINEERING-I	2	1	0	3	CVL226, MTH141, MTH144	CC
2	CVL218	BUILDING MATERIALS	3	0	0	3	CVP102, CVP103	CC
3	CVL230	HYDROLOGY & HYDRAULICS ENGINEERING	2	1	0	3	MTH141, MTH144	CC
4	CVL311	ENVIRONMENTAL ENGINEERING - I	3	0	0	3	EVS103	CC
5	HMM305	MANAGEMENT FOR ENGINEERS	3	0	0	3	-	AECC
6		OPEN ELECTIVE-I	2	0	0	2	-	AECC
7	ARP204	QUANTITATIVE AND QUALITATIVE APTITUDE SKILL	1	0	0	1	-	

[4] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

		BUILDING						
PRACTICALS								
1	ARP204	QUANTITATIVE AND QUALITATIVE APTITUDE SKILL BUILDING	0	0	2	1	-	SEC
2	CVP228	STRUCTURAL ENGINEERING-I LAB	0	0	2	1	CVL228	CC
3	CVP289	PROJECT BASED LEARNING -II	0	0	2	1	-	SEC
					TOTAL	**21**		
INDUSTRIAL INTERNSHIP (TO BE EVALUATED IN V SEMESTER)								

SHARDA UNIVERSITY

School of Engineering & Technology

Batch: 2020-24

Program / Branch:B.Tech. Civil Engineering **Semester: V**

S. No.	Subject Code	Subjects	Teaching Load			Credits	PRE-REQUISITE /CO-REQUISITE	Type of Course[5]: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
THEORY SUBJECTS								
1	CVL325	GEOTECHNICAL ENGINEERING	2	1	0	3	CVL218	CC
2	CVL326	STRUCTURAL ENGINEERING-II	2	1	0	3	CVL226, MTH141, MTH144	CC
3	CVL331	INTRODUCTION TO GIS	2	0	0	2	-	CC
4		ELECTIVE-I	3	0	0	3	-	DSE
5		OPEN ELECTIVE-II	3	0	0	3	-	AECC
6	ARP301	PERSONALITY DEVELOPMENT AND DECISION MAKING SKILL	1	0	0	1	-	
PRACTICALS								
1	ARP301	PERSONALITY DEVELOPMENT AND DECISION MAKING SKILL	0	0	2	1	-	SEC

[5] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

2	CVP396	TSEC-I	0	0	2	1	-	SEC
3	CVP388	PROJECT BASED LEARNING -III	0	0	2	1	-	SEC
4	CVP295	INDUSTRIAL INTERSHIP	0	0	2	1	-	SEC
5	ECC301	COMMUNITY CONNECT	0	0	4	2	-	SEC
6	CVP331	INTRODUCTION TO GIS LAB	0	0	2	1	-	
					TOTAL	**22**	-	

SHARDA UNIVERSITY

School of Engineering & Technology

Batch: 2020-24

Program / Branch: B.Tech. Civil Engineering **Semester: VI**

S. No.	Subject Code	Subjects	Teaching Load			Credits	PRE-REQUISITE/ CO-REQUISITE	Type of Course[6]: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
THEORY SUBJECTS								
1	CVL329	DESIGN OF BASIC CONCRETE STRUCTURES	3	1	0	4	CVL322, CVL226, MTH141, MTH144	CC
2	CVL330	INTRODUCTION TO TRANSPORTATION ENGINEERING	3	0	0	3	-	CC
3	CVL441	ELECTIVE-II, CONTRETE TECHNOLOGY	3	0	0	3	-	DSE
4	CVL332	ELECTIVE-III, GEOTECHNICAL ENGG.-II	2	1	0	3	-	DSE
5	MCE004	OPEN ELECTIVE-III, ROCK ENGINEERING	3	0	0	3	-	AECC
6	CVL436	CONSTRUCTION ENGINEERING	3	0	0	3	-	CC

[6] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

		MANAGEMENT						
	ARP302	CAMPUS TO CORPORATE	1	0	0	1	-	SEC
PRACTICALS								
1	ARP302	CAMPUS TO CORPORATE	0	0	2	1	-	SEC
2	CVP397	TSEC-II	0	0	2	1	-	SEC
3	CVP389	PROJECT BASED LEARNING – IV	0	0	2	1	-	SEC
4	CVP441	ELECTIVE -II LAB	0	0	2	1	-	SEC
					TOTAL	**24**		
INDUSTRIAL INTERNSHIP (TO BE EVALUATED IN VII SEMESTER)								

SHARDA UNIVERSITY

School of Engineering & Technology

Batch: 2020-24

Program / Branch:B.Tech. CivilEngineering **Semester: VII**

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	PRE-REQUISITE/ CO-REQUISITE	Type of Course[7]: 1. CC 2. AECC 3. SEC 4. DSE
				L	T	P			
THEORY SUBJECTS									
1	CVL441		ELECTIVE-IV (FUNDAMENTALS OF CONCRETE TECHNOLOGY)	2	1	0	3	-	DSE
2	CVL433		DESIGN OF STRUCTURAL STEEL MEMBER	2	1	0	3	CVL218	CC
3			COMPREHENSIVE EXAMINATION (AUDIT)	0	0	0	0	-	SEC
4	CVL428		ELECTIVE – V(ADVANCED STRUCTURAL DESIGN)	3	0	0	3	-	DSE
5			ELECTIVE-VI	3	0	0	3	-	DSE
6			OPEN ELECTIVE-IV	3	0	0	3	-	AECC
PRACTICALS									
1	CVP496		MAJOR PROJECT -I	0	0	6	3	-	SEC

[7] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

2	CVP395	INDUSTRIAL INTERNSHIP	0	0	2	1	-	SEC
3	CVP433	DESIGN OF STRUCTURAL STEEL MEMBER LAB	0	0	2	1	CVL433	CC
					TOTAL	**20**		

SHARDA UNIVERSITY

School of Engineering & Technology

Batch: 2020-24

Program / Branch: B. Tech/Civil **Semester: VIII**

S. No.	Subject Code	Subjects	Teaching Load			Credits	PRE-REQUISITE/ CO-REQUISITE	Type of Course[8]: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
PRACTICALS								
1	CVP497	MAJOR PROJECT – II	0	0	16	8		SEC
					TOTAL	**8**		

[8] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

COURSE STRUCTURE (2020-24)

School: SET		**Batch: 2020-24**	
Program: B Tech		**Current Academic Year: 2020-21**	
Branch: Civil		**Semester: I**	
1	Course Code	CVP102	Course Name: Introduction to Civil Engineering
2	Course Title	INTRODUCTION TO CIVIL ENGINEERING	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Basic Engineering	
5	Course Objective	1. To give an understanding to the students of the vast breadth and numerous areas of engagement available in the overall field of Civil Engineering 2. To motivate the student to pursue a career in one of the many areas of Civil Engineering with deep interest and keenness. 3. To expose the students to the various avenues available for doing creative and innovative work in this field by showcasing the many monuments and inspiring projects of public utility. 4. To expose the students to Sketchup, to enable them to freely express their ideas in 3D.	
6	Course Outcomes	CO1:Introduction to what constitutes Civil Engineering. CO2:Highlighting the depth of engagement possible within each of these areas. CO3:Exploration of the various possibilities of a career in this field. CO4:Understanding the vast interfaces this field has with the society at large. CO5: Enable students to freely express their ideas in the way civil engineers do. CO6: Providing a foundation for the student to launch off upon an inspired academic pursuit into this branch of engineering	
7	Course Description	Introduce the students to various aspects of Civil Engineering and to Understand the vast interfaces this field has with the society at large.Providing a foundation for the student to launch off upon an inspired academic pursuit into this branch of engineering.Enable students to freely express their ideas in the way civil engineers do.	
8	Outline syllabus		
	Unit 1	**Introduction**	

	A	What is Civil Engineering/ Infrastructure? Broad disciplines of Civil Engineering; Importance of Civil Engineering, Possible scopes for a career.		
	B	History of Civil Engineering. Development of various materials of construction and methods of construction.		
	C	National Planning for Infrastructural Development, five-year plan outlays for construction; current budgets for infrastructure works.		
	Unit 2	**Various Branches of Civil Engineering**		
	A	Architecture and Town Planning, LEED ratings, Smart Cities		
	B	Building Materials and Construction Management		
	C	Environmental Engineering		
	D	Geotechnical and Water Resources		
	E	Structural Engineering and Software		
	F	Surveying and GIS		
	G	Transportation Engineering		
	Unit 3	**Introduction to Google Sketchup**		
	A	Introduction to Sketchup		
	B	Making of 2D Plans		
	C	Making of 3D drawings.		
		Total Hours		
	Mode of examination	Practical		
	Weightage Distribution	CA	MTE	ETE
		60%	0%	40%
	Text book/s*	1. Patil, B.S.(1974), Legal Aspects of Building and Engineering Contract 2. The National Building Code, BIS, (2017) 3. RERA Act, (2017)		
	Other References			

School: SET		**Batch: 2020-24**
Program: B.Tech		**Current Academic Year: 2020-21**
Branch:ALL		**Semester:I**
1	Course Code	MEP 106
2	Course Title	Computer Aided Design & Drafting Lab
3	Credits	1.5
4	Contact Hours (L-T-P)	0-0-3
	Course Status	Compulsory
5	Course Objective	The objective of this introductory course is to make students familiar with computer-aided drafting/ design, introduce them about the basic commands, tools and dimension techniques for creation and presentation of various engineering drawing by using AutoCAD software which helps in visualization and problem solving in engineering disciplines.
6	Course Outcomes	After successful completion of this course the student will be able to CO1: identifythe fundamental features of CAD, AutoCAD workspace and user interface. CO2: applying drawing, editing, and viewing tool for creating two dimensional engineering drawings in AutoCAD. CO3: choose advance features to present an engineering drawing in AutoCAD. CO4: reframe an engineering drawing by implementing dimension techniques. CO5: define and interpret different orthographic projections from a pictorial view. CO6: Application of variety of drawing techniques and be able to replicate specific drawings in multiple perspectives
7	Course Description	This introductory course is offered to students to make them proficient in design, layout, product development, and other careers that require technical drawing. Using the current version of the AutoCAD software, students will learn a variety of drawing techniques and be able to replicate specific drawings in multiple perspectives. The pinnacle of the class is to empower and enable students to create using the software provided. Career opportunities and 3-D modeling, manufacturing, and engineering will also be explored. No drafting or computer experience is necessary.

8	Outline syllabus			
	List of Experiments			
	Experiment 1	Introduction to AutoCAD and its interface with assignment 1		
	Experiment 2	Working with coordinates, Drawing ofline, circle, arc, polygon and creating sketches by using them assignment 2		
	Experiment 3	Editing of drawing by using editing Tools and Power tools with assignment 3		
	Experiment 4	Creating of advanced feature like fillet, chamfer, hatch and using of reusable items with assignment 4		
	Experiment 5	Representing text and dimensioning in AutoCADwith assignment 5		
	Experiment 6	Creating the drawing of the given assignment 6 by using AutoCAD features.		
	Experiment 7	Creating the drawing of the given assignment 7 in AutoCAD.		
	Experiment 8	Creating the drawing of the given diagram and giving dimensions in AutoCAD.		
	Experiment 9	Creating the drawing of TajMahal in Autocad 2D		
	Experiment 10	Creating of orthographic projections from a 3D figure		
	Mode of examination	Practical		
	Weightage Distribution	CA	MTE	ETE
		60%	0%	40%
	Text book/s*	1. Ibrahim Zaid,"CAD/CAM- Theory and Practice", McGraw Hill, International Edition.		
	Software	AutoCAD		

School: SET		**Batch: 2020-24**
Program: B.Tech		**Current Academic Year: 2020-21**
Branch: EEE		**Semester: I/II**
1	Course Code	EEE112
2	Course Title	Principles of Electrical and Electronics Engineering
3	Credits	3
4	Contact Hours (L-T-P)	2-1-0
	Course Status	Compulsory
5	Course Objective	To provide the students with an introductory concept in the field of electrical and electronics engineering to facilitate better understanding of the devices, techniques and equipments used in engineering applications.
6	Course Outcomes	CO1: To analyze and solve basic electrical circuits CO3: To understand the working principle of transformer and identify its applications. CO3: To understand the working principle of dc and ac motors and identify the starting methods of single phase induction motor CO4: To apply the basics of diode to describe the working of rectifier circuits such as half and full wave rectifiers CO5: To apply the concepts of basic electronic devices to design various circuits CO6:To work upon the principle and applications of dc/ac motors and transformers
7	Course Description	This initial course introduces the concepts and fundamentals of electrical and electronic circuits and devices. Topics include basic circuit analysis, diode and transistor fundamentals and applications. This course also introduces working principle and applications of dc/ac motors and transformers.
8	Outline syllabus	
	Unit 1	**DC & AC Circuits (6 lectures)**
	A	Electrical circuit elements (R, L and C), series and parallel circuits, concept of equivalent resistance, Kirchhoff current and voltage laws, star-delta conversion
	B	Analysis of simple circuits with dc excitation and Superposition Theorem, Representation of sinusoidal waveforms, peak and rms values, real power, reactive power, apparent power, power factor
	C	Introduction to three phase system, relationship between phase voltages and line voltages,

	Unit 2	**Transformer(4 lectures)**		
	A	Working principle and construction of transformer, EMF equation		
	B	Efficiency of transformer, Power and distribution transformer and difference between them		
	C	Transformer applications in transmission and distribution of electrical power		
	Unit 3	**Electrical Motors (6 lectures)**		
	A	Construction, working principle, torque-speed characteristic and applications of dc motor.		
	B	Construction, working principle and applications of a three-phase induction motor, significance of torque-slip characteristic		
	C	Working principle starting methods and applications of single phase induction motor		
	Unit 4	**Semiconductor Diode and Rectifier (5 lectures)**		
	A	PN junction and its biasing		
	B	Semiconductor diode, ideal versus practical diode , VI characteristics of diode		
	C	Half wave and full wave rectifiers with and without filters.		
	Unit 5	**Transistors (5 lectures)**		
	A	Bipolar Junction Transistor (BJT) – Construction, working principle and input-output characteristics		
	B	BJT as CE amplifier and as a switch		
	C	Introduction to JFET		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010. 2. S. K. Bhattacharya, “Basic Electrical and Electronics Engineering”, Pearson Publication. 3. Robert L Boylestad, “Electronic Devices and Circuit Theory” Pearson Education, 2009		
	Other References	1. V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989.		

PHY120 Engineering Physics

School: SET		**Batch: 2020-24**
Program: B.Tech		**Current Academic Year: 2020-21**
Branch: ME/CE		**Semester: II**
1	Course Code	PHY120
2	Course Title	Engineering Physics
3	Credits	3
4	Contact Hours (L-T-P)	2-1-0
	Course Status	Compulsory
5	Course Objective	1. To know about the Elasticity, Stress- Strain Diagram and Bending of beam 2. To explain the concepts of Transverse and Longitudinal Waves, interference, stretched string and standing waves and resonance. 3. To get introduced about the zeroth and first laws thermodynamics, General Relation between Cp and Cv and Work Done during Isothermal and Adiabatic Processes. 4. To analyse the Second law of thermodynamics, Carnot Cycle, Kelvin-Planck and Clausius Statements and their Equivalence.
6	Course Outcomes	CO1: Learn the Elastic moduli, Relation between elastic constants, Poisson's Ratio and Bending of beam CO2: Understand the importance interference, standing waves and resonance CO3: Able to explain the Zeroth and first laws of Thermodynamics draw free body diagram of any mechanics problem CO4: Figure out the Applications of First Law; General Relation between Cp and Cv; Work Done during Isothermal and Adiabatic Processes CO5: Studied Second Law of Thermodynamics; Concept of Entropy. CO6: Analyse the concepts of Elasticity, Waves and different laws of Thermodynamics
7	Course Description	This course is about describing the different Elastic constants, concepts of waves, Zeroth, first and second laws of Thermodynamics
8	Outline syllabus	

	Unit 1	**Elasticity**		
	A	Hooke's Law, Stress- Strain Diagram, Elastic moduli, Relation between elastic constants, Poisson's Ratio, Determination of Poisson's ratio		
	B	Energy stored per unit volume in a strain; Bending of beam		
	C	Bending moment, Cantilever		
	Unit 2	**Waves**		
	A	Transverse and Longitudinal Waves, speed of a travelling wave		
	B	wave speed on a stretched string, energy and power		
	C	wave equation, interference, standing waves and resonance.		
	Unit 3	**Zeroth and first law of thermodynamics**		
	A	Thermodynamic Equilibrium; Zeroth Law of Thermodynamics and Concept of Temperature; Work and Heat Energy		
	B	First Law of Thermodynamics; Applications of First Law; General Relation between Cp and Cv		
	C	Work Done during Isothermal and Adiabatic Processes		
	Unit 4	**Second law of thermodynamics**		
	A	Limitations of first law of thermodynamics, Reversible and Irreversible Processes; Carnot Cycle		
	B	Kelvin-Planck and Clausius Statements and their Equivalence		
	C	Second Law of Thermodynamics; Concept of Entropy.		
	Mode of examination	Theory/Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Principles of physics, J. Walker, D. Halliday and R. Resnick, Wiley India pvt. Ltd. 2. Heat and Thermodynamics, Brijlal and N. Subramanyan, S.Chand and Sons.		
	Other References	1. The Feyman Lectures on Physics, volume 1.		

INSTRUCTIONAL PLAN
Academic Year: 2020-21 (Even Semester)

School: SET	**Subject: Engineering Physics**
Program: B.Tech	**Subject Code: PHY120**
Branch: CE/ME	**Instructor:**

Scheme			**Scheme of Examination**		
L	P	T	Internal Assessment	Mid Term	End Term Examination
2	0	1	30%	Examination 20%	50%

Course outline

In Conjunction with basic knowledge of various phenomenon of physics, the course discusses about the Concepts of Elasticity, Hooke's Law, Elastic moduli, Bending of beam Cantilever, Transverse and Longitudinal Waves, interference, Laws of Thermodynamics Carnot Cycle; Kelvin-Planck and Clausius Statements and their Equivalence; Second Law of Thermodynamics; Concept of Entropy.

Course Evaluation	
Attendance	NA
Homework	10
Quizzes	15
labs	0
Presentations	5
Any other	NA
References :	
Text book	1. Principles of physics, J. Walker, D. Halliday and R. Resnick, Wiley India pvt. Ltd. 2. Heat and Thermodynamics, Brijlal and N. Subramanyan, S.Chand and Sons.
Other References	1. The Feyman Lectures on Physics, volume 1.
Course Outcomes	CO1: Able to learn the fundamental concepts on Hook's law, Poisson's ratio application for elasticity property on a material

	CO2:Understand a wide range of physical phenomena including light and the wave properties of matter including electrons and atoms. CO3: Formulate the first law of thermodynamics for a closed systems and arrange the change in energy in the closed systems via heat and work transfer. CO4: Able to analyse energy changes in chemical reaction using first law of thermodynamic CO5: Able to assess thermodynamic applications using second law of thermodynamics. Co6: To impart knowledge in basic concepts of physics relevant to engineering applications
Softwares	NA

Session No.	**Unit**	**Outline syllabus**	**Evaluation Parameter**	**Pedagogy ***
	Unit-1	**Elasticity**		
1		Hooke's Law, Stress- Strain Diagram		
2		Elastic moduli, Relation between elastic constants	1 Assignment and 1 Quiz	
3		Poisson's Ratio, Determination of Poisson's ratio		
4		Energy stored per unit volume in a strain		
5		Bending of beam	1 Assignment and 1 Quiz	
6		Bending moment		

7		Cantilever		
	Unit 2	**Waves**		
8		Transverse and Longitudinal Waves		
9		speed of a travelling wave	1 Assignment and 1 Quiz	
10		wave speed on a stretched string		
11		energy and power		
12		wave equation, interference, standing waves and resonance		
	Unit 3			
13		Thermodynamic Equilibrium		
14		Zeroth Law of Thermodynamics and Concept of Temperature	1 Assignment and 1 Quiz	
15		Work and Heat Energy		

16		First Law of Thermodynamics		
17		Applications of First Law		
18		General Relation between Cp and Cv		
19		General Relation between Cp and Cv		
20		Work Done during Isothermal and Adiabatic Processes		
21		Work Done during Isothermal and Adiabatic Processes		
	Unit 4			
22		Limitations of first law of thermodynamics		
23		Reversible and Irreversible Processes	1 Assignment and 1 Quiz	
24		Carnot Cycle; Kelvin-Planck and Clausius Statements and their Equivalence		
25		Second Law of Thermodynamics		
26		Concept of Entropy		

Schools: SBS		**Batch: 2020-24**
		Current Academic Year: 2020-21
		Semester: 2nd (Second)
1	Course Code	**ARP102**
2	Course Title	Communicative English -2
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
5	Course Objective	To Develop LSRW skills through audio-visual language acquirement, creative writing, advanced speech et al and MTI Reduction with the aid of certain tools like texts, movies, long and short essays.
6	Course Outcomes	**CO1** Move from primary self-assessment to larger goal and vision statement realisation with the help of feature length films as enablers and multimedia as language facilitators. **CO2** To develop a positive attitude through written expression of positive thought process and outlook with the help of writing activities like story completion et al. **CO3** Learn advanced writing skills in English like full length essays et al. **CO4** Master the science of speech and correct pronunciation through the accent-neutralisation program followed by reading sessions applying the lessons learnt. **CO5:** leads learners to an advanced level of writing, reading, listening and speaking abilities **CO6:**Enable the employability skills of students
7	Course Description	The course takes the learnings from the previous semester to an advanced level of language learning and self-comprehension through the introduction of audio-visual aids as language enablers. It also leads learners to an advanced level of writing, reading, listening and speaking abilities, while also reducing the usage of L1 to minimal in order to increase the employability chances.
8	Outline syllabus – ARP 202	
	Unit A	**Acquiring Vision, Goals and Strategies through Audio-visual Language Texts**
	Topic 1	Pursuit of Happiness / Goal Setting & Value Proposition in life
	Topic 2	12 Angry Men / Ethics & Principles

	Topic 3	The King's Speech / Mission statement in life | strategies & Action Plans in Life
	Unit B	**Creative Writing**
	Topic 1	Story Reconstruction - Positive Thinking
	Topic 2	Theme based Story Writing - Positive attitude
	Topic 3	Learning Diary Learning Log – Self-introspection
	Unit C	**Writing Skills 1**
	Topic 1	Precis
	Topic 2	Paraphrasing
	Topic 3	Essays (Simple essays)
	Unit D	**MTI Reduction/Neutral Accent through Classroom Sessions & Practice**
	Topic 1	Vowel, Consonant, sound correction, speech sounds, Monothongs, Dipthongs and Tripthongs
	Topic 2	Vowel Sound drills , Consonant Sound drills, Affricates and Fricative Sounds
	Topic 3	Speech Sounds | Speech Music| Tone | Volume| Diction |Syntax |Intonation | Syllable Stress |
	Unit E	**Gauging MTI Reduction Effectiveness through Free Speech**
	Topic 1	Jam sessions
	Topic 2	Extempore
	Topic 3	Situation-based Role Play
9	Evaluations	*Class Assignments/Free Speech Exercises / JAM Group Presentations/Problem Solving Scenarios/GD/Simulations (60% CA and 40% ETE*
10	Texts & References | Library Links	• Wren, P.C.&Martin H. *High English Grammar and Composition*, S.Chand& Company Ltd, New Delhi. • Blum, M. Rosen. *How to Build Better Vocabulary*. London: Bloomsbury Publication • Comfort, Jeremy(et.al). *Speaking Effectively*. Cambridge University Press. The Luncheon by W.Somerset Maugham - http://mistera.co.nf/files/sm_luncheon.pdf

Observations:

1. A Single Consolidated Syllabus has now replaced the Previous Functional English Beginners -2 and Functional English Intermediate -2

2. Credits previously allocated to FEN 02 the Lab Sessions have been dissolved

3. The Pearson Voice Labs have been completely eliminated

School: SET		**Batch: 2020-24**
Program: B.Tech		**Current Academic Year: 2020-21**
Branch: CIVIL		**Semester: II**
1	Course Code	CVP103
2	Course Title	MATERIAL TESTING LAB
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Core
5	Course Objective	The lab course would help the students in understanding the basic materials used in construction and their properties
6	Course Outcomes	CO1: Examine the rocks and aggregates used for construction CO2: Examine and Compare the results of tests on brick CO3: Discover the properties of different type of soils and its properties CO4: Differentiate between the properties of cement, mortar and concrete and its manufacturing CO5: Compare the properties of different type of metals, non-metals and alloys CO6:Application of understanding the basic materials used in construction and their properties
7	Course Description	Different materials are used for construction and this course shall detail some of these materials and their properties.
8	Outline syllabus	
	Unit 1	**Introduction to Materials**
		Testing on basic materials like Rock hardness, Rock and Stone identification, Aggregate classification and testing
	Unit 2	**Bricks**
		Dimension analysis test on bricks, water absorption
	Unit 3	**Clay and Soil**
		Identification of Soil and Soil types, Soil Sieve Analysis and soil water absorption test
	Unit 4	**Cement, Concrete, Mortar and Water**
		Basic testing of cement such as fineness, setting time, understanding mortar and concrete and its component, Basic test of water such as pH etc.
	Unit 5	**Metals and Non-metals**

		Some basic test of strength on iron, aluminum, glass, wood and metal alloys		
	Mode of examination	Practical and Viva		
	Weightage Distribution	CA	MTE	ETE
		60%	0%	40%
	Text book/s*	Lab manual		
	Other References	-		

School: SET		**Batch: 2020-24**
		Current Academic Year: 2021-22
		Semester: 3rd
1	Course Code	**ARP203**
2	Course Title	Logical Skills Building and Soft Skills
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
5	Course Objective	To enhance holistic development of students and improve their employability skills. To provide a 360 degree exposure to learning elements of Business English readiness program, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To step up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a student will have entered the threshold of his/her 1st phase of employability enhancement and skill building activity exercise.
6	Course Outcomes	CO1: Know Yourself – A proven Student engagement model to assess individual skill level CO2: To identify a student's TNI/TNA (Training Need Identification and Analysis) data CO3: To make students self-aware | raise self-esteem & effectiveness CO4: To build positive thinking in students and reinforce positive attitude building CO5: How to build positive emotional competence in students | GOAL Setting and SMART Goals CO6: Enhancing LSRW (Listening Speaking Reading Writing) | Verbal Abilities - 1
7	Course Description	This Level 1 blended training approach equips the students for Industry employment readiness and combines elements of soft skills and numerical abilities to achieve this purpose.
8	Outline syllabus – ARP 203	
	Unit 1	**BELLS (Building Essential Language and Life Skills)**
	A	Subject Verb Agreement | One word substitution, writing well formed sentences, tense, preposition,
	B	Idioms, phrases, spotting the errors , root verb error, prefix & suffix
	C	*Know Yourself*: Techniques of Self Awareness | Self Esteem & Effectiveness| Building Positive Attitude | Building Emotional Competence
	D	Positive Thinking & Attitude Building | Goal Setting and SMART Goals – Milestone Mapping | Enhancing L S R W G and P (Listening Speaking Reading) | Verbal Abilities - 1
	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**

	A	Syllogism | Letter Series | Coding, Decoding , Ranking & Their Comparison Level-1
	B	Number Puzzles
	C	Selection Based On Given Conditions
	Unit 3	**Quantitative Aptitude**
	A	Number Systems Level 1 | Vedic Maths Level-1
	B	Percentage ,Ratio & Proportion | Mensuration - Area & Volume |Algebra
	Weightage Distribution	*Class Assignment/Free Speech Exercises / JAM – 60% | Group Presentations/Mock Interviews/GD/ Reasoning, Quant & Aptitude – 40%*
	Text book/s*	*Wiley's Quantitative Aptitude-P Anand* | ***Quantum CAT – Arihant Publications*** | ***Quicker Maths- M. Tyra*** | *Power of Positive Action (English, Paperback, Napoleon Hill) | Streets of Attitude (English, Paperback, Cary Fagan, Elizabeth Wilson) The 6 Pillars of self-esteem and awareness – Nathaniel Brandon | Goal Setting (English, Paperback, Wilson Dobson*

1	Course number	**BTY316**	
2	Course Title	**Introduction to Biology for Engineers**	
3	Credits	2	
4	Contact Hours (L-T-P)	2-0-0	
5	Course Objective	To provide a foundation in biotechnology with engineering of living systems and to apply various tools of traditional engineering fields such as mechanical, material, electrical and chemical to understand and solve biomedical and biological problems and harness potential of living systems for the benefit of human mankind.	
6	Course Outcomes	After successfully completion of this course students will be able to: CO1: Explain the scope, concepts, and terminology of biotechnology. CO2: Investigate and explain current events and advances in biotechnology. CO3: Discuss About the interdisciplinary nature of Biotechnology CO4: Describe techniques involving the manipulation of DNA CO5: Explore career opportunities in biotechnology CO6: Solve biomedical and biological problems and harness potential of living systems for the benefit of human mankind	
7	Outline syllabus:		
7.01	XXXNNN.A	**Unit A**	**UNIT I: Introduction to Biotechnology**
7.02	XXXNNN.A1	Unit A Topic 1	History and origin of Biotechnology
7.03	XXXNNN.A2	Unit A Topic 2	Traditional and Modern Biotechnology
7.04	XXXNNN.A3	Unit A Topic 3	Important events in history of biotechnology.
7.05	XXXNNN.B	**Unit B**	**UNIT II: Scope of Biotechnology**
7.06	XXXNNN.B1	Unit B Topic 1	Areas of Biotechnology
7.07	XXXNNN.B2	Unit B Topic 2	Medicine and health care

7.08	XXXNNN.B3	Unit B Topic 3	Agriculture and industrial biotechnology
7.09	XXXNNN.C	**Unit C**	**UNIT III: Biotechnology as interdisciplinary science**
7.10	XXXNNN.C1	Unit C Topic 1	Introduction to Bioinformatics and Computational Biology
7.11	XXXNNN.C2	Unit C Topic 2	Role of Biotechnology in maintaining sustainable environment
7.12	XXXNNN.C3	Unit C Topic 3	Basics of Convergence of biotechnology and electronics
7.13	XXXNNN.D	**Unit D**	**UNIT IV: Basics of Gene Technology**
7.14	XXXNNN.D1	Unit D Topic 1	DNA as blue print of life
7.15	XXXNNN.D2	Unit D Topic 2	Introduction to rDNA Technology
7.16	XXXNNN.D3	Unit D Topic 3	Transgenesis and Cisgenesis
7.17	XXXNNN.E	**Unit E**	**UNIT V: Current advances in Biotechnology**
7.18	XXXNNN.E1	Unit E Topic 1	Introduction to Stem cells,
7.19	XXXNNN.E2	Unit E Topic 2	Tissue engineering and
7.20	XXXNNN.E3	Unit E Topic 3	Gene therapy
8	Course Evaluation		
8.1	Course work: 30% marks		
8.11	Attendance	None	
8.12	Assignments	5 marks	
8.13	Quizzes	20 marks	
8.14	Presentations	5 marks	
8.15	Any other	None	
8.16	MTE	20 marks	

8.18	End-term examination: 50 marks	
8.19	References	
8.20	Text book	1. Smith J. E., Biotechnology, 3rd Edition, Cambridge University Press (2006)
8.21	Other References	1. Molecular biology of the Gene (4th Edition),J .D. Watson, N. H. Hopkins, J. W. Roberts,J.A. Steitz and A.M. 2. Ravi, Indu, Baunthiyal, Mamta, Saxena, Jyoti. Advances in Biotechnology, Springer 2014.

School: SET		**Batch : 2020-24**
Program: B.TECH		**Current Academic Year: 2020-21**
Branch: CE		**Semester: III**
1	Course Code	CVL232 Course Name: NUMERICAL METHODS IN ENGINEERING
2	Course Title	NUMERICAL METHODS IN ENGINEERING
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Core
5	Course Objective	1. To learn methods of solution of linear eigen value problems. 2. To learn methods to solve problems of linear algebra. 3. To introduce methods of interpolation available 4. To formulate and solve linear programming problems. 5. To formulate and solve dynamic programming problems.
6	Course Outcomes	CO1: Able to solve various linear eigen value problems. CO2: Apply concept of linear algebra to various engineering problems. CO3: Adopt various interpolation techniques in the engineering problems. CO4: Apply the methods of linear programming to various engineering problems. CO5: Apply the methods of dynamic programming to various engineering problems. CO6: Apply the concepts of Numerical Methods to civil engineering problems.
7	Course Description	Linear Eigen value problems, Linear Algebra, Interpolation techniques, linear programming problems, dynamic programming problems.
8	Outline syllabus	
	Unit 1	**Linear Algebra, Eigen Values and Vectors**
	A	Linear systems of equations, matrices and determinants, Row Reduction Method Cramer's rule eigen values and eigenvectors
	B	Static Condensation Method
	C	Basis of eigenvectors and diagonalization
	Unit 2	**Power, Iterative and Factorization Methods**
	A	Iterative methods: Gauss-Seidel and power methods

	B	Echelon Form of Matrix		
	C	QR-factorization		
	Unit 3	**Interpolation and Approximation**		
	A	Newton's Approximation Technique		
	B	Central Difference Method, Divided Difference Method		
	C	Lagrange's Unequal Interval		
	Unit 4	**Linear Programming Problems**		
	A	Introduction		
	B	LPP formulation		
	C	Graphical Method		
	Unit 5	**Dynamic Programming Problems**		
	A	Introduction		
	B	Sequencing Technique		
	C	Problems related to construction		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	Higher Engineering Mathematics by BS Grewal. Operational Research: An Introduction by H.A. Taha.		
	Other References	Advanced Engineering Mathematics by E. Kreyszig, John Wiley & Sons, 2010, ISBN: 0470458364.		

School: SET		**Batch:**
Program: B.TECH		**Current Academic Year: 2021-22**
Branch: CE		**Semester: III**
1	Course Code	CVP232
2	Course Title	NUMERICAL METHODS IN ENGINEERING LAB
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Core
5	Course Objective	To utilize various software's in order to solve basic problems of mathematics through it. Once when familiar with the software, develop some tools to solve problems related to civil engineering.
6	Course Outcomes	CO1: Use software for basic matrices operation CO2: Apply concept of linear algebra using software. CO3: Apply interpolation techniques using software CO4: Apply linear and dynamic programming using software CO5: Adopt the use of software in basic civil engineering problems. CO6: Solve civil engineering problems using software.
7	Course Description	Practical based on linear eigenvalue problems, practical related to linear algebra, practical related to interpolation, practical related to linear and dynamic programming, calculation of stress, strains, shear force, bending moment and analysis of beam using software.
8	Outline syllabus	
	Unit 1	**Eigen Value Problems**
		Exp 1- Basic matrix operations using Excel/SciLAB
	Unit 2	**Linear Algebra**
		Exp 2 – Gauss Elimination method using Excel/SciLAB
	Unit 3	**Interpolation Problem**
		Exp 3 – Interpolation using Excel/SciLAB
	Unit 4	**Solving Linear Programming Problem**
		Exp 4 – Linear Programming using Excel
	Unit 5	**Dynamic Programming Problem**
		Exp 5 – Dynamic Programming using Excel

	Unit 6	**Application of Numerical Methods in Civil Engineering**		
		Exp 6 – Calculation of stress/strains using Excel		
		Exp 7 – Calculation of Shear Force and Bending Moment using Excel		
		Exp 8 – Analysis of Beam Problem using Excel		
	Mode of examination	Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		60%	0%	40%

School: SET		**Batch: 2020-24**	
Program: B.TECH		**Current Academic Year: 2021-22**	
Branch: CE		**Semester: III**	
1	Course Code	CVL225	Course Name: SURVEYING AND LEVELLING
2	Course Title	SURVEYING AND LEVELLING	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Status	Core	
5	Course Objective	The objective of the course is the preparation of plan estate or buildings roads, railways, pipelines, canals, etc. Or to measure area of field, state, nation. Object of geodetic surveying is to determine precise positions on the surface of the earth of widely distant points.	
6	Course Outcomes	CO1. Students will be able to identify specific types of surveys required for any particular project CO2. Students will be able to apply this knowledge in correcting the errors in surveying in real practice. CO3. Students will be able to apply this knowledge in real-time jobs of conducting surveying for any and every type of project. CO4. Students will be able to apply this knowledge in running and maintenance of all types of survey instruments, including Total Station and GPS. CO5. Students will be able to apply this knowledge in determining all elevation reduced levels with respect to GTS datum. CO6. Students will be able to design specifications for different types of surveys required for location specific projects, including their laying out.	
7	Course Description	This course enlightens the importance of surveying to Civil Engineers, Maps and Scales, Layout of engineering structures on ground, Methods of distance and angle measurements, Levelling and Contouring,	
8	Outline syllabus		

	Unit 1	**Introduction to Surveying**		
	A	Definition, Branches of Surveying, Basic principles of Surveying, Basic measurements and fixing of details		
	B	Importance of surveying to Civil Engineers, Co-ordinate systems		
	C	Maps and Scales, Tape Errors and their type in measurements		
	Unit 2	**Linear and Angular Measurement**		
	A	Optical methods of distance measurements; Theodolite- Different types (Transit and Digital) and their salient parts, Basic terms, Fundamental lines		
	B	Electronic methods of distance measurements (EDMI), Error sources in EDMI and calibration,		
	C	Measurement of horizontal and vertical angles, Temporary and permanent adjustments and tests		
	Unit 3	**Levelling and Contouring**		
	A	Definitions, Methods of determining elevation, Classification and salient parts of levels		
	B	Temporary and permanent adjustment of levels, method of reduction of levels, Sources of errors and precision, Methods of representation		
	C	Definition and characteristics of contours, Methods of contouring and its usage		
	Unit 4	**Engineering Survey**		
	A	General requirements and specifications for Engineering project surveys, Reconnaissance, Preliminary and Locations surveys for highways, railways, and canals		
	B	Layout of culverts, canal structures, bridges and buildings		
	C	Tunnels survey- correlation of underground and surface surveys		
	Unit 5	**Setting out**		
	A	Need of setting out; Control for setting out: Vertical and Horizontal control; Protection and referencing of controls		
	B	Basic setting out procedures: angle distance, distance, angle-angle; Use of grids in setting out; Use of total station and GPS in setting out; Setting out building foundation and floors		
	C	Controlling verticality of structures; Route setting out: Setting out curves: simple and transition curves, vertical curves		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%

	Text book/s*	Arora, K.R., "Surveying", Vol. I & II,Thirteenth edition,Standard Book House,Rajsons Publications, 1705-A NaiSarak, Delhi -110006
	Other References	1. T .P. Kanetkar& S. V. Kulkarni, "Surveying and Levelling" Part I and II, ,Twenty Fourth Edition, VidhyarthiGrihaPrakashan, 1786, Sadashiv Path, Pune-411030 2. S. K. Duggal, "Surveying", Volumes I & II, Third Edition, Tata Mc Graw-Hill, New Delhi 3. Bannister, A and Baker, R. "Solving Problems in Surveying", Longman Scientific Technical, UK. 4. A M Chandra, "Plane Surveying", Third Edition, New Age International Publishers, New Delhi. 5. Subramanian, R. "Surveying and Levelling", Second Edition, Oxford University Press.

School: SET		**Batch: 2020-24**	
Program: B.TECH		**Current Academic Year: 2021-22**	
Branch: CE		**Semester: III**	
1	Course Code	CVL226	Course Name: INTRODUCTION TO FLUID MECHANICS
2	Course Title	INTRODUCTION TO FLUID MECHANICS	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Status	Core	
5	Course Objective	This course aims to develop an understanding of fluid mechanics and its application in a variety of engineering problems. Learn to use control volume analysis to develop basic equations and to solve problems. Understand and use differential equations to determine pressure and velocity variations in internal and external flows and the concept of viscosity in real flows. Learn to use equations in combination with experimental data to determine losses in flow systems.	
6	Course Outcomes	CO1. Student will be able to characterize fluids at rest and in motions. CO2. Student will be able to develop concepts and analyse principles and laws of fluids at rest and in motion. CO3. Student will synthesize resultant interactions of flows and engineered natural systems. CO4. Student will be able to compute head losses and flow characteristics in simple pipes CO5. Student will be able to formulate relationship among physical parameters CO6. Student will learn the concept of turbines and pumps and can differentiate between their working.	
7	Course Description	This course explains the theoretical, numerical and experimental studies that contribute to the fundamental understanding and/or application of fluid phenomena.	
8	Outline syllabus		
	Unit 1	**Introduction**	
	A	Properties of fluids	
	B	Kinematics of Fluid Flow	
	C	Equations of motion	

	Unit 2	**Fluid Statics**		
	A	Fluid Pressure and its application to manometers		
	B	Hydrostatic forces on surfaces		
	C	Buoyancy and floatation		
	Unit 3	**Flow through Pipes**		
	A	Introduction to mouth piece, orifice, notches and weirs		
	B	Major and minor losses in pipes; concept of water hammer		
	C	Forces on submerged bodies		
	Unit 4	**Dynamics of Fluid flow**		
	A	Euler's Equation of motion		
	B	Bernoulli's equation and its		
	C	Applications of Bernoulli`s equation to orifice, mouth piece Pitot tube, venturimeter, notches, weirs		
	Unit 5	**Dimensional Analysis and Introduction to Hydraulic machines**		
	A	Buckingham`s π theorem		
	B	Model Analysis		
	C	Introduction to pumps and Turbines		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Garde R.J. and A.G. Mirajgaonkar; Engineering Fluid Mechanics, Nem Chand & Bros Publishers		
	Other References	1. Modi P.N. and S.M. Seth, Hydraulic and Fluid Mechanics, Standard Book House, New Delhi, 2002 2. Bansal R.K., Fluid Mechanics and Hyd. Machines, Laxmi publisher, New Delhi, 2008 3. Subramanyam, Problems in Fluid Mechanics, Tata McGraw Hill, New Delhi, 2004 4. Streeter V.L. & Wylie E.B, Fluid Mechanics, McGraw Hill, 1998 5. Douglas J. F., J. M. Gasiorek, J. A. Swaffield, Fluid Mechanics, Pearson Education, Asia, 1st edition, 2002. 6. Irving H. Shames, "Mechanics of Fluid", Mc- Graw Hill. 1986. 7. Frank M. White, "Fluid Mechanics", Mc- Graw Hill, 1994.		

School: SET	**Batch: 2020-24**

Program: B.TECH		**Current Academic Year: 2021-22**	
Branch: CE		**Semester: III**	
1	Course Code	CVL227	Course Name: INTRODUCTION TO SOLID MECHANICS
2	Course Title	INTRODUCTION TO SOLID MECHANICS	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Status	Core	
5	Course Objective	The objective of this Course is to introduce to continuum mechanics and material modelling of engineering materials based on first energy principles: deformation and strain; momentum balance, stress and stress states; elasticity and elasticity bounds. The subject of mechanics of materials involves analytical methods for determining the strength, stiffness (deformation characteristics), and stability of the various members in a structural system	
6	Course Outcomes	CO1: Describe the concepts and principles, understand the theory of elasticity including strain/displacement and Hooke's law relationships; and perform calculations, relative to the strength and stability of structures and mechanical components CO2: Define the characteristics and calculate the magnitude of combined stresses in individual members and complete structures CO3: Draw the shear force and bending moment diagrams for various types of beams subjected to various loadings. CO4: Calculate the stresses due to bending of beams and analyze columns. CO5: Analyze bodies subjected to torsion and analyze cylinders for hoop stresses and longitudinal stresses CO6: Determine the strength, stiffness (deformation characteristics), and stability of the various members in a structural system	
7	Course Description	Simple stress and strains, compound stresses and strains, shear force and bending moment diagrams, bending of beams and columns, torsion equation and analysis of cylinders.	
8	Outline syllabus		
	Unit 1	**Simple Stresses and Strains**	
	A	Concept of stress and strain, St. Venant's principle, stress and strain diagram, Elasticity and plasticity – Types of stresses and strains	
	B	Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them	
	C	Bars of varying section – composite bars. Strain Energy – Resilience – Gradual, sudden, impact and	

		shock loadings – simple applications		
	Unit 2	**Compound Stresses and Strains**		
	A	Two dimensional system, stress at a point on a plane, principal stresses and principal planes		
	B	Mohr circle of stress, ellipse of stress and their applications		
	C	Two dimensional stress-strain system, principal strains and principal axis of strain, Relationship between elastic constants.		
	Unit 3	**Shear Force and Bending Moment Diagrams**		
	A	Bending moment (BM) and shear force (SF) diagrams.BM and SF diagrams for cantilevers simply supported and fixed beams with or without overhangs		
	B	Calculation of maximum BM and SF and the point of contra-flexure under concentrated loads, uniformly distributed loads over the whole span or part of span		
	C	Combination of concentrated loads (two or three) and uniformly distributed loads, uniformly varying loads, application of moments.		
	Unit 4	**Bending of beams and columns**		
	A	Assumptions – Derivation of bending equation, Determination of bending stresses-focusing on Numericals		
	B	Relationship between moment, slope and deflection		
	C	Definition, classification of columns, end conditions, Euler theory(for long column), its limitation and application.		
	Unit 5	**Torsion and Cylinders**		
	A	Derivation of torsion equation and its assumptions		
	B	Applications of the equation of the hollow and solid circular shafts, torsional rigidity		
	C	Derivation of formulae and calculations of hoop stress, longitudinal stress in a cylinder		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Timoshenko, S. and Young, D. H., “Elements of Strength of Materials”, DVNC, New York, USA. 2. Kazmi, S. M. A., “Solid Mechanics” TMH, Delhi, India.		
	Other References	1. Hibbeler, R. C. Mechanics of Materials. 6th ed. East Rutherford, NJ: Pearson Prentice Hall, 2004 2. Crandall, S. H., N. C. Dahl, and T. J. Lardner. An Introduction to the Mechanics of Solids. 2nd ed. New York, NY: McGraw Hill, 1979. 3. Strength of Materials by R. Subramanian, Oxford University Press, New Delhi.		

School: SET		**Batch: 2020-24**		
Program: B.TECH		**Current Academic Year: 2021-22**		
Branch: CE		**Semester: III**		
1	Course Code	CVP251	Course Name: Project Based Learning-1	
2	Course Title	Project Based Learning-1		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-2		
	Course Status	Core		
5	Course Objective	1. To identify problems in civil engineering field. 2. To learn to prepare abstract and literature review of the problem selected and use of MS word. 3. To learn proper referencing format and MS word and work on the model related to problem. 4. To learn basics of MS excel and applications and work on the model related to problem. 5. To learn basics of MS Powerpoint and to present a model of the problem allocated.		
6	Course Outcomes	CO1: Able to identify various problems and their solution in civil engineering. CO2: Apply concept of preparing abstract and literature review. CO3: Adopt proper referencing format. CO4: Apply the application of MS Excel in civil engineering problems. CO5: Provide a solution of the problem in terms of a model/presentation. CO6: To identify problems and present a solution in terms of model of the problem allocated		
7	Course Description	Linear Eigen value problems, Linear Algebra, Interpolation techniques, linear programming problems, dynamic programming problems.		
8	Outline syllabus		**Document Required**	**Marks Allotted**
	Unit 1	**Introduction to PBL and Problem**	**Problem Identification and Group Formulation**	**15**
	A	Brief of PBL		
	B	Group Formation, Problem Identification		
	C	Definition of Problem, Basics of MS-Word		

	Unit 2	**Abstract and Literature Review**	**Abstract, Literature Review of the problem assigned**	**15**
	A	Abstract Introduction		
	B	Literature Review: Web based tools for efficient search		
	C	Preparation of Document as per format prescribes, MS Word: Creating table, figures, images, guidelines for the same.		
	Unit 3	**Referencing**	**Methodology and Results.**	**15**
	A	Referencing Introduction		
	B	Difference between referencing and bibliography		
	C	MS Word: Equation Editor, symbols, page break, cover page.		
	Unit 4	**MS Excel**	**Conclusion of Problem allotted**	**15**
	A	Introduction		
	B	Basics of Excel		
	C	Application of Excel		
	Unit 5	**MS Powerpoint**	**Presentation on the topic and model submission and viva-voce.**	**40**
	A	Introduction		
	B	Basics of Powerpoint, Standard format of presentation followed		
	C	Model preparation / Presentation on topic allotted.		
	Mode of examination	Presentation/Viva-voce		
	Weightage Distribution	CA	MTE	ETE
		60%	0%	40%

School: SET		**Batch: 2020-24**
		Current Academic Year: 2021-22
		Semester: 4th
1	Course Code	**ARP204**
2	Course Title	Quantitate and Qualitative Aptitude Sill Building
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
5	Course Objective	To enhance holistic development of students and improve their employability skills. Provide a 360 degree exposure to learning elements of Business English readiness program, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a will have entered the threshold of his/her 2nd phase of employability enhancement and skill building activity exercise.
6	Course Outcomes	CO1: Learn what is VMOSA (Vision, Mission, Values and Ethics) Communication Process CO2: Communication Styles and flexing and 4 social styles of communication CO3: Understand Listening Skills and Listening Styles CO4: Understanding the Art of giving feedback and probing CO5: Business writing skills and non-verbal communication CO6: MTI Reduction Program | Verbal Abilities - 2
7	Course Description	This course bundle allows students to build vision, mission and strategy statements while exposing them to various models of communication along with MTI reduction and the 2nd level of quant, aptitude and reasoning abilities
8	Outline syllabus – ARP204	
	Unit 1	**Communicate to Conquer**
	A	*VMOSA (Vision, Mission, Values and Ethics)* |Business Communication -Verbal Communication Skills | Barriers in communication | Basics of effective communication – PRIDE Model
	B	Different styles of communication & style flexing (Based on the 4 social styles-Analytical, Driving, Expressive, Amiable) | Importance of Listening & practice of Active Listening - Sentence Arrangements, Correction Analogies| The Art of Giving Feedbacks| Feedback Skills | Asking fact finding questions- Probing Skills
	C	Email Etiquette | Business Writing Skills| Telephone Etiquette Skills (Telephone Handling Skills) | Non Verbal Communication-Kinesics, Proxemics, Paralanguage | MTI Reduction Program | Verbal Abilities - 2

	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**
	A	Coding Decoding , Ranking & Their Comparison Level-2
	B	Series, Blood Relations & Number Puzzle
	Unit 3	**Quantitative Aptitude**
	A	Number System Level 2
	B	Vedic Maths Level-2 | Probability | Permutation & Combination
	C	Percentage, Profit & Loss ,Partnership, Simple Interest & Compound Interest
	Weightage Distribution	*(CA)Class Assignment/Free Speech Exercises / JAM – 60% | (ETE) Group Presentations/Mock Interviews/GD/ Reasoning, Quant & Aptitude – 40%*
	Text book/s*	*Wiley's Quantitative Aptitude-P Anand |* ***Quantum CAT – Arihant Publications | Quicker Maths- M. Tyra |*** *Power of Positive Action (English, Paperback, Napoleon Hill) | Streets of Attitude (English, Paperback, Cary Fagan, Elizabeth Wilson) The 6 Pillars of self-esteem and awareness – Nathaniel Brandon | Goal Setting (English, Paperback, Wilson Dobson*

School: SET		**Batch: 2020-24**	
Program: B.TECH		**Current Academic Year: 2021-22**	
Branch: CE		**Semester: IV**	
1	Course Code	CVL228	Course Name: STRUCTURAL ENGINEERING – I
2	Course Title	STRUCTURAL ENGINEERING – I	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Status	Core	
5	Course Objective	The objective of the course is to introduce Students of Civil Engineering about Mechanics of Deformable Solids where determinate structures were considered. They will use (a) Moment-area method (b) Energy method for the analysis of Determinate structures. Concept of Rolling Loads and Influence lines will be learned for simply supported beams and determinate trusses. The course will cover the analysis of arches and cables.	
6	Course Outcomes	CO1: Describe different types of supports and reactions from degrees of freedom and identify an indeterminate structure, general theorems applicable on determinate structures. CO2: Examine the use of Moment area method to determine slope and deflection for cantilever, simply supported beam.Examine the use of Conjugate Beam Method and Virtual Work Method. Calculate the deflections of pin jointed trusses. CO3: Discuss the effect of Rolling Loads on simply supported beams as bridge girder and to find out influence line diagrams for Reactions, Shear force and bending moment for simply supported beams and internal forces in determinate trusses. CO4: Analysis arches using analytical method. CO5: Analysis of cables and arches using analytical method. CO6:To create structures with adequate safety and serviceability under the influence of the relevant loads and actions during the lifetime of the structure.	
7	Course Description	Introduction to various support conditions, types of structures, Methods of analyzing determinate structure, Rolling loads, influence line diagrams, Analysis of arches and cables.	

8	Outline syllabus			
	Unit 1	**General Theorems**		
	A	Introduction to type of supports and free body diagram, Strain energy in elastic structures		
	B	Castigliano's theorem, Deflection of determinate structures by Principle of virtual work (unit load method)		
	C	Betti and Maxwell reciprocal theorems		
	Unit 2	**Deflection of statically determinate structures& Truss Analysis**		
	A	Conjugate beam method, Moment area method		
	B	Unit Load Method		
	C	Perfect, Deficient and Redundant trusses, Assumptions and Nature of Forces in Members. Method of Joints, Method of Sections.		
	Unit 3	**Rolling Loads**		
	A	Influence lines for simply supported beams and overhanging beams		
	B	Maximum Shear force and bending moment due to moving load for simply supported beam		
	C	Absolute shear force and bending Moment, Equivalent UDL		
	Unit 4	**Three hinged Parabolic arches**		
	A	Determination of normal thrust		
	B	Determination ofshear force		
	C	Determination of Bending Moment		
	Unit 5	**Suspension bridges**		
	A	Suspension cable with three hinged stiffening girder		
	B	Determination of Horizontal tension in the cable		
	C	Determination of Shear force and Bending Moment		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Reddy C.S., Basic Structural Analysis, Tata McGraw Hill Publishing Company, New Delhi.		
	Other References	1. Theory of Structures by S. Ramamruthum 2. Kukreja, C.B., Sastry, V.V., Experimental Methods in Structural Mechanics, Standard Publishers and Distributers, 2009.		

School: SET		**Batch: 2020-24**	
Program: B.TECH		**Current Academic Year: 2021-22**	
Branch: CE		**Semester: IV**	
1	Course Code	CVL218	Course Name: BUILDING MATERIALS
2	Course Title	BUILDING MATERIALS	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core	
5	Course Objective	The course provides and introductory overview of the various materials used in construction. It shall also explain the different loads acting on the building, its effect which affects the choice of materials, along with the orientation of the building and the bye-laws used for the construction. The students are also exposed to some of the new materials which have been introduced in recent times	
	Course Outcome	CO1. Describe the basic materials' properties of construction materials CO2. Describe the composition and properties of the most common building materials CO3. Perform simple calculation about the strength and other properties of most of the building materials CO4. Proportion and produce concrete as well as evaluate the strength of manufactured concrete CO5. Evaluate the appropriateness of the conventional and new materials in construction CO6: Understand the application of some of the new materials which have been introduced in recent times.	
7	Course Description	This course demands that each student develops an understanding of the behaviour of basic materials including wood, steel, concrete, and masonry products and the related engineering relationships required. Bricks, Rocks, Stones, Aggregates, Wood, Steel, Concrete, and their applications to the construction process are presented. The course would assist the student in understanding the properties and behaviour of the material preparation for future construction engineering topics.	
8		Outline syllabus	
	Unit 1	**Introduction and Planning of a Building**	
	A	Functions of a building and the role of materials. Physical, Chemical and Mechanical properties of materials	
	B	Different types of load acting on a building and its role in deciding the materials	

	C	Building orientation, Setting, Layout and Bye-laws for construction		
	Unit 2	**Basic Materials**		
	A	Rocks, Stones and Aggregates (Coarse and Fine)		
	B	Clay, Water and Bricks (Clay and Fly-Ash)		
	C	Lime, Puzzolana and other cementing materials		
	Unit 3	**Building Materials-1**		
	A	Cement, Mortar, Plasters and Pointing		
	B	Concrete: Its production and usage		
	C	Timber		
	Unit 4	**Building Materials-2**		
	A	Ferrous and non-ferrous materials		
	B	Polymers and Ceramic		
	C	Paints, Distempers and Varnishes		
	Unit 5	**Composite Materials**		
	A	Fibre Reinforced Concrete		
	B	Polymer Reinforced Concrete		
	C	Use of Nano Technology in Civil Engineering		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Building Materials – S.K. Duggal - New Age Int'l Publication, New Delhi. ISBN: 978-81-224-3379-1 2. Building Construction and Material - Gurcharan Singh - Standard Book House, New Delhi. ISBN: 978-81-89401-21-4		
	Other References	1. Building Materials – Gambhir and Jamwal (McGraw Hill, New Delhi) 2. Don A. Watson, Construction Materials and Process, McGraw Hill Co., 1972		

School: SET		**Batch: 2020-24**	
Program: B.TECH		**Current Academic Year: 2021-22**	
Branch: CE		**Semester: IV**	
1	Course Code	CVL230	Course Name: HYDROLOGY AND HYDRAULICS ENGINEERING
2	Course Title	HYDROLOGY AND HYDRAULICS ENGINEERING	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Status	Core	
5	Course Objective	The objective of the course is to introduce the students to hydrological and open channel flows problems and relatethe theory and practice of problems in hydraulic engineering. Understand the basic aquifer parameters and estimate groundwater resources for differenthydro-geological boundary conditions Understand application of systems concept, advanced optimization techniques to coverthe socio-technical aspects in the field of water resources.	
6	Course Outcomes	CO1. Apply the mathematical, statistical, geological, hydrological, agronomic, and hydraulic processes involved in methods of irrigation, carrier network of irrigation water and the natural forces causing rainfall, runoff, evaporation, transpiration, depression storage, retention storage, infiltration, percolation, surface and sub-surface flows etc. CO2. Assess the physical dynamics of water movement in open channels and rivers and compute mathematically flow processes in the above cases. CO3. Compare different types of free surface flows: uniform, non-uniform, steady, unsteady etc. CO4. Analyse different channel shapes and cross sections and their performance. CO5. Analyze the steps for gradually varied water surface profiles. CO6. Perform the design of channel carrying sediments.	
7	Course Description	This course aims to comprehensively deal with flows having a free surface in channels constructed for water supply, irrigation, drainage, navigation, and hydroelectric power generation; in sewers, culverts, canals, and tunnels flowing partially full; and in natural streams and rivers.	
8	Outline syllabus		
	Unit 1	**Engineering Hydrology**	
	A	Components of hydrologic cycle	
	B	Estimation of rainfall, infiltration, stream flows and evapotranspiration.	
	C	Analysis and Synthesis of Hydrographs.	

	Unit 2	**Open Channel Hydraulics**		
	A	Types of flow in open channel		
	B	Uniform Flow		
	C	Rigid Boundary Channel		
	Unit 3	**Energy and Momentum Principles**		
	A	Specific energy		
	B	Critical depth & its computations		
	C	Specific force and Control Sections		
	Unit 4	**Gradually Varied Flow in Open Channels**		
	A	Gradually varied flow computations		
	B	Classification of gradually varied flows		
	C	Features of Surface profile curves		
	Unit 5	**Hydraulic Jump**		
	A	Introduction		
	B	Hydraulic jump evaluation in rectangular channel		
	C	Surges in open channel		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	Arora, K.R., "Surveying", Vol. I & II,Thirteenth edition,Standard Book House,Rajsons Publications, 1705-A NaiSarak, Delhi -110006		
	Other References	1. T .P. Kanetkar& S. V. Kulkarni, "Surveying and Levelling" Part I and II, ,Twenty Fourth Edition, VidhyarthiGrihaPrakashan, 1786, Sadashiv Path, Pune-411030 2. S. K. Duggal, "Surveying", Volumes I & II, Third Edition, Tata Mc Graw-Hill, New Delhi 3. Bannister, A and Baker, R. "Solving Problems in Surveying", Longman Scientific Technical, UK. 4. A M Chandra, "Plane Surveying", Third Edition, New Age International Publishers, New Delhi. 5. Subramanian, R. "Surveying and Levelling", Second Edition, Oxford University Press.		

School: SET		**Batch: 2020-24**	
Program: B.TECH		**Current Academic Year: 2021-22**	
Branch: CE		**Semester: IV**	
1	Course Code	CVL311	Course Name: Environmental Engineering-I
2	Course Title	Environmental Engineering-I	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core	
5	Course Objective	This course is aimed at teaching students about the various unit operations involved in municipal water treatment with the intention of supplying drinking water (which conforms to the applicable regulatory norms or standards) to consumers. The course also encompasses the design of conveyance network and house connections. This course covers everything from the selection of the raw water source all the way down to the clean drinking water at consumer end.	
6	Course Outcomes	CO1: Characterize, compare and select the water sources (surface and subsurface) for fulfilling the water demand of a given city, over an appropriate design period. CO2: Define and examine the various key characteristics (physical, chemical and biological) of drinking water. They should also demonstrate knowledge of applicable drinking water standards (IS10500 and IS1172). Students should be able to compute and forecast population and water demands CO3: Formulate the treatment scheme and design the various unit operations involved in conventional municipal water treatment process. They should be able to describe advanced treatment techniques, recent advances and domestic water purification CO4: Design the water conveyance network and pipe layouts. Students should also be able to design a house connection and identify its components as well as various plumbing fixtures and valves. CO5: Understand necessity of conservation of water, principle of house drainage and sanitation system. CO6:Select appropriate water supply sources, estimate the qualitative and quantitative requirements, design water treatment (including those for small communities) and conveyance schemes	
7	Course Description	Introduction, water quality and demand, water treatment, water transportation, water conservation and house sanitation.	
8	Outline syllabus		
	Unit 1	**Introduction**	
	A	Introduction to planned water supply	
	B	Sources of Water Supply	
	C	Water Collection- Intake Structures	

	Unit 2	**Water Quality and Demand**		
	A	Physical, chemical & Biological characteristics		
	B	Water demands, factors affecting demand		
	C	Population Forecasting, design flows		
	Unit 3	**Water Treatment**		
	A	Conventional treatment process design.		
	B	Advanced water treatment processes		
	C	Domestic water purification		
	Unit 4	**Water Transportation**		
	A	Pipe materials, head loss		
	B	Distribution Network, Layout		
	C	Service connection and appurtenances, system of plumbing		
	Unit 5	**Water conservation and house sanitation**		
	A	Rainwater harvesting		
	B	Principles of house drainage, pipes and traps, Classification of traps: nahni trap, gulley trap, interception trap, grease trap, sanitary fitting		
	C	Small community supply sources and treatment		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text Books	1. Garg,S.K.“ Water Supply Engineering”,Khanna Publishers.2012 2.Sawyer and McCarty “ Chemistry for Environmental Engineeringand Science”, McGraw Hills.2000		
	Other references	3.Peavy,H.S.,Rowe,D.R.andTchobanoglous,G“Introductionto 4.Environmental Engineering” McGraw Hill. 1986 Davis,M.L.andCornwell,D.A.,“IntroductiontoEnvironmental Engineering”, McGraw Hill. 1998 5.Masters,G.M.,“IntroductiontoEnvironmentalEngineeringandScience” Prentice Hall OfIndia.1998 6.HammerandHammer,“WaterandWastewaterTechnology”,PrenticeHall of India.1998 7.CPHEEO,“ManualonWaterSupplyandTreatment”,BureauofIndian Standards, CPHEEO.1999		

School: SET		**Batch: 2020-24**
Program: B.TECH		**Current Academic Year: 2021-22**
Branch: CE		**Semester: IV**
1	Course Code	CVP228
2	Course Title	STRUCTURAL ENGINEERING-I LAB
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Core
5	Course Objective	The course will create the understanding between theoretical concept of strength and behavior of structural member under the effect of the load with practical aspect.
6	Course Outcomes	CO1: Test the various types of strengths of material. CO2: Test the hardness and toughness of mild steel using various apparatus. CO3: Relate the theoretical knowledge with practical condition. CO4: Study the behavior of various structural members under the effect of different type of loading CO5: Test and understand the flexural rigidity of structural member. CO6: To build a relationship between theoretical concept of strength and behavior of structural member under the effect of the load with practical aspect.
7	Course Description	Testing the various types of strengths of material, properties like hardness, toughness, flexural rigidity, Study the effect of load on different types of structural members.
8	Outline syllabus	
	Unit 1	**Practical related to strength testing**
		Exp 1- To conduct a tensile test on a mild steel specimen with the help of U.T.M and determine the following:(1) Ultimate strength (2) Percentage elongation (3) Percentage reduction in area.
		Exp 2- To conduct a shear test on U.T.M and determining ultimate shear strength fora given specimen.
		Exp 3- To conduct a bending test on U.T.M and determine ultimate bending strength for given specimen with the help of simply supported attachment.
		Exp 4- To conduct a compressive test on CTM and determine the ultimate compressive strength of the given specimen
		Exp 5- To find out the Torsion strength and the modulus of rigidity of the material of the test rod.
	Unit 2	**Practical related to hardness & toughness testing**
		Exp 6- To conduct the hardness test on mild steel specimen and find out the hardness of material by

		Rockwell & Brinell hardness test method		
		Exp 7- To conduct the impact test on mild steel specimen and find out the hardness of material by Izod & Charpy's impact test method		
	Unit 3	**Practical related to verification of theorems**		
		Exp 8- Verification of Maxwell-Betti's Law.		
		Exp 9- Verification of moment area theorem.		
	Unit 4	**Practical related to behavior study under loading**		
		Exp 10- Study the behavior of various types of column.		
		Exp 11- Study the behavior of three hinged arch.		
		Exp 12- Study the behavior of cantilever beam subjected to symmetrical and unsymmetrical bending.		
		Exp 13- Determination of elastic deflection of curved beams.		
	Unit 5	**Practical related to property determination**		
		Exp 14- Determination of flexural rigidity of beam.		
	Mode of examination	Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		60%	0%	40%

SCHOOL: SCHOOL OF BUSINESS STUDIES		TEACHING DEPARTMENT: Human Resource	ACADEMIC SESSION :	FOR STUDENTS BATCH – B.Tech.
1	**Course number**	**HMM 303**		
2	**Course Title**	**Management for Engineers Code- HMM 305**		
3	Credits	03		
4	Learning Hours L-T-P	3-0-0		
5	Course Objective	The objective of this course is to expose the students to understand the basics of Management Foundations. The students will be given a detailed grounding for the theories and live cases related to the general management. The aim of the course is to orient the students in theories and practices of Management so as to apply the acquired knowledge in actual business practices. This is a gateway to the real world of management and decision-making.		
6	Course Outcomes	On successful completion of this module students will be able to: CO1: Understand basic principles and concepts related to management and an organisation. CO2: Understanding the best management practices for a value driven organisation. CO3: Understanding professional ethics, workforce diversity issues and cross cultural management CO4: Understanding the concept of job analysis Manpower planning, Recruitment, Transfers and Promotions CO5: Understand the important of management control, decision making within an organization. CO6: Facilitate application of real world of management and decision-making		
7	Outline syllabus			
7.01	HMM 303 A	Unit A	**Introduction of Management & Organisation**	
7.02	HMM 303 A1	Unit A Topic 1	1.1 Management-Definition of Management & Organisation	
7.03	HMM 303 A2	Unit A Topic 2	1.2 Concept, Nature, Scope and Functions of Management, Levels of Management, Management Theories - Taylors principle, Fayol's Principles, Hawthorne Studies, Systems Approach and Contingency Approach to Management.	

7.04	HMM 303	A3	Unit A Topic 3	1.3 Mintzberg's Managerial Roles, Skills of Manager,
7.05	HMM 303	A4	Unit A Topic 4	1.4 Functions of management
7.06	HMM 303	B	Unit B	**Management Planning Process**
7.07	HMM 303	B1	Unit B Topic 1	2.1 Planning objectives and characteristics,
7.08	HMM 303	B2	Unit B Topic 2	2.2 Hierarchies of planning,
7.09	HMM 303	B3	Unit B Topic 3	2.3 The concept and techniques of forecasting.
7.10	HMM 303	C	Unit C	**Organizing**
7.11	HMM 303	C1	Unit C Topic 1	3.1 Meaning, Importance and Principles,
7.12	HMM 303	C2	Unit C Topic 2	3.2 Departmentalization, Span of Control,
7.13	HMM 303	C3	Unit C Topic 3	3.3 Types of Organization,
7.14	HMM 303	C4	Unit C Topic 4	3.4 Authority, Delegation of Authority.
7.15	HMM 303	D	Unit D	**Staffing**
7.16	HMM 303	D1	Unit D Topic 1	4.1 Meaning, Job analysis
7.17	HMM 303	D2	Unit D Topic 2	4.2 Manpower planning, Recruitment, Transfers and Promotions
7.18	HMM 303 D3		Unit D Topic 3	4.3 Appraisals, Management Development, Job Rotation, Training, Rewards and Recognition,
7.19	HMM 303	E	Unit E	**Directing & Controlling**
7.20	HMM 303	E1	Unit E Topic 1	5.1 Motivation, Co-ordination, Communication,
7.21	HMM 303	E2	Unit E Topic 2	5.2 Directing and Management Control, Decision Making,
7.21	HMM 303	E3	Unit E Topic 3	5.3 Management by objectives (MBO) the concept and relevance. Objectives and Process of Management Control
8.01	Course Evaluation			
8.02	Continuous Assessment		30%	
9.01	MTE		20 %	
9.02	ETE		50 %	
9.03	References			
9.04	Text book*		• Principles & practice of Mgmt., L.M. Prasad	
9.05	Other references		• Management Today, Burton & Thakur • Principles & Practices of Mgmt., C.B. Gupta • Understanding Management, Richard L.Daft	

		• Management, Stoner, Freemand & Gilbert • Essential of Management, Koontz O' Donnel

School: SET	**Batch: 2020-24**
Program: B.TECH	**Current Academic Year: 2021-22**
Branch: CE	**Semester: IV**
OPEN ELECTIVE (2-0-0) 2	

School: SET		**Batch :** 2020-24
		Current Academic Year: 2012-23
		Semester: 5th
1	Course Code	**ARP 301**
2	Course Title	Personality Development and Decision making Skills
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
5	Course Objective	To enhance holistic development of students and improve their employability skills. Provide a 360-degree exposure to learning elements of Business English readiness program, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To up skill and upgrade students across varied industry needs to enhance employability skills. By the end of this semester, a student will have entered the threshold of his/her 3rd phase of employability enhancement and skill building activity exercise.
6	Course Outcomes	CO1: Understanding Personality and its traits | The art of impression management CO2: Personality Development and Transformation – Value & Ethics – Contribution to the society. CO3: Behavioural and Interpersonal Skills CO4: Avoiding Arguments | The Art of Assertiveness CO5: Argument Handling - Verbal & Writing Skills CO6: The 4M Model | Verbal Abilities-3
7	Course Description	This bundles Training approach attempts to explore the personality, character, and the natural style of the student. This helps to develop character, personality, confidence and interpersonal abilities within the student along with level 3 readiness in quant, aptitude and reasoning skills
8	Outline syllabus – ARP301	
	Unit 1	**Impress to Impact**
	A	What is Personality? |Who Am I? Creating a positive impression – The 3 V's of Impression | Individual Differences and Personalities
	B	Personality Development and Transformation – Value & Ethics| Building Self Confidence | Behavioural and Interpersonal Skills (My contribution towards society/ nation)
	C	Avoiding Arguments – Essay Writing | The Art of Assertiveness | The Personal Effectiveness Grid | Assessing our Strengths & Limitations and Creating an Action Plan for Learning with the 4M Model | Verbal Abilities-3

	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**
	A	Numbers & Digits , Mathematical Operations | Analytical Reasoning
	B	Cubes & Cuboids | Statement & Assumptions
	C	Strong & Weak Argument
	Unit 3	**Quantitative Aptitude**
	A	Work & Time ,Pipes & Cistern
	B	Time ,Speed & Distance, Quadratic & Linear Equations, Logs & Inequalities
	C	Sequence & Series, Logarithms, Data Interpretation | Data sufficiency - Level 1
	Weightage Distribution	*(CA)Class Assignment/Free Speech Exercises / JAM – 60% | (ETE) Group Presentations/Mock Interviews/GD/ Reasoning, Quant & Aptitude – 40%*
	Text book/s*	*Wiley's Quantitative Aptitude-P Anand* | ***Quantum CAT – Arihant Publications*** | ***Quicker Maths- M. Tyra*** | *Power of Positive Action (English, Paperback, Napoleon Hill) | Streets of Attitude (English, Paperback, Cary Fagan, Elizabeth Wilson) The 6 Pillars of self-esteem and awareness – Nathaniel Brandon | Goal Setting (English, Paperback, Wilson Dobson*

School: SET		**Batch: 2020-24**	
Program: BTech		**Current Academic Year: 2022-23**	
Branch: CE		**Semester: V**	
1	Course Code	CVL325	Course Name: GEOTECHNICAL ENGINEERING
2	Course Title	GEOTECHNICAL ENGINEERING	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Status	Core	
5	Course Objective	To make the students interpret various properties of soils and to develop knowledge on various concepts like effective stress, permeability, compaction characteristics of soil, stress due to applied loads, lateral earth pressure.	
6	Course Outcomes	CO1: Classify soils for assessing its suitability for foundation, embankment, or highway. CO2: Synthesize soil components in its three phases and analyze total and effective stress. CO3: Evaluate compaction characteristics and interpret field compaction results with respect to compaction specifications. CO4: Analyze shear strength and compressibility parameters under drained and undrained conditions. CO5: Analyze passive and active lateral earth pressures. CO6: To understand various factors governing the Engineering behavior of soils and the suitability of soils for various Geotechnical Engineering applications	
7	Course Description	Formation of Soil from rock, Classification and index properties of soils, Stresses on soil, Permeability and capillarity properties, Shear strength of soil, Lateral earth pressure theories.	
8	Outline syllabus		
	Unit 1	**Soil Formation and Classification**	
	A	Formation of Soil from rocks, Civil engineering problems related to soil	
	B	Three phase diagram and index properties of soils	
	C	Classification of soil, Consistency of clays-Atterberg limits	
	Unit 2	**Principle of effective stress, Capillarity and Permeability**	
	A	Principle of effective stress, Physical meaning of effective stress	
	B	One-dimensional flow; Darcy's law, Determination of permeability for cohesive and cohesionless soils, Permeability of layered deposits,	
	C	Capillarity, Seepage forces, Flow Nets	

	Unit 3	**Soil Compaction and Consolidation**		
	A	Concept of compaction and Laboratory compaction tests		
	B	Factors affecting compaction, Compaction in the field, Difference between consolidation and compaction		
	C	Components of total settlement; Compressibility, Terzaghi's theory of one-dimensional consolidation; Time-rate of consolidation; Settlement analysis		
	Unit 4	**Shear strength of soils**		
	A	Mohr's circle of stress, Methods of determination of shear strength parameters of cohesive and non-cohesive soils		
	B	Direct shear test, Tri-axial shear test, Unconfined compression test and vane shear test		
	C	Drainage conditions and strength parameters		
	Unit 5	**Earth pressure Theories**		
	A	Introduction, Effect of wall movement on earth pressure		
	B	Types of earth pressure, Rankine's theory of earth pressure,		
	C	Coulomb's theory of earth pressure, Coulomb equation for cohesionless backfills		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	Arora, K.R., "Soil Mechanics and Foundation Engineering", Standard publishers and distributors, New Delhi, 1997		
	Other References	1. Basic and applied soil mechanics – Gopal Ranjan and Rao, A.S.R. (Wiley Eastern Ltd., New Delhi (India), 1997) 2. Venkataramaiah. C, "Geotechnical Engineering" Wiley Eastern Ltd.		

School: SET		**Batch: 2020-24**	
Program: B.TECH		**Current Academic Year: 2022-23**	
Branch: CE		**Semester: V**	
1	Course Code	CVL326	Course Name: STRUCTURAL ENGINEERING-II
2	Course Title	STRUCTURAL ENGINEERING-II	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Status	Core	
5	Course Objective	This course will provide the in-depth knowledge of Moment Distribution Method, Slope-deflection method, Kani's method, Three moment theorem for analyzing beams and frames with different support conditions, approximate methods in analysis of frames for vertical and horizontal loads and introduction to matrix method of analysis.	
6	Course Outcomes	CO1: Describe the types of structures in practice and analyze the various types of beams and frames using Slope deflection method. CO2: Define the stiffness, carry over factor, distribution factor and analysis of different beams and frames using Moment distribution method. CO3: Analysis of continuous beams &frames by Kani's Method, Analysis of continuous beams by Three moment theorem CO4: Analyze the building frames for vertical and horizontal loading by portal and cantilever method CO5: Understand the basic concept of Matrix Method. CO6:Analysis indeterminate structures by various methods	
7	Course Description	Static and Kinematic indeterminacy, Slope-deflection method, Moment distribution method, Kani's method, Three moment theorem, Approximate methods, Basics of Matrix methods	
8	Outline syllabus		
	Unit 1	**Introduction & Slope deflection method**	
	A	Types of structures occurring in practice and their classification, Stable and unstable Structures, Static and kinematic determinacy and indeterminacy of structures, Symmetrical and unsymmetrical loads	
	B	Introduction, Slope-deflection equations, Analysis of statically indeterminate beams with and without settlement of support	
	C	Analysis of rigid frame with and without sway	
	Unit 2	**Moment Distribution method**	

	A	Introduction, Absolute and relative stiffness of members, stiffness and carry-over factors, distribution factor		
	B	Application of moment distribution method on different types of beams with different support condition		
	C	Analysis of frames		
	Unit 3	**Kani's Method & Three Moment theorem**		
	A	Analysis of continuous beams &frames by Kani's Method		
	B	Analysis of frames with different column length and end conditions of bottom storey by Kani's method		
	C	Analysis of continuous beams by Three moment theorem		
	Unit 4	**Approximate Methods**		
	A	Analysis of Building Frames by Approximate methods for vertical loads		
	B	Assumptions of portal method, Analyze building frames by portal method for horizontal loads		
	C	Assumptions of cantilever method, Analyze building frames by cantilever method for horizontal loads.		
	Unit 5	**Introduction to Matrix Methods**		
	A	Introduction to stiffness and flexibility		
	B	Difference between stiffness and flexibility method		
	C	Stiffness coefficients for prismatic members and their use for formulation of equilibrium equation		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Reddy C.S., Basic Structural Analysis, Tata McGraw Hill Publishing Company, New Delhi. 2. Hibbeler R.C.; "Structural Analysis", Eight Edition., Prentice Hall, 2012 3. Weaver W & Gere JM, Matrix Methods of Framed Structures, CBS Publishers & Distributors, Delhi. 4. Junnarkar S. B. and. Shah H. J. Mechanics of structures, vol. II, Charotar pub., India. 5. Gupta and Pandit, Structural Analysis: A Matrix Approach, TMH.		
	Other References	6. Analysis of structures Vol. I & II by Vazrani and Ratwani. Khanna publications. 7. Wang C.K. Intermediate structural analysis, McGraw Hill, New York.		

School: SET		**Batch: 2020-24**	
Program: B.TECH		**Current Academic Year: 2022-23**	
Branch: CE		**Semester: V**	
1	Course Code	CVL331	Course Name: INTRODUCTION TO GIS
2	Course Title	INTRODUCTION TO GIS	
3	Credits	2	
4	Contact Hours (L-T-P)	2-0-0	
	Course Status	Core	
5	Course Objective	The course would help the students to 1. Become familiar with the basics of digital mapping, data types and maps 2. Be able to perform analysis on the map data and understand how the data is stored in maps 3. Provide expected knowledge an skills and expertise necessary for management of GIS projects	
6	Course Outcomes	CO1: Understand the spatial concept, its application to Civil Engg CO2: Illustrate the usage of different type of maps and understand the fundamental data used CO3: Discover the relationship between the spatial and non-spatial data and modify the data as per the need CO4.:Analyse different data to estimate and determine the relationship between the data and the real world problems CO5:Assess and compare the results to get meaningful output and write the map interpretation for everyone to understand CO6: Analyse the data to make meaningful maps and interpret them for solving civil engineering and planning problems	
7	Course Description	This course provides the students with and introduction to the principles of GIS, data types, data structure, techniques of data manipulation and map making. At the later stage, they would also study about analysing the data to make meaningful maps and interpret them for solving civil engineering and planning problems.	
8	Outline syllabus		
	Unit 1	**Systems and Study**	
	A	Introduction, History, Objectives and Components of GIS	
	B	Importance and Application of GIS to Civil Engineers	
	C	Anatomy and the Business of GIS	

	Unit 2	**Representing the Data on Maps**		
	A	Map types, Scale, Co-ordinate System, Map Projection, Transformation and Geo-referencing		
	B	Raster and Vector Data, Data Models and Data Structure		
	C	Continuous Data and Generalisation of Data		
	Unit 3	**Spatial and Attribute Data Management**		
	A	Introduction to Spatial and Attribute Data and its storage		
	B	Data Access and manipulation using SQL		
	C	Raster and Vector Data Encoding methods		
	Unit 4	**Geo-spatial Analysis**		
	A	Raster and Vector Data query		
	B	Geo-spatial measurements		
	C	Overlay, Network and Surface Analysis		
	Unit 5	**Geo-visualisation and Implementation**		
	A	Classification, Reclassification, Map Composition, Report and Layout		
	B	Planning a Project and its Implementation		
	C	Management of the Project		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	Geographic Information System and Science, Paul Longely, Michael F Goodchild, David J Maguire and David W Rhind, John Wiley & Sons, 2011 Remote Sensing and GIS. Basudeb Bhatta. Oxford University Press, 2011		
	Other References	Principles of Geographical Information System for Land Resource Assessment, P.A. Burrough, Clarendon Press, Oxford, 1986. Geographic Information Systems, T.R. Smith & Piqent, London Press, 1985.		

School: SET		**Batch: 2020-24**
Program: B.Tech		**Current Academic Year: 2022-23**
Branch: CIVIL		**Semester: V**
1	Course Code	CVP311
2	Course Title	INTRODUCTION TO GIS LAB
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Core
5	Course Objective	The lab course would help the students in 1. Becoming familiar with software used for Geomatics Engineering 2. Learning how to make map from the surveyed data and how to convert paper maps into digital maps 3. Learning how to attach attributes to the map and do different kind of analysis 4. Learning how to present the analysed result into a meaningful way so as others to understand
6	Course Outcomes	CO1: Recognise and understand the different software used for geomatics and its user-interface CO2: Apply the fundamental concepts to the maps to convert map projection and convert raster to vector CO3: Categorise an connect different type of map data, find errors and correct them CO4: Analyse, Compile and present the results in an effective manner CO5: Able to create the final map layout and represent the data in visual form CO6: Able to present the analyzed result into a meaningful way so as others to understand
7	Course Description	The lab would introduce the students to the geomatics software for making digital maps and performing analysis on the map and data manipulation. Any commercial (ArcGIS, MapInfo etc.,) or open-source software (QGIS or any other) shall be used, depending upon the availability.
8	Outline syllabus	
	Unit 1	**Introduction to the software**
		Introduction to the GIS software, Installation, details User-interface and data storage format
	Unit 2	**Geo-referencing and Spatial Data Capture**
		Bring the paper map to the GIS system, geo-referencing the map, converting the map to digital form by vector data capture and importing the digital surveyed data and incorporating the same to the digital map

	Unit 3	**Building Spatial Databases**		
		Map cleaning, editing and topology building, Link the field collected and captured data to the map		
	Unit 4	**Query Building and Analysis**		
		Build spatial and non-spatial query using SQL, perform different type of analysis and data manipulations		
	Unit 5	**Data representation and Visualisation**		
		Make the final map layout and represent the data in visual form to visualize the data presented for everybody to understand		
	Mode of examination	Practical and Viva		
	Weightage Distribution	CA	MTE	ETE
		60%	0%	40%
	Text book/s*	Lab Manual		
	Other References	-		

School: SET		**Batch : 2020-24**	
Program: B.TECH		**Current Academic Year: 2022-23**	
Branch: CE		**Semester: V**	
1	Course Code	CVL404	Course Name: ENVIRONMENTAL ENGINEERING-II
2	Course Title	ENVIRONMENTAL ENGINEERING-II	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Elective	
5	Course Objective	This course is aimed at teaching students the concept and design of various unit operations involved in municipal wastewater treatment. The concepts and design of biological processes is emphasized. The course also covers the design of sewer network for conveyance of wastewater from homes to the treatment plant.	
6	Course Outcomes	CO1: Characterize municipal wastewater, calculate its BOD and describe its microbiology; differentiate between different types of reactors, choose the appropriate reactor for given unit operation and propose a process flow sheet. CO2: Design primary and secondary suspended growth processes; compute various design parameters and compare the various modifications of ASP, design aerated lagoons, oxidation ditches CO3: Design attached growth systems such as tricking filters and RBCs, compare and contrast between various biological treatment operations. CO4: Design anaerobic digesters and compare anaerobic and aerobic treatment processes, describe tertiary treatment, evaluate various sustainability options for an STP. CO5: Describe the sewage collection systems, calculate sewage discharges and design sewers. CO6: Characterize wastewater, design wastewater treatment and conveyance systems.	
7	Course Description	This course prepares the students for understanding of wastewater treatment design and conveyance. Concept of reactors and biological treatment are introduced to augment the students' understanding of unit operations and treatment schemes. The course also prepares the students for evaluating the sustainability options and advanced wastewater treatment processes.	
8	Outline syllabus		
	Unit 1	**Introduction**	
	A	Wastewater Characteristics and composition	

	B	Wastewater Microbiology and BOD Kinetics		
	C	Reactor design, process flow sheet, STP design considerations		
	Unit 2	**Treatment process-I**		
	A	Primary treatment processes		
	B	Biological Treatment processes and deign considerations		
	C	Design of Suspended Growth systems: Activated Sludge Process, waste stabilization ponds and ditches, Aerated lagoon		
	Unit 3	**Treatment process-II**		
	A	Theory of attached growth		
	B	Design of attached growth systems: Trickling filter		
	C	Rotating Biological Contactors (RBC)		
	Unit 4	**Treatment process-III**		
	A	Anaerobic treatment, digester design		
	B	Tertiary treatment, Sustainable wastewater treatment		
	C	STP layout and design		
	Unit 5	**Wastewater Conveyance**		
	A	Wastewater collection and discharge estimation		
	B	Sewer: types, materials, joints and appurtenances		
	C	Flow in full or partially full sewers, sewer design		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Metcalf and Eddy Inc.: Wastewater Engineering, Tata McGraw Hills		
	Other References	2. Peavy, H.S., Rowe, D.R. and Tchobanoglous , G "Introduction to Environmental Engineering" McGraw Hill. 1986 3. S.K.Garg: Sewage Disposal and Air Pollution Engineering (Environmental Engineering Vol. – II), Khanna Publishers 4. Steel and McGhee: Water Supply and Sewerage, PHI 5. Masters, G.M., "Introduction to Environmental Engineering and Science" Prentice Hall Of India.1998 6. Hammer and Hammer, "Water and Wastewater Technology", Prentice Hall of India. 1998, 7th ed.		

		7. CPHEEO, "Manual on sewerage and sewage Treatment", Bureau of Indian Standards, CPHEEO. 1999 1. Karia and Christian, "Wastewater Treatment: Concepts and design approach", Prentice Hall of India.

School: SET		**Batch :** 2020-24
		Current Academic Year: 2022-23
		Semester: 6th
1	Course Code	**ARP 302**
2	Course Title	Campus to Corporate
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
5	Course Objective	To enhance holistic development of students and improve their employability skills. Provide a 360 degree exposure to learning elements of Business English readiness program, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a will have entered the threshold of his/her 4th phase of employability enhancement and skill building activity exercise.
6	Course Outcomes	CO1: Understanding basics of Human Resources CO2: Role Clarity | KRA | KPI | Understanding JD CO3: Conflict Management CO4: Art of Communication - Verbal CO5: Understanding Personal Branding CO6: Relationship Management | Verbal Abilities-4
7	Course Description	This penultimate stage introduces the student to the basics of Human Resources. Allows the student to understand and interpret KRA | KPI and understand Job descriptions. A student also understands how to manage conflicts, brand himself/herself, understand relations and empathise others with level-4 of quant, aptitude and logical reasoning
8	Outline syllabus – ARP 302	
	Unit 1	**Ace the Interview**
	A	HR Sensitization (Role Clarity | KRA | KPI | Understanding JD) | Conflict Management
	B	Mock Interviews| GD's| Extempore |JAM| Impromptu speeches| Personal Branding
	C	Empathy VS Sympathy | Relationship Management | Verbal Abilities-4
	D	Resume/ CV Writing | Sentence Correction –Spotting error | Synonyms & Antonyms
	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**

	A	Sitting Arrangement & Venn Diagrams | Puzzles | Distribution | Selection
	B	Direction Sense | Statement & Conclusion | Strong & Weak Arguments
	C	Analogies, Odd One out | Cause & Effect
	Unit 3	**Quantitative Aptitude**
	A	Average , Ratio & Proportions, Mixtures & Allegation
	B	Geometry-Lines, Angles & Triangles
	C	Problem of Ages | Data Sufficiency - L2
	Weightage Distribution	(CA)Class Assignment/Free Speech Exercises / JAM – 60% | (ETE) Group Presentations/Mock Interviews/GD/ Reasoning, Quant & Aptitude – 40%
	Text book/s*	Wiley's Quantitative Aptitude-P Anand | **Quantum CAT – Arihant Publications | Quicker Maths- M. Tyra |** Power of Positive Action (English, Paperback, Napoleon Hill) | Streets of Attitude (English, Paperback, Cary Fagan, Elizabeth Wilson) The 6 Pillars of self-esteem and awareness – Nathaniel Brandon | Goal Setting (English, Paperback, Wilson Dobson

School: SET		**Batch : 2020-24**	
Program: B.TECH		**Current Academic Year: 2022-23**	
Branch: CE		**Semester: VI**	
1	Course Code	CVL329	Course Name: DESIGN OF BASIC CONCRETE STRUCTURE
2	Course Title	DESIGN OF BASIC CONCRETE STRUCTURE	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status	Core	
5	Course Objective	This course will provide students an understanding and ability to analyse and design reinforced concrete structural elements for both serviceability and ultimate limit states. This course provides an introduction to Working Stress method of design. Students will be exposed to the complete analysis and design procedures for beams, slabs, and columns, based on Indian Standards for flexure, shear and torsion loading. Students will also be exposed to the use of Indian Standards and Design Aids.	
6	Course Outcomes	CO1: Identify the different types of structural members and load acting on it.Recognizethe combination of load as per IS-456-2000. CO2: Analyze and design members to meet collapse and serviceability requirements as per IS456:2000. CO3: Design the cross section of rectangular and flanged beams to resist flexure, shear and torsion and study the flexural, shear and torsional behaviour of rectangular beams experimentally. CO4: Design simple slabs subjected to flexure and shear. CO5: Design short columns subjected axial and bending loads and studyitsbehaviour experimentally CO6:. To give complete detailing of the designed RCC structure.	
7	Course Description	This course is for analysis and design of basic concrete structural component like Beam, column, slab and foundation.	
8	Outline syllabus: Structural design of basic component of structure.		
	Unit 1	**Limit State of Collapse - Flexure**	
	A	Introduction of Philosophies of Design by Limit State Method	
	B	Analysis and design of Singly Reinforced Rectangular Beam	
	C	Analysis and design of Doubly Reinforced Rectangular Beam	
	Unit 2	**Flanged Beams**	
	A	Introduction of Flanged beam	

	B	Flanged Beams T-L beam		
	C	Design of T and L beam.		
	Unit 3	**Design for Shear, Bond, Anchorage, Development Lengthand Torsion**		
	A	Limit State of Collapse in Shear		
	B	Bond, Anchorage, Development Length		
	C	Torsion in Beams		
	Unit 4	**Reinforced Concrete Slab**		
	A	Introduction of slab		
	B	Design of One-way Slabs		
	C	Design of Two-way Slabs		
	Unit 5	**Design of Compression Members**		
	A	Definitions, Classifications, Guidelines andAssumptions for ShortAxially Loaded Compression Members		
	B	Design of Short Columns under Axial Load with Uniaxial Bending		
	C	Design of Short Columns under Axial Load with Biaxial Bending.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Sinha, S.N. (2002). *Reinforced Concrete Design*, Tata McGraw-Hill Education Private Limited, New Delhi.		
	Other References	1. Indian standard on "*PLAIN AND REINFORCED CONCRETE -CODE OFPRACTICE*," Bureau of Indian Standard, 2000 – IS456:2000 2. Indian standard on "*CODE OF PRACTICE FOR DESIGN LOADS*," Bureau of Indian Standard, IS875:1987 (Parts I, II & III). 3. Special Publication on "*DESIGN AIDS FOR REINFORCED CONCRETE TO IS:456-1978*," SP16:1980, Bureau of Indian Standard. 4. Neville, A.M., Brooks, J.J. (1987). "*Concrete Technology*", Pearson Education. 5. 5.Unnikrishna Pillai, S, Devdas Menon (2003). "*Reinforced Concrete Design*",Tata McGraw-Hill Education Private Limited. 6. Varghese, P.C. (2004). "*Limit State Design of Reinforced Concrete*", PHILearning Private Limited.		

School: SET		**Batch : 2020-24**	
Program: B.TECH		**Current Academic Year: 2022-23**	
Branch: CE		**Semester: VI**	
1	Course Code	CVL330	Course Name: INTRODUCTION TO TRANSPORTATION ENGINEERING
2	Course Title	INTRODUCTION TO TRANSPORTATION ENGINEERING	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core	
5	Course Objective	To develop knowledge of Highway Geometric Design and to formulate the fundamental principles of traffic flow, traffic characteristic measurements and their interpretation for infrastructure changes or development. To develop an understanding of highway materials, including basic test on bitumen and design of highway pavements.	
6	Course Outcomes	CO1: Explain different road development plans, select the appropriate materials for use in different road layers CO2: Describe geometric design fundamentals in relation to safety and driver comfort, focusing on horizontal and vertical alignment CO3: Design the geometric curves of a road pavement, performing the traffic studies necessary before making changes to or designing new road infrastructure CO4: Designing traffic signal timings for junctions, perform test on stone aggregate and bitumen CO5: Understand different materials used in pavement design, Design highway pavements, CO6: To develop knowledge of Highway Geometric Design and to formulate the fundamental principles of traffic flow, traffic characteristic measurements	
7	Course Description	Development of transportation in India, different road plans, cross sectional elements, stopping sight distance, overtaking sight distance, design of vertical and horizontal elements of road, traffic studies, different highway materials and their design.	
8	Outline syllabus		
	Unit 1	**Introduction**	
	A	Overview of transportation system, Transportation modes, importance of roads	
	B	scope of highway engineering, importance of transportation planning,	
	C	Development of transportation in India and different road plans, introduction to highway elements	
	Unit 2	**Highway Geometric Design**	

	A	Cross sectional elements, traffic separators, road margins,		
	B	Stopping sight distance, overtaking sight distance, overtaking zones,		
	C	Super elevation, transition curves, design of vertical element;		
	Unit 3	**Traffic engineering**		
	A	Vehicle characteristics, human characteristics, traffic studies, presentation of traffic volume data, speed studies, spot speed studies, speed and delay studies, o&d studies		
	B	Traffic manoeuvres, traffic capacity studies, PCU, parking studies, accident studies and records		
	C	Relationship between travel time-capacity-volume-density-speed, road markings and signings, signal design		
	Unit 4	**Highway Materials**		
	A	Soil classifications, evaluation of soil strength		
	B	Stone aggregates, tests on bitumen		
	C	Design of bitumen mixes		
	Unit 5	**Design of Highway Pavements**		
	A	Types of pavement structure, design factors		
	B	Design of flexible pavements, California bearing ratio method		
	C	Design of Rigid Pavements		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	Highway Engineering by Khanna and Justo		
	Other References	1. The Handbook of highway engineering–T.F.Fwa (Editor), National University of Singaopre, Singapore, CRC Press 2. Transportation Engineering: An Introduction 3rd Edison, C. Jotin Khisty and B Kent Lall 3. American Association of State Highway and Transportation Officials (1990), A Policy on Geometric Design of Highways and Streets, AASHTO, Washington, DC.		

School: SET		**Batch : 2020-24**
Program: B.TECH		**Current Academic Year: 2021-22**
Branch: CE		**Semester: VI**
1	Course Code	CVL436 | Course Name: CONSTRUCTION ENGINEERING MANAGEMENT
2	Course Title	CONSTRUCTION ENGINEERING MANAGEMENT
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	Course Status	Core
5	Course Objective	The objective of this Course is to introduce students to the basics of construction engineering and management and to prepare students for entry level management positions in construction industry.
6	Course Outcomes	CO1:Describe the concepts of basic elements of management in construction industry. CO2:Apply the concepts of Material Management in construction industry. CO3: Apply the concepts of safety management in construction industry. CO4:Apply the concepts of Equipment management in construction industry. CO5:Apply the knowledge of planning and scheduling activities in construction industry. CO6: the broad principles and concepts of construction management
7	Course Description	The students will learn the basics elements of management, the concepts of material management, the activities involved in safety management, various activities in equipment management and the knowledge of planning and scheduling various activities in an construction site.
8	Outline syllabus	
	Unit 1	**Elements of Management**
	A	Project Cycle, Organization, Planning
	B	Scheduling, Monitoring and updating
	C	Management System in Construction
	Unit 2	**Material Management**
	A	Scope, Objective and functions of material management.
	B	Procurement and store management
	C	Materials handling management, Inventory control and management, Disposal of Surplus Materials
	Unit 3	**Safety Management**

	A	Causes, classification, cost and measurement of an accident		
	B	safety programme for construction, protective equipment, accident report.		
	C	safety measures: (a) For storage and handling of building materials. (b) Construction of elements of a building (c) In demolition of buildings		
	Unit 4	**Equipment Management**		
	A	Productivity, operational cost, owing and hiring cost		
	B	Constriction equipment: Earth moving, Hauling equipments, Hoisting equipments.		
	C	Conveying Equipments, Concrete Production equipments, Tunneling equipments.		
	Unit 5	**Construction Planning**		
	A	Need of construction planning		
	B	Constructional Resources, construction team, stages in construction, preparation of construction schedule		
	C	Job layout, inspection and quality control.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. . Robert L. Peurifoy, Clifford J., Schexnayder, AviadShapira “Construction Planning Equipment and Methods” McGraw Hills Education (India), Private Ltd.,New Delhi.		
	Other References	1. Mangement Machines and Methods in Civil Engineering-John,Christan, John Wiley and Sons.		

School: SET		**Batch : 2020-24**
Program: B.TECH		**Current Academic Year: 2022-23**
Branch: CE		**Semester: VI**
1	Course Code	CVP397
2	Course Title	TECHNICAL SKILLS ENHANCEMENT COURSE - 2
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Core
5	Course Objective	To apply the concepts of environmental engineering, geo-technical engineering and transportation engineering through various experiments.
6	Course Outcomes	CO1: To apply the procedure of evaluating physical water quality parameters. CO2: To apply the procedure of evaluating chemical water quality parameters. CO3: Apply knowledge of transportation engineering in various experiments CO4: Apply knowledge of geo-technical engineering in various experiments CO5: Apply knowledge of geo-technical engineering in various experiments CO6: To apply the concepts of environmental engineering, geo-technical engineering and transportation engineering through various experiments
7	Course Description	Practical based physical water quality parameters, chemical water quality parameters, experiments based on transportation engineering and geo-technical engineering.
8	Outline syllabus	
	Unit 1	**Environmental Engineering - Physical water quality parameters**
		Exp 1- determination of total solids, total dissolved solids and total suspended solids of a water sample. Exp 2- determination of turbidity of water sample and determination of residual chlorine of a water sample.
	Unit 2	**Environmental Engineering - Chemical Water quality parameters.**
		Exp 3 - determination of chloride content of a water sample Exp 4 - determination of optimal coagulant dose.
	Unit 3	**Transportation Engineering**
		Exp 5: Determination of Flash and fire point of bitumen, ductility of bitumen, penetration of bitumen as per IS: 1203-1978

		Exp 6: To determine the CBR by conducting load penetration test. Exp 7: To determine specific gravity of Bitumen Exp 8: To determine the marshall stability of bitumen mixture.		
	Unit 4	**Geo-Technical Engineering**		
		Exp 9: To determine natural moisture content of soil sample by calcium carbide method and oven dry method. Exp 10: To determine liquid limit and plastic limit of soil.		
	Unit 5	**Geo-Technical Engineering**		
		Exp 11: To determine dry density of soil by Proctor compaction method.		
		Exp 12: Determine unconfined compressive strength of soil.		
		Exp 13: Determine the permeability of soil.		
	Mode of examination	Practical		
	Weightage Distribution	CA	MTE	ETE
		60%	0%	40%

School: SET		**Batch : 2020-24**	
Program: B.TECH		**Current Academic Year: 2022-23**	
Branch: CE		**Semester:**	
1	Course Code	CVL441	Course Name: Fundamentals of concrete technology
2	Course Title	Fundamentals of concrete technology	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Elective	
5	Course Objective	The objective of this Course is 1. To introduce different type of cements used for various purposes i.e. repairing work, mass construction, underwater construction etc. 2. To adopt suitable aggregate for specific construction work i.e. light weight concrete, polymer concrete, high performance concrete etc. 3. To understand the behaviour of various admixtures in mortar/concrete and their importance in various applications. 4. To learn the rheological and Hardened properties of concrete and factors affecting fresh properties of concrete. 5. To understand the IS recommendations for design Mix and quality control in construction work.	
6	Course Outcomes	After completion of the course, students will be able to: CO1: Choose suitable cement for specific construction work CO2: Prepare Design Mix of concrete and evaluate fresh properties CO3: Determine Mechanical properties and understand durability aspect of concrete CO4: Assessment of existing structures by using NDT CO5: Describe the concept of chemical admixtures in concrete CO6: Apply quality control measures in construction work	
7	Course Description	Types of cement, chemical composition, application of different type of cements. Classification and Characteristics of aggregates, function and applications of admixtures. Rheological properties, factor	

		affecting workability of concrete. Mechanical properties of concrete, special concrete and IS recommendation for DESIGN Mix and quality control.
8	Outline syllabus	
	Unit 1	**Introduction to Cement**
	A	Introduction, Tests on physical properties of cement.
	B	Sulphate resisting cement, Portland Pozzolana cements, Advantages of PPC, White cement, Expansive cements, High alumina cement, Special cements.
	C	**Water:** Qualities of water, Use of sea water for mixing concrete
	Unit 2	**Mix Design and Fresh Concrete**
	A	Basic considerations, Factors in the choice of mix proportions, Design of standard concrete mixes by IS method, Introduction to various design methods
	B	w/c ratio, Workability of concrete, Factors affecting workability of concrete, Measurement of workability using slump test, Compaction factor test, Flow test, Vee-Bee Test
	C	Segregation and Bleeding of concrete, Different types of mixers and vibrators, Process of concreting
	Unit 3	**Mechanical properties and Durability of concrete**
	A	Mechanical properties of concrete and their testing Compressive strength, Split tensile strength, Flexural strength, Curing of concrete,
	B	Factors influencing the strength of concrete, Shrinkage and creep of concrete, Fatigue & Impact strength of concrete
	C	Permeability and AAR, Carbonation, corrosion, acid attack, Fire resistance of concrete, Thermal properties of concrete,
	Unit 4	**Non-destructive testing of concrete, Hot weather concreting and Types of concrete**
	A	Rebound hammer test, Penetration resistance test, Pull-out test, Ultrasonic pulse velocity test
	B	Concreting in hot weather condition, RMC concrete as per IS 4926:2003
	C	Types of concrete: Introduction
	Unit 5	**Admixtures and Quality Control**
	A	Introduction, Functions of admixtures, Classification of admixtures, Accelerators, Retarders, Water reducing agents, Damp proofing, Water proofing admixture, Super-plasticisers, air entraining admixtures, Application of various admixtures
	B	Flaws in concrete and its remedial measures, Field control for quality of concrete, Factors causing variation in the quality of concrete,
	C	Quality management in concrete construction, Advantages of quality control

	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Shetty .M.S., " Concrete Technology, Theory and Practice", Revised Edition, S. Chand & company Ltd., New Delhi,2006 2. Neville. A.M. , " Properties of Concrete", 4th Edition Longman		
	Other References	1. Metha P.K and Monteiro. P.J.M, " CONCRETE", Microstructure, Properties and Materials, Third Edition, Tata McGraw- Hill Publishing company Limited, New Delhi, 2006 3. Mindass and Young, " Concrete", Prentice Hall.		

School: SET		**Batch : 2020-24**
Program: BTech		**Current Academic Year: 2022-23**
Branch: CE		**Semester: VI**
1	Course Code	CVL332 | Course Name: GEOTECHNICAL ENGINEERING - II
2	Course Title	GEOTECHNICAL ENGINEERING - II
3	Credits	3
4	Contact Hours (L-T-P)	2-1-0
	Course Status	Elective
5	Course Objective	To provide knowledge of site investigation, selection of foundation types for design, allowable loads and permissible settlements of shallow and deep foundations, stability analysis of slope and soil improvement techniques.
6	Course Outcomes	CO1: Identify various methods of soil exploration to locate different thicknesses of soil strata. CO2: Analyze and design foundations with respect to settlements and stability. CO3: Design earth retaining walls and sheet pile walls according to Rankine and Coulomb theories. CO4: Calculate maximum allowable excavation depth and maximum slope inclination of embankment with respect to stability, hydraulic failure, and heave. CO5: Apply the techniques of ground improvement with enhanced engineering characteristics CO6: To provide knowledge of site investigation, selection of foundation types for design
7	Course Description	Introduction to different types of foundation, Soil Investigation, Bearing capacity, Shallow and deep foundations, Allowable and maximum differential settlements of buildings, Design and construction of well foundation, Retaining walls, Ground Improvement Techniques.
8	Outline syllabus	
	Unit 1	**Soil Investigation**
	A	Introduction, Soil Investigation, Planning for subsurface exploration
	B	Methods of exploration, Geophysical exploration, and Geological Investigations
	C	Soil sampling and samplers, In-situ tests, Common soil tests, Soil investigation report.
	Unit 2	**Shallow Foundations**
	A	Introduction, Types of shallow foundations, mechanism of load transfer, Modes of failure
	B	Terzaghi's bearing capacity theory, Computation of bearing capacity in soils
	C	Settlement of footings and rafts, Allowable and maximum differential settlements of buildings

	Unit 3	**Deep Foundations**		
	A	Introduction, Different types of foundations, Design methodology for piles		
	B	Calculation of pile capacity, Stresses in pile, Analysis of pile group, Settlement of pile group, Concept of negative skin friction		
	C	Design and construction of well foundation, Tilt and shift, Remedial measures during sinking of well foundation.		
	Unit 4	**Retaining Walls**		
	A	Type of retaining walls, Proportioning of retaining walls		
	B	Lateral earth pressure on Retaining walls, Stability checks: overturning, sliding, bearing capacity		
	C	Different types of sheet pile walls, construction methods		
	Unit 5	**Ground Improvement Techniques**		
	A	Principles of ground improvement, Mechanical densification		
	B	Drop hammer and compaction pile, Compaction of cohesive soils, pre-loading and vertical drains		
	C	Stone columns, Admixture stabilisation, Grouting, Geosynthetics, Dewatering.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	Principles of Foundation Engineering – Das, B.M. (PWS Publishing, California)		
	Other References	1. Foundation Analysis and Design – Bowles J.E. (McGraw Hill, 1994) 2. Soil Mechanics and Foundation Engineering – B.C. Punmia (S CHAND publishers) 3. Soil Mechanics and Foundation Engineering – Arora, K.R. (Standard publishers and distributors, New Delhi)		

School: SET		**Batch : 2020-24**	
Program: B.TECH		**Current Academic Year: 2023-24**	
Branch: CE		**Semester: VII**	
1	Course Code	CVL432	Course Name: ESTIMATION COSTING AND CONTRACT MANAGEMENT
2	Course Title	ESTIMATION COSTING AND CONTRACT MANAGEMENT	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Status		
5	Course Objective	This course aims to equip the students with current practices in cost and material estimates in addition to valuation practices and also makes the students familiar with different types of drawings used at site. It enlightens about the procedures of raising a bid and converting it to a contract along with the laws related to it.	
6	Course Outcomes	CO1. Distinguish between different types of estimates and building drawing and understand the technical specifications for various works to be performed for a project and how they impact the cost of a structure. CO2. Quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure and prepare bar bending schedule. CO3. Be able to understand how competitive bidding works and how to submit a competitive bid proposal and review contract documents in preparation for competitive bidding. CO4. Judge the tender notice and able to calculate the security money and earnest money. CO5. Know the powers of arbitrator and arbitration act. CO6. To apply current practices in cost and material estimates in addition to valuation practices	
7	Course Description	This course helps to understand all costs relating to building and civil engineering projects, from the initial calculations to the final figures. It gives scope to minimise the costs of a project and enhance value for money, while still achieving the required standards and quality.	
8	Outline syllabus		
	Unit 1	**Estimation and Building Drawing**	
	A	General items of work in Building – Standard Units Data for Estimates.	
	B	Types of estimate, Detailed, Revised, supplementary, Abstract and Approximate method of estimating. working drawings, site plan, layout plan, site selection and layout techniques, index plan, plinth area administrative approval and Technical Sanction	
	C	Standard Specifications, Specification for building works, Specification for earthworks for roads, canals, etc. Specification for other Civil Engineering works,	

	Unit 2	**Estimation of Buildings**		
	A	Detailed Estimates of foundation work, RCC work		
	B	Detailed Estimates of Brickwork, stonework, woodwork		
	C	Detailed estimate of types of different types of buildings		
	Unit 3	**Bar Bending schedule and Earthwork Estimation**		
	A	Reinforcement bar bending and bar requirement schedules.		
	B	Earthwork for roads		
	C	Earthwork for canals		
	Unit 4	**Analysis of Rate**		
	A	Analysis of Rates for earthwork, concrete works. D P C. Brickwork, stone masonry, Sanitary & water supply works, road works, etc.		
	B	Analysis of Rates for Sanitary & water supply works, road works, etc.		
	C	Analysis of Rates for plastering, pointing, road work, carriage of materials.		
	Unit 5	**Contracts and Arbitration**		
	A	Contracts, Contract Documents – Conditions of contract, Extension, Termination , and penalty		
	B	Tender, tender notice, tender form, Technical Bid, and Financial Bid, Earnest money, and Security money		
	C	Lift irrigation from surface and ground waters.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Dutta B.N. Estimating and Costing, UBS publishers, 2000. 2. Gurcharan Singh and Jagdish Singh, Estimating costing and valuation, Standard Publishers, 2011. 3. Shah M.H and Kale C.M, Principles of building drawing Tata Mc Graw Hill Publishing co. Ltd., New Delhi		
	Other References	1. Willy, Trench and Lee, Willy's Element of Quantity Surveying, Wiley-Blackwell, 2005 2. Standard Schedule of rates and standard data book by public works department. 3. Latest I.S. 1200 (Parts I to XXV: method of measurement of building and Civil Engineering works – B.I.S.) 4. National Building Code 2005. 5. Civil Engineering Drawing by NS Kumar; IPH, New Delhi		

School: SET		**Batch : 2020-24**	
Program: B.TECH		**Current Academic Year: 2023-24**	
Branch: CE		**Semester: VII**	
1	Course Code	CVL433	Course Name: DESIGN OF STRUCTURAL STEEL MEMBER
2	Course Title	DESIGN OF STRUCTURAL STEEL MEMBER	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Status	Core	
5	Course Objective	Structural Steel is one of the commonly used materials for construction of buildings, bridges and other structures. This course is about the design procedures for structural elements to withstand structural loads according to IS 875 and IS 800-2007. Objective of this course to get knowledge of design of tension members, compression members, flexural members and members subject to combined loading. Students will develop skills in use for the technical language of structural steel design.	
6	Course Outcomes	CO1: To study the design philosophy and identify the various loads and their combination. CO2: Design of connections (welds and bolts). Design of tension member. CO3: Examine the different types of compression members and design the steel members according to Indian Standards(IS 800-2007) CO4: Discuss the various types of flexural members and calculate their design loads and design as per IS800-2007. CO5: Discuss the need of foundation and learn to calculate their design loads and design Procedure. Design of basic parts of plate girders. CO6: Apply the concept of structural design in real world application	
7	Course Description	This course is for analysis and design of basic steel structural component and their connection like compression, tension, flexure member and foundation. Design of advance structure like plate girder.	
8	Outline syllabus: Structural design of basic component of steel structure.		
	Unit 1	**Introduction , Bolted Connection, Welded Connection and Tension Member**	
	A	Philosophies of Design by Limit State MethodDesign Philosophy as per IS 800 2007, IS 875 (Part- 1 to 5) 1987	
	B	Welded and Bolted connections	
	C	Tension members	
	Unit 2	**Compression Members**	

	A	Struts		
	B	Axially loaded columns		
	C	Built up columns by using batten		
	Unit 3	**Flexure members**		
	A	Introduction to flexure member		
	B	Laterally supported beam		
	C	Laterally supported beam		
	Unit 4	**Foundation**		
	A	Slab base		
	B	Gusset base		
	C	Design of slab base and gusset base		
	Unit 5	**Plate girder**		
	A	Introduction of plate girder.		
	B	Curtailment of web and flange.		
	C	Design of girder without stiffeners.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Duggal,S.K (2009) ."Design of steel structures" Tata McGraw Hills, Education Private Limited, New Delhi.		
	Other References	1. IS: 875-1987, "Code of practice for design loads"(Parts I-V). 2. IS800-2007, "Indian Standard Code of practice for general construction of steel. 3. Ramamrutham.S(2013). "Design of steel structure", Dhanpat Rai publishing Company(P) Ltd.		

School: SET		**Batch : 2020-24**
Program: B.TECH		**Current Academic Year: 2023-24**
Branch: CE		**Semester: VII**
1	Course Code	CVP433
2	Course Title	DESIGN OF STRUCTURAL STEEL MEMBER LAB
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Core
5	Course Objective	To apply the concepts of structural analysis and design in various engineering problems through the use of Design software (STAAD-Pro)
6	Course Outcomes	CO1: To adopt softwares for structural engineering problems. CO2: To perform the analysis of beams, frames and trusses using softwares. CO3: To perform the analysis and design of 2D buildings using softwares. CO4: To perform the analysis and design of 3D buildings using softwares CO5: To perform dynamic analysis using softwares and foundation design. CO6: To apply the concepts of structural analysis and design in various engineering problems through the use of Design software (STAAD-Pro)
7	Course Description	Subject consist of practical related to structural analysis and design using the use of design software (STAAD-Pro). Students will learn the use of STAAD-Pro in various structural engineering problems of analysis and design.
8	Outline syllabus	
	Unit 1	**Basics of Structural Analysis and STAAD-Pro**
		Exp 1- Introduction of Structural Analysis and Design. Exp 2- General Guidelines for Design, Model Editing Tools, Model Generation.
	Unit 2	**Analysis of Beams, frames and trusses**
		Exp 3 - Analysis of different type of beam for various loading Exp 4 - Analysis of Rigid Jointed plane frame and space Frame Exp 5: Modelling and Analysis of Trusses
	Unit 3	**Analysis and Design of 2D Buildings**
		Exp 6: Modelling, Static analysis and Design of 2D RCC Buildings Exp 7: Modelling, Static analysis and Design of 2D Steel Buildings
	Unit 4	**Analysis and Design of 3D RCC Buildings**

		Exp 8: Modelling, Static analysis and Design of 3D RCC Buildings Exp 9: Modelling, Static analysis and Design of 3D Steel Buildings		
	Unit 5	**Dynamic Analysis and Foundation Design**		
		Exp 10: Modelling, Analysis and Design of Multi-storey buildings subjected to Wind load and seismic loads		
		Exp 11: Foundation Design		
	Mode of examination	Practical		
	Weightage Distribution	CA	MTE	ETE
		60%	0%	40%

LIST OF DEPARTMENTAL ELECTIVES AND OPEN ELECTIVES

School: SET		**Batch : 2020-24**	
Program: B.TECH		**Current Academic Year: 2022-23**	
Branch: OE		**Semester: 6**	
1	Course Code	CVL440	Course Name: **Environmental Pollution Control**
2	Course Title	Environmental Pollution Control	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Elective	
5	Course Objective	To provide students an understanding of the various types of pollution and pollution control measures.	
6	Course Outcomes	On a successful completion of this course students will be able to: 1. Understand the different types of environmental pollutions and their impact. 2. Examine the quality of water and they will be able to take necessary control measures of water pollution 3. Students will be aware of various sources of Air pollution and their serious impact on humans and environment. 4. Use proper solid waste management and to understand the methods of soil pollution control 5. Understand the impact of noise on the humans and animals 6. Compile, analyze and formulate the concepts to address environmental pollution	
7	Course Description	Introduction, water pollution, Air pollution, Soil pollution, Noise Pollution	
8	Outline syllabus		
	Unit 1	**Introduction**	
	A	What is pollution	

	B	Types of pollution		
	C	Necessity of pollution control		
	Unit 2	**Water pollution**		
	A	Sources of water pollution, Environmental & health issues due to water pollution		
	B	Water Quality Standards		
	C	Water Treatment: primary, Secondary and Tertiary, Swimming pool, Domestic Water, self purification		
	Unit 3	**Air pollution**		
	A	Sources of air pollution, Environmental & health issues due to air pollution		
	B	Control measures, Particulate control equipment,		
	C	Control devices for Gaseous Pollutants		
	Unit 4	**Soil pollution**		
	A	Sources of soil pollution, Environmental & health issues due to soil pollution		
	B	Control measures,		
	C	Solid Waste Treatment: methods		
	Unit 5	**Noise pollution**		
	A	Sources of noise pollution		
	B	Environmental & health issues due to noise pollution		
	C	Control measures		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Other references	Environmental Engineering by Peavy, Rowe and Tchobanoglous, McGraw Hill		

School: SET	**Batch : 2020-24**
Program: B.TECH	**Current Academic Year: 2022-23**
Branch: OE	**Semester: 6**
Course Code	CVL438 Course Name: Sustainable development and environmental planning
Course Title	Sustainable development and environmental planning
Credits	3
Contact Hours (L-T-P)	3-0-0
Course Status	Open Elective
Pre-requisites	Basic understanding of environmental activities and aptitude of logical thinking.
Course objective	This course is aimed at planning and management of environment for sustainable human development. Recent key concepts such as emission trading and clean development mechanisms will be discussed in detail for achieving sustainability.
Course Outcome	CO1. Understanding of environmental planning, environmental management; discuss the key rules in environmental planning acts CO2. Classification of environmental resources; integrate economic and environmental accounts CO3. Design life cycle assessment strategy, Discuss key ideas of Kyoto Protocol; compare GHG abatement methods; assess emissions CO4. Describe CDM project cycle; explore secondary markets for emissions trading and discuss the future for emissions reduction and trading CO5. Formulate cleaner production process and design its key components; discuss sustainable development in social perspective CO6. Enumerate sustainable development in social perspective
Course Contents (Brief)	EPA, Motor vehicle act 1988, Life Cycle Assessment, Carbon Trading, Framework for Environmental planning and management, CDM Project cycle, environmental protocols, Sustainable development with cleaner production and process flow understanding**.**
Syllabus	
Module	**Topic(s)**

Unit 1 : Environmental Management	
UNIT 1	Importance of environmental planning and management
	What is Sustainable Development
	Legal framework for environmental planning; Motor vehicles Act, 1988
Unit 2 : Environmental Resources	
UNIT 2	Economic development
	Use of resources
	Life cycle assessment (LCA)
Unit 3 : Carbon Trading	
UNIT 3	Kyoto Protocol, emission trading
	Greenhouse gas abatement measures
	GHG markets
Unit 4: Clean Development Mechanism	
UNIT 4	CDM Project cycle
	Secondary market for emission trading
	India`s stand and CDM
Unit 5 : Clean Production	
UNIT 5	Cleaner Production
	Process flow diagram
	Social perspectives on sustainable development

Suggested texts and reference materials

1. TE Graedel, BR Allenby, Industrial Ecology and Sustainable Engineering, PHI.
2. TH Tietenberg, "Emission Trading: Principles and practice". RFF Press, 2006.
3. A D Ellerman, FJ Convery and C De, "Pricing carbon: The European Union
1. Emission Trading Scheme". Cambridge University Press, 2010.
4. D. Freestone and C Streck, "Legal Aspects of Carbon Trading" Kyoto
2. Copenhagen and beyond", OUP Oxford, 2009.
5. S M Patil, "Law on Environment".
6. MM Sulphey, Introduction to Environmental Management, PHI.

School: SET		**Batch : 2020-24**
Program: B.Tech		**Current Academic Year: 2022-23**
Branch: Civil Engineering		**Semester: 6**
1	Course Code	CVL601
2	Course Title	Industry 4.0 and Construction Engineering
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	Course Status	Elective
5	Course Objective	1. Understand the concept of Industry 4.0 and the drivers and enablers of Industry 4.0 2. Learn the basics of the Internet of things (IoT) and sensors 3. To provide students with an understanding of smart cities, sensors and integrating into better and quicker urban planning solutions 4. To evaluate the usage of BIM in smart buildings and construction for improved building performance 5. Understand the opportunities, challenges brought about by Industry 4.0 and how organisations and individuals should prepare to reap the benefits
6	Course Outcomes	After completion of this course, students will able to, CO1: Explain the concept of Industry 4.0 and its applications CO2: Identify various components of Industry 4.0 applications in the construction industry. CO3: Apply the concept of IoT to the civil engineering problem of smart cities CO4: Apply the concept of Information technology in constructing smarter buildings CO5: Analyze various methods by which Buiding Information modelling can help in smarter constructions CO6: Analyse how Industry 4.0 can help in building a better, efficient and safe construction
7	Course Description	The world is at the onset of the Fourth Industrial Revolution and this revolution is very much driven by the smarts in automating decision making and processes. Advancements in IT has resulted in immense improvements in computational power across nearly all electronic devices and enhanced capabilities in connecting the dots in an increasingly networked society. With automation becoming the norm of the new Industry revolution, this course provides comprehensive coverage on, among others, the role of data, sensors, automation in different segments of construction. The course would also discuss the Industry 4.0 technologies, applications and case studies. The opportunities and

		challenges brought about by Industry 4.0, and how organisations and knowledge workers can be better prepared to reap the benefits of this latest revolution, shall also be discussed.		
8	Outline syllabus			
	Unit 1	**Introduction**		
	A	Various Industrial Revolutions, Definition of Industry 4.0, Concept and benefits of Industry 4.0		
	B	Globalization and emerging issues, The Fourth Industrial Revolution, Smart and Connected Business Perspective		
	C	Industry 4.0 Drivers and Enablers, Barriers and Challenges		
	Unit 2	**Raod to Industry 4.0**		
	A	Basic concepts, Internet of things (IoT), Industrial Internet of things (IIoT) and Internet of services (IoS)		
	B	The basic requirement for Industry 4.0		
	C	Virtual and Augmented reality in Industry 4.0		
	Unit 3	**Smart Cities**		
	A	What are smart cities		
	B	Smart Cities Technologies – Network, devices, Data and Intelligence		
	C	Some case studies of implemented smart cities		
	Unit 4	**Smart Buildings**		
	A	Essential attributes of a smart building		
	B	IT in Building Systems		
	C	Data Analytics, monitoring conveyance systems and real-time location systems		
	Unit 5	**BIM and Smart Consruction**		
	A	Fundamentals of BIM and its potential benefits		
	B	Project Management for BIM and Improved Building Performance		
	C	Development of a BIM-based Building Management System		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Demystifying Smart Cities - Practical Perspectives on How Cities Can Leverage the Potential of New Technologies		

		Anders Lisdorf Published by Apress in 2020 ISBN-13 (pbk): 978-1-4842-5376-2 ISBN-13 (electronic): 978-1-4842-5377-9 https://doi.org/10.1007/978-1-4842-5377-9 Copyright © 2020 by Anders Lisdorf 2. Advanced Technology for Smart Buildings - James Sinopoli ISBN 13: 978-1-60807-865-3 © 2016 ARTECH HOUSE, 685 Canton Street Norwood, MA 020624. 3. Building Information Modelling, Building Performance, Design and Smart Construction MohammadDastbaz· ChrisGorse AliceMoncaster Editors ISBN 978-3-319-50345-5 ISBN 978-3-319-50346-2 (eBook) DOI 10.1007/978-3-319-50346-2 Library of Congress Control Number: 2017931959 © Springer International Publishing AG 2017
	Other References	Nil

School: SET		**Batch : 2020-24**	
Program: B.TECH		**Current Academic Year: 2022-23**	
Branch: CE		**Semester: 6**	
1	Course Code	CVL333	Course Name: MATRIX METHOD
2	Course Title	MATRIX METHOD	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Status	Elective	
5	Course Objective	The main objective is to expand the student's knowledge which was gained in basic structural analysis courses. This course is also expected to enable a good understanding of how students will be able to implement the methods for the analysis of indeterminate structures.	
6	Course Outcomes	CO1: Introduction of methods for matrix approach. CO2: Describe the method to generate stiffness matrix for different types of structural members. CO3: Discuss the method to generate flexibility matrix for different types of structural members. CO4: Apply stiffness method for the analysis of various structural members. CO5: Apply concept of flexibility method for the analysis of various structural engineering problems. CO6:Implement Matrix method for the analysis of indeterminate structures	
7	Course Description	Introduction to matrix approach, Various methods for analysis, Analysis of indeterminate beam and frames using matrix approach.	
8	Outline syllabus		
	Unit 1	**Introduction to Matrix Method**	
	A	Introduction to stiffness and flexibility	
	B	Stiffness coefficients for prismatic members	
	C	Use of Stiffness coefficient for formulation of equilibrium equation	
	Unit 2	**Stiffness Matrix**	
	A	Generation of stiffness matrix for beam	
	B	Generation of stiffness matrix for frame structures	
	C	Generation of stiffness matrix for truss structures	
	Unit 3	**Flexibility Matrix**	
	A	Generation of flexibility matrix for beam	
	B	Generation of flexibility matrix for frame structures	

	C	Generation of flexibility matrix for truss structures		
	Unit 4	**Analysis by Stiffness Method**		
	A	Analysis of continuous beams without settlement of supports by stiffness method		
	B	Analysis of continuous beams with settlement of supports		
	C	Analysis of continuous portal frames with and without settlement of supports		
	Unit 5	**Analysis by Flexibility Method**		
	A	Analysis of continuous beams without settlement of supports by stiffness method		
	B	Analysis of continuous beams with settlement of supports		
	C	Analysis of continuous portal frames with and without settlement of supports		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Structure Analysis A matrix Approach by G.S. Pandit, S.P. Gupta		
	Other References	**1.** Matrix Analysis of Framed Structures by William Weaver, Jr. James M. Gere **2.** Matrix Methods of Structural Analysis by S. S. Bhavikatti		

School: SET		**Batch : 2020-24**	
Program: B.TECH		**Current Academic Year: 2023-24**	
Branch: CE		**Semester: 7**	
1	Course Code	CVL428	Course Name: Advance Structure Design
2	Course Title	Advance Structure Design	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Elective	
5	Course Objective	The objective of this Course is to provide knowledge with more advanced coverage of various topics relating to the design of concrete and steel structures. The course will enhance the knowledge of various design methods and behaviour of material in plastic condition.	
6	Course Outcomes	CO1:Describe the concepts and parameters to be considered for the design of foundation and complete design of different types of foundations. CO2:Analysis and design of different types of retaining walls as Indian Standard Codes CO3: Study of working stress method and IS code for water Tank design; Design of water tanks with different base joints. CO4:Analyze and Design gantry girder to support moving loads. CO5:Study of plastic behavior of structural members; analysis of structures in plastic condition. CO6: Apply knowledge of various design methods and behavior of material in plastic condition.	
7	Course Description	Foundation, Retaining Walls, Water Tank and Domes, Gantry Girder Design, Plastic Analysis and Design	
8	Outline syllabus		
	Unit 1	**Design of Foundations**	
	A	Introduction	
	B	Design of Combined footing	
	C	Design of Pile and Pile Cap	
	Unit 2	**Design of Retaining Walls**	
	A	Analysis of cantilever retaining wall	
	B	Design of Heel and Toe slab	
	C	Design of Vertical stem	
	Unit 3	**Water Tank**	

	A	Circular tank on ground (with flexible connection with base)		
	B	Circular tank on ground (with rigid connection with base)		
	C	Dome		
	Unit 4	**Gantry Girder**		
	A	Introduction		
	B	Load Consideration		
	C	Design of Gantry Girder		
	Unit 5	**Plastic Analysis and Design**		
	A	Introduction to plastic analysis, Concept of Limit load analysis		
	B	Plastic analysis of beams using mechanism method		
	C	Plastic Design of Beams		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1.Sinha, S.N. (2002). Reinforced Concrete Design, Tata McGraw-Hill Education Private Limited, New Delhi. 2. Duggal, S.K." Design of steel structures" Tata McGraw Hills, 2009		
	Other References	1. Indian standard on "PLAIN AND REINFORCED CONCRETE -CODE OF PRACTICE," Bureau of Indian Standard, 2000 – IS456:2000 2. Unnikrishna Pillai, S, Devdas Menon (2003). "Reinforced Concrete Design", Tata McGraw-Hill Education Private Limited. 3. Varghese, P.C. (2004). "Limit State Design of Reinforced Concrete", PHI Learning Private Limited. 4. IS: 800 – 2007 "Use of Structural Steel in General Building Constructions", BIS. 5. Steel Table by BIS		

School: SET		**Batch : 2020-24**	
Program: B.TECH		**Current Academic Year: 2023-24**	
Branch: CE		**Semester: 7**	
1	Course Code	CVL434	Course Name: Irrigation Engineering & Hydraulic Structures
2	Course Title	Irrigation Engineering & Hydraulic Structures	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Elective	
5	Course Objective	The course encompasses the fundamental principles of hydraulic design of storage reservoirs, dams, barrages, canal head regulators, full capacity discharge, full supply level and longitudinal slope of different sections of canal, falls, head as well as cross regulators, cross-drainage structures, escapes etc. for canal network. This course covers everything from the selection of the water source all the way down to the farmers' field including drainage of irrigated land.	
6	Course Outcomes	CO1. Analyse rainfall and runoff data, synthesize hydrographs, estimate time required for irrigating a land, assess crop water requirement depending upon Delta, Duty, Base Period, etc. CO2. Conduct various surveys and investigations required for preparation of Feasibility Report of an irrigation project. CO3. Design appropriate irrigation water conveyance network comprising of canals in regime conditions as well as lined canals, various types of irrigation/hydraulic structures (falls, head regulators, cross regulators, canal escapes, irrigation outlets, etc.) commensurate with the location-specific topographical, geological, social, environmental, economic, political etc. constraints. CO4. Coordinate amongst agriculturists, soil scientists, agronomists, water resources planners, designers, and construction as well as maintenance engineers, adequately and effectively, in proper and scientific assessment of crop water requirement and availability of irrigation water from various sources and their optimal conjunctive uses. Assess requirement of exact machines and equipment for construction of irrigation structures. CO5. Apply professional and ethical skills required in planning of irrigation, engineering hydrology and integrated water resources development and management. CO6. To impart the knowledge of various irrigation techniques , requirements of the crop	

7	Course Description	This course is aimed at teaching students about the fundamentals of irrigation engineering to enable them to assess the spatial and temporal quantity of water required for irrigating a command area for various types of crops, spatial and temporal availability of surface and ground water, conduct surveys and investigations required for formulation of irrigation projects.		
8	Outline syllabus			
	Unit 1	**IRRIGATION**		
	A	Benefits, ill-effects, methods and status of development of irrigation in India. Functions of irrigation water in plant growth, Delta, Duty, Base period of crops.		
	B	Assessment of requirement of irrigation water for various crops, crop rotation. Depth and frequency of irrigation. Irrigation efficiencies.		
	C	Drainage of irrigated land. Command Area Development & Participatory Irrigation Management Programs.		
	Unit 2	**Surveys and Investigations**		
	A	Various surveys required for project formulation at feasibility and DPR stages.		
	B	Norms for topographical surveys for reservoir, dam, canal alignment, CD works.		
	C	Economic and Financial Feasibility of irrigation projects.		
	Unit 3	**Storage and Diversion Works I**		
	A	Components of storage and diversion works, various zones of storages in reservoirs.		
	B	Types of dams. Selection of site for location of reservoirs		
	C	Fundamental principles of design of gravity, earth, rock fill dams and foundations.		
	Unit 4	**Storage and Diversion Works II**		
	A	Building materials and procedures for construction of Diversion works.		
	B	Spillways and its type		
	C	Ground water Hydrology		
	Unit 5	**Canals and Lift Irrigation**		
	A	Components of canal work, Types of canals. Alignment of canals. Types of structures in canal network.		
	B	Design of canals in regime conditions, canal lining, design of lined canals.		
	C	Lift irrigation from surface and ground waters.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	G. L. Asawa, "Elementary Irrigation Engineering", New Age Publishers		

	Other References	1. Bharat Singh, ”Fundamentals of Irrigation Engineering” Nem Chand & Bros. Roorkee, 2. S.K.Garg “Irrigation Engineering and Hydraulic Structures”, Khanna Publishers, Delhi. 3. Sharma and Sharma, “Irrigation Engineering”, S. Chand Publishers, Delhi 4. B.C.Punmia and B.B.Lal,” Irrigation and Water Power Engineering”, Standard Publishers and Distributors, Nai sarak, Delhi. 5. A. M. Michael, “Irrigation Theory and Practice”, Second edition, Vikas Publishing House Pvt. Ltd., Sector-8, Noida (Distributors: UBS Publishers Distributors Pvt. Ltd.). 6. K. Subramanya, “Engineering Hydrology”, Tata McGraw-Hill Publishing Co. Ltd. New Delhi.

School: SET		**Batch : 2020-24**	
Program: B.TECH		**Current Academic Year: 2023-24**	
Branch: CE		**Semester: 7**	
1	Course Code	CVL323	Course Name: Railways, Airport & Harbor
2	Course Title	Railways, Airport & Harbor	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Elective	
5	Course Objective	To understand the concepts associated with the geometric design of railway engineering systems by introducing the concepts of permanent way design and to develop skills on airport and harbor engineering.	
6	Course Outcomes	CO1: Understand the development and planning in railways, rails and its functions, rail failure, rail creep, fixtures and fastenings, sleepers, ballast CO2: Geometric design fundamentals focusing on horizontal and vertical alignment CO3: Estimate length of transition curve in railways, Simple turnout design CO4: Discuss different components of harbor, various accessories used to anchorage the ships, navigational aids, coastal structures CO5: Understand development and planning in airways, Study different airport zones, calculate runway length, taxiway design CO6: To Perform the suggested activities individually or in team and have fundamental knowledge of modes of transportation	
7	Course Description	Introduction to railways, different components of railways, rails and its types, rail failure, Geometric design of railways, design of turnout, harbor, docks, ports, mooring accessories, development of airways in India, airport planning, runway design, taxiway design.	
8	Outline syllabus		
	Unit 1	**Introduction to Railways engineering**	
	A	Role of railways in transportation, historical development of railways, permanent way, gauges in railway tracks, typical railway track cross-section, coning of wheels	
	B	Function of rails, requirement of rails, types of rail	

		sections – comparison of rail types, length of rail, rail wear, rail failures		
	C	Creep of rails, rail fixtures and fastenings – Fish plates, spikes, bolts, chairs, and keys, bearing plates, sleepers, sleeper density, ballast		
	Unit 2	**Geometric design of railways**		
	A	Alignment, horizontal curves, super elevation, equilibrium, cant and cant deficiency		
	B	Length of transition curve, gradients and grade compensation.		
	C	Necessity of points and crossings, design of simple turnout, principle of signaling, mechanical devices for inter locking		
	Unit 3	**Harbor Engineering**		
	A	Definition of Terms- Harbors, Ports, Docks, Tides and Waves, Littoral Drift, Sounding, Littoral Transport with Erosion and Deposition		
	B	Navigational Aids, Coastal Structures- Piers, Break waters, Wharves, Jetties, Quays, Spring Fenders		
	C	Mooring Accessories, Types of docks, locks and lock gates		
	Unit 4	**Airport planning**		
	A	History and development of Air transport , advantages and disadvantages		
	B	Airport Planning – regional planning, factors affecting site selection, surveys for site selection, airport classification		
	C	Airport obstructions: zoning laws, classification of obstructions, imaginary surfaces, approach zone, turning zone		
	Unit 5	**Runway Design**		
	A	Orientation, Cross wind Component, Wind rose Diagram ,Geometric Design and Corrections for Gradients		
	B	Taxiway Design – Geometric Design Elements		
	C	Minimum Separation Distances, Design Speed, Airport Drainage, runway and taxiway markings		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%

	Text book/s*	1. Arora and Saxena; Railway Engineering by, Dhanpat Rai Publications (P) Ltd, New Delhi. (2006) 2. Rangawala ; airport engineering by, Charotar publishing house Pvt ltd. 3. Aggarwal M.M & Satish Chandra; Railway Engineering, Oxford University Press(2000). 4. R Srinivasa Kumar ,Transportation Engineering,University press
	Other References	1. J.S. Mundrey, "A course in Railway Track Engineering". Tata McGraw Hill, 2000 2. Robert Horenjeff; Planning and Design of Airports (2nd edition), McGraw Hill Book Co

School: SET		**Batch : 2020-24**	
Program: B.TECH		**Current Academic Year: 2023-24**	
Branch: CE		**Semester: 7**	
1	Course Code	CVL435	Course Name: INTRODUCTION TO PRESTRESSED CONCRETE DESIGN
2	Course Title	INTRODUCTION TO PRESTRESSED CONCRETE DESIGN	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Elective	
5	Course Objective	1. To develop an understanding of prestressed concrete, its general principles and various methods of pre-stressing. 2. To adopt various methods used in analysis of stresses and design the end-zone reinforcement. 3. The learn the types of losses and measure the deflection of prestressed members. 4. To understand the IS recommendations for design for flexure, shear and torsion. 5. To adopt the IS recommendations for designing of pre-stressed and post-stressed members.	
6	Course Outcomes	CO1: Describe the concepts of prestressing concrete, general principles and methods of pre-stressing. CO2: Analyze the stresses developed in the member during stressing by various methods and design the end-zone reinforcement. CO3: Calculate the losses due to prestress and the deflection in members due to pre-stressing. CO4: Design the sections for Flexure, Shear and Torsion as per Indian standard recommendation. CO5: Design various pre-stressed and post-stressed members as per Indian standard recommendations. CO6: To design prestressed concrete structures	
7	Course Description	Introduction to prestressing, elastic analysis and transfer of prestress, loss in prestress, short-term and long-term deflections in prestressed members, design of sections for flexure, shear and torsion., design of pre-tensioned and post-tensioned members as per Indian Standard recommendations and introduction to composite sections.	
8	Outline syllabus		
	Unit 1	**Introduction**	
	A	Historic development, General principles, Advantages and limitations	
	B	Materials and Indian Standard recommendations	
	C	Methods and Systems of Pre-stressing	
	Unit 2	**Elastic Analysis and Transfer of Prestress**	
	A	Elastic analysis of prestressed concrete beams with different cable profiles	

	B	Transfer of pre-stress in pre-tensioned members and end zone reinforcement		
	C	Anchorage zone stresses and end zone reinforcement as per Indian Standard.		
	Unit 3	**Loss of Prestress and Deflection**		
	A	Short term and long-term losses		
	B	Factors influencing deflections and its control		
	C	Short term and long-term deflections of uncracked members		
	Unit 4	**Design for Flexure, Shear and Torsion**		
	A	Kern Zone, allowable stresses and design criteria as per Indian Standards		
	B	Elastic design for Flexure		
	C	Elastic design for Shear and Torsion		
	Unit 5	**Design of Pre-Stressed Members**		
	A	Design of Pre-Tensioned members		
	B	Design of Post-Tensioned Members		
	C	Introduction to Composite Sections and differential shrinkage		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Krishna Raju, N., "*Prestressed Concrete*," Tata McGraw-Hill Publishing Company Limited, 2012		
	Other References	1. Rajagopalan, N., "Prestressed Concrete," Narosa publishing house, 2013. 2. Indian standard on "CODE OF PRACTICE FOR PRESTRESSED CONCRETE," Bureau of Indian Standard, 2003 – IS 1343:2012		

School: SET		**Batch : 2020-24**	
Program: B.TECH		**Current Academic Year: 2023-24**	
Branch: CE		**Semester:7**	
1	Course Code	CVL417	Course Name: Sustainable Development
2	Course Title	Sustainable Development	
3	Credits	2	
4	Contact Hours (L-T-P)	2-0-0	
	Course Status	Elective	
5	Course Objective	The objective of this course is to put the understanding into practice, changing our unsustainable ways into more sustainable ones. The aim of sustainable development is to balanceeconomic, environmental and social needs, allowing prosperity for now and future generations.	
6	Course Outcomes	CO1: Understand the importance of environment, sustainable development and its need CO2: Identify the causes in climate change and how to save the environment CO3: Describe the various laws and abatements for the safety of environment CO4: Understand the CDM project cycle and secondary market for emission trading CO5: Describe the cleaner production, process flow diagram and zero waste	
7	Course Description	Environment and Governance, Sustainable development and environment, Need of sustainable development, Climate change & alternative energies, Over-use of natural resources – overpopulation, deforestation, water shortage & overfishing, How we can live more sustainably, Kyoto Protocol, Greenhouse gas abatement, Carbon trading, CDM Project cycle, Secondary market for emission trading, Kyoto protocol and Post Kyoto era, Cleaner Production, Process flow diagram, Zero Waste, Social perspectives of Sustainable development	
8	Outline syllabus		
	Unit 1	**Sustainable development**	
	A	Environment and Governance	
	B	Sustainable development and environment	
	C	Need of sustainable development	
	Unit 2	**Climate change**	
	A	Climate change & alternative energies	

	B	Over-use of natural resources – overpopulation, deforestation, water shortage & overfishing		
	C	How we can live more sustainably		
	Unit 3	**Carbon Trading**		
	A	Kyoto Protocol		
	B	Post Kyoto era		
	C	Carbon trading		
	Unit 4	**Emission trading**		
	A	CDM Project cycle		
	B	Secondary market for emission trading		
	C	Greenhouse gas abatement		
	Unit 5	**Clean Production**		
	A	Cleaner Production, Process flow diagram		
	B	Zero Waste		
	C	Social perspectives of Sustainable development		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. TE Graedel, BR Allenby, Industrial Ecology and Sustainable Engineering, PHI. 2. TH Tietenberg, "Emission Trading: Principles and practice". RFF Press, 2006.		
	Other References	1. A D Ellerman, FJ Convery and C De, "Pricing carbon: The European UnionEmission Trading Scheme". Cambridge University Press, 2010. 2. D. Freestone and C Streck, "Legal Aspects of Carbon Trading" KyotoCopenhagen and beyond", OUP Oxford, 2009. 3. S M Patil, "Law on Environment". 4. MM Sulphey, Introduction to Environmental Management, PHI.		

School: SET		**Batch : 2020-24**	
Program: BTech		**Current Academic Year: 2023-24**	
Branch: Civil		**Semester:7**	
1	Course Code	CVL426	Course Name : Management of Disasters
2	Course Title	MANAGEMENT OF DISASTERS	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Professional Elective	
5	Course Objective	1. To understand the various types of disasters and their impact. 2. To develop an understanding of why and how the modern disaster management is involved with Pre-Disaster and Post-Disaster Activities. 3. Agencies involved in Disaster Management in India. 4. Application of Technology.	
6	Course Outcomes	CO1: Understand the key concepts of a Disaster. CO2:Identify the various types of disasters that can occur. CO3:Develop a basic under understanding of Prevention, Mitigation, Preparedness, Response and Recovery. CO4:Learn the Disaster Management Organisation of India and working of various National Disaster Management Agencies. CO5: Develop an understanding of Application of Science and Technology in Disaster Management. CO6:To understand conceptual understanding of disasters and its relationships with development.	
7	Course Description	Introduction to disasters, Types of disasters, Disaster management cycle and framework, Disaster Management in India, Disaster Management Act and Guidelines, Application of Science and Technology for Disaster management and Mitigation, Case studies about various disasters.	
8	Outline syllabus		
	Unit 1	**Introduction**	
	A	Concept and definition of Disaster, Hazard, Vulnerability	
	B	Risk, Capacity – Disaster and Development	
	C	Disaster management history.	
	Unit 2	**Types of Disaster**	
	A	Geological Disasters	
	B	Hydro-Meteorological Disasters	

	C	Technological Disasters		
	D	Biological Disasters		
	E	Man-made Disaster		
	Unit 3	**Disaster Management Cycle and Framework**		
	A	Disaster Management Cycle		
	B	Pre-Disaster – Risk Assessment and Analysis		
	C	Prevention and Mitigation of Disasters		
	D	Early Warning System		
	E	Post-disaster – Damage and Needs Assessment		
	Unit 4	**Disaster Management in India**		
	A	Disaster Profile of India		
	B	Mega Disasters of India and Lessons Learnt		
	C	Disaster Management Act		
	D	National Disaster Management Plan		
	E	Role of National Agencies		
	Unit 5	**Applications of Science and Technology**		
	A	GIS		
	B	GPS		
	C	Remote Sensing		
		Total Hours		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Coppola D P, 2007. Introduction to International Disaster Management, Elsevier Science (B/H), London. 2. "Disaster Management in India", Ministry of Home Affairs, Government of India. 3. "Disaster Management Act", Ministry of Home Affairs, Government of India. 4. "Disaster Management Plan of India", Ministry of Home Affairs, Government of India.		
	Other References			

School: SET		**Batch : 2020-24**	
Program: B.TECH		**Current Academic Year: 2023-24**	
Branch: CE		**Semester: 8**	
1	Course Code		Course Name: Earthquake Engineering
2	Course Title	Earthquake Engineering	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Elective	
5	Course Objective	The objective of this course is to study the basic concepts of Earthquake engineering, seismological activity of the earth in response to sub-surface strata, plate tectonics, faults, waves Induced by earthquakes, and size of earthquakes, liquefaction phenomenon.	
6	Course Outcomes	CO1: Understand the basic concepts of earthquake engineering and the facts related to earthquakes, Define the tectonic plate theory, different plates and its movement CO2: Explain plate boundaries, concept of elastic rebound theory CO3:Discuss the earthquake hazards and different types of seismic waves occurred after an earthquake CO4: Discuss the various types of seismic inputs and different methods to analyze a building seismically. CO5: Design of shear wall, ductility capacity and retrofitting techniques for different types of buildings	
7	Course Description	Introduction to Earthquake, basic terminologies, Earth and its interior, plate tectonic theory, faults and its types, Elastic rebound theory, types of seismic waves, seismic inputs, zoning of India, design of shear wall, retrofitting strategies for RCC and masonry building.	
8	Outline syllabus		
	Unit 1	**Introduction**	
	A	Introduction to Earthquakes, Causes of earthquakes, basic Terminology, Magnitude, Intensity	
	B	Introduction to Seismology, Earth and its interior	
	C	Theory of Plate Tectonic, Plate Margins and Earthquake occurrences, The Movement of Indian Plate	
	Unit 2	**Faults and Plate boundaries**	
	A	Fault, Different Faults Type, Introduction to Plate Boundaries, Types of Plate Boundaries, Examples of Plate Boundaries	

	B	Elastic Rebound Theory, Earthquake Hazards		
	C	Seismic Waves, Types of Seismic waves, Primary Waves, Secondary waves, Surface Waves, Rayleigh Waves, Love waves, Wave Parameters, Detection		
	Unit 3	**Seismic inputs & IS code method of seismic analysis**		
	A	Time history, fourier spectrum, power spectral density function, design response spectrum		
	B	Seismic co-efficient method and its limitation, I. S. code provision for seismic (static) analysis of buildings		
	C	Seismic Zoning Map of India		
	Unit 4	**Past earthquakes and shear wall**		
	A	Damages during past earthquakes and remedial measures		
	B	Allowable ductility demand, Ductility capacity, Reinforcement detailing for members and joints		
	C	Introduction to shear wall, Elements of shear wall, position of shear wall		
	Unit 5	**Seismic Evaluation and Retrofitting**		
	A	Introduction, components of seismic evaluation Methodology		
	B	Seismic Retrofitting Strategies of reinforced concrete building		
	C	Seismic Retrofitting Strategies of Masonry building		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Steven L. Kramer, “Geotechnical Earthquake Engineering,” Pearson, 2003 2. Anil K. Chopra, “Dynamics Of Structures Theory & Applications to Earthquake Engineering” ,Pearson, 2007 3. Datta T K. ”Seismic Analysis of Structures”, Wiley India Private Limited		
	Other References	1. An Introduction to Seismology, Earthquakes and Earth Structure. Stein, S. and Wysession, M., Blackwell Publishing 2. Modern Global Seismology. Lay, T., and Wallace, T.C., Academic Press		