SHARDA SCHOOL OF ENGINEERING & TECHNOLOGY

Programme Structure

B. Tech in Civil Engineering
Program Code: SET0301
Batch: 2023-27

Department of Civil Engineering

Sharda School of Engineering & Technology
B.Tech- Civil Engineering
Batch: 2023-2027
TERM 1

Semester I							
Sr. No	**Course Code***	**Course Name**	**Category ******	**L**	**T**	**P**	**Credits**
1	CVP102	Introduction to Civil Engineering	Core Course	0	0	2	1
2	CSE113	Programming for Problem Solving	Core Course	3	0	0	3
3	MTH141	Calculus, Analysis and linear Algebra	Core Course	3	1	0	4
4	CSP113	Programming for Problem Solving Lab	Core Course	0	0	2	1
5	EEE112	Principle of Electrical & Electronics Engineering	Core Course	2	1	0	3
6	EEP112	Principle of Electrical & Electronics Engineering Lab	Core Course	0	0	2	1
7	ARP101	Communicative English-1	Core Course	1	0	2	2
8	MEP106	Computer Aided Design and Drafting	Core Course	0	0	3	1.5
9	HMM111	Human Values and Ethics	Core Course	2	0	0	2
	Semester I Total Minimum Credits:18.5						

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TERM II

Semester II							
Sr. No	**Course Code***	**Course Name**	**Category ****	**L**	**T**	**P**	**Credits**
1	CSE114	Application Based Programming in Python	Core Course	3	0	0	3
2	MTH144	Differential Equations, Special Transforms and Statistics	Core Course	3	1	0	4
3	PHY 127	Engineering Physics	Core Course	3	1	0	4
4	MEP105	Mechanical Workshop	Core Course	0	0	3	1.5
5	ARP102	Communicative English-2	Core Course	1	0	2	2
6	PHY162	Physics Lab-II	Core Course	0	0	2	1
7	CSP114	Application Based Programming in Python Lab	Core Course	0	0	2	1
8	CVL103	Environmental Studies	Core Course	2	0	0	0
9	CVL105	Construction Materials	Core Course	3	0	0	3
10	CVP105	Construction Materials Lab	Core Course	0	0	2	1
	Semester II Total Minimum Credits:20.5						

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TERM III

Semester III							
Sr. No	**Course Code***	**Course Name**	**Category ****	**L**	**T**	**P**	**Credits**
1	ARP 203	Logical Skills Building and Soft Skills	Core Course	1	0	2	2
2	BTY 316	Introduction to Biology for Engineers	Core Course	2	0	0	2
3	CVL 225	Surveying and Levelling	Core Course	2	1	0	3
4	CVP 225	Surveying and Levelling Lab	Core Course	0	0	2	1
5	CVL 226	Introduction to Fluid Mechanics	Core Course	2	1	0	3
6	CVL227	Introduction to Solid Mechanics	Core Course	2	1	0	3
7	CVP288	Project Based Learning-1	(DSE/**P**/D/GE)	0	0	4	2
8	CVP 226	Introduction to Fluid Mechanics Lab	Core Course	0	0	2	1
9	CVL234	Numerical Techniques in Civil Engineering	Core Course	1	0	0	1
10	CVP234	Numerical Techniques in Civil Engineering Lab	Core Course	0	0	2	1
11		Industrial Internship	Core Course	0	0	4	2
	Semester III Total Minimum Credits:21						

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TERM IV

Semester IV							
Sr. No	**Course Code***	**Course Name**	**Category ****	**L**	**T**	**P**	**Credits**
1	ARP204	Quantitative and Qualitative Aptitude Skill Building	Core Course	1	0	2	2
2	CVL228	Structural Engineering-1	Core Course	2	1	0	3
3	CVL325	Geotechnical Engineering	Core Course	2	1	0	3
4		Departmental Elective-1	(DSE/**P**/D/GE)	2	1	0	3
5		Open Elective-1	(DSE/**P**/D/GE)	2	0	0	2
6	CVP289	Project Based Learning-2	(DSE/**P**/D/GE)	0	0	4	2
7	CVP228	Structural Engineering-1 Lab		0	0	2	1
8	IED001	Introduction to Entrepreneurship	Core Course	1	0	2	2
9	CVP320	Water Supply Engineering Lab	Core Course	0	0	2	1
10	CVP321	Geotechnical Engineering Lab	Core Course	0	0	2	1
11	CVL320	Water supply Engineering	Core Course	2	0	0	2
	Semester IV Total Minimum Credits: 22						

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TERM V

Semester V							
Sr. No	**Course Code***	**Course Name**	**Category ****	**L**	**T**	**P**	**Credits**
1	ARP301	Personality Development and Decision Making Skill	Core Course	1	0	2	2
2	CVL326	Structural Engineering-2	Core Course	2	1	0	3
3		Departmental Elective-2	(DSE/**P**/D/GE)	3	0	0	3
4		Departmental Elective-3	(DSE/**P**/D/GE)	3	0	0	3
5	CVP388	Project Based Learning-3	(DSE/**P**/D/GE)	0	0	4	2
6		Open Elective-2	(DSE/**P**/D/GE)	2	0	0	2
7	ECC301	Community Connect	Core Course	0	0	4	2
8	CVL331	Introduction to GIS	Core Course	2	0	0	2
9	CVP331	Introduction to GIS Lab	Core Course	0	0	2	1
10	CVL401	Irrigation Engineering	Core Course	2	0	0	2
11		Industrial Internship	Core Course	0	0	4	2
	Semester V Total Minimum Credits:24						

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TERM VI

Semester VI							
Sr. No	**Course Code***	**Course Name**	**Category ****	**L**	**T**	**P**	**Credits**
1	ARP302	Campus to Corporate	Core Course	1	0	2	2
2		Design of Basic Concrete Structures	Core Course	3	0	0	3
3		Departmental Elective-4	(DSE/**P**/D/GE)	3	0	0	3
4		Departmental Elective-5	(DSE/**P**/D/GE)	2	1	0	3
5		Open Elective-3	(DSE/**P**/D/GE)	3	0	0	3
6		Departmental Elective-6	(DSE/**P**/D/GE)	2	0	0	2
7		Research Methodology	Core Course	2	0	0	2
8	CVP389	Project Based Learning-4	(DSE/**P**/D/GE)	0	0	4	2
9		Departmental Elective-4 Lab	(DSE/**P**/D/GE)	0	0	2	1
10	CVL333	Transportation Engineering	Core Course	3	0	0	3
11	CVP398	Transportation Engineering Lab	Core Course	0	0	2	1
	Semester VI Total Minimum Credits:25						

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TERM VII

Semester VII							
Sr. No	**Course Code***	**Course Name**	**Category ****	**L**	**T**	**P**	**Credits**
1	CVL433	Design of Structural Steel Member	Core Course	2	1	0	3
2	CVL431	Advanced Structural Design	Core Course	2	0	0	2
3	CVP496	- Major Project- 1	Core Course	0	0	4	2
4		Open Elective-4	(DSE/**P**/D/GE)	3	0	0	3
5		Project Management	SEC/ Core Course	2	0	2	3
6		Departmental Elective-7	(DSE/**P**/D/GE)	3	0	0	3
7		Advanced Structural Design Lab	Core Course	0	0	2	1
8	CVL402	Earthquake Engineering	Core Course	2	0	0	2
9		Industrial Internship	Core Course	0	0	4	2
	Semester VII Total Minimum Credits:21						

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TERM VIII

Semester VIII							
Sr. No	**Course Code***	**Course Name**	**Category ****	**L**	**T**	**P**	**Credits**
1	CVL497	Capstone Project-2	Core Course	0	0	16	8
						Semester VIII Total Minimum Credits:8	
Grand Total Minimum Credits for Programme: 160							

List of Departmental Electives

DE1	CVL230 Hydrology and Hydraulics Engineering
	Probability and Statistics
DE2	Wastewater Engineering
	Advanced Water and wastewater treatment
DE3	CVL332 Geotechnical Enginering-2
	CVL333 Matrix Method
DE4	Concrete Technology
	CVL410 Design of High-rise buildings
DE5	CVL432 Estimation and Contracts
	Solid waste Management
	Air Pollution and Control
DE6	CVL436 Construction Engineering Management
	Dynamics of Structures
DE7	Quality and Safety in construction
	CVL323 Railways, Airports and Harbour

List of Programme Core

S.NO	CODE	SUBJECT	L	T	P	C
1	PC1	Programme Core	2	1	2	4
2	PC3	Programme Core	2	1	2	4
3	PC4	Programme Core	2	1	0	3
4	PC12	Project Based Learning (PBL) -1	0	0	4	2
5	PC7	Research Methodology	2	0	0	2
6	PC5	Programme Core	2	1	2	4
7	PC6	Programme Core	2	1	0	3
8	PC8	Programme Core	3	0	0	3
9	PC9	Programme Core	3	0	0	3
10	PC13	Project Based Learning -II	0	0	4	2
11	PC10	Programme Core	2	1	0	3
12	PC11	Programme Core	2	0	2	3
13	PC16	TSEC-I	0	0	2	1
14	PC14	Project Based Learning -III	0	0	4	2
15	PC18	Programme Core	3	1	0	4
16	PC17	TSEC-II	0	0	2	1
17	PC15	Project Based Learning – IV	0	0	4	2
18	PC19	Programme Core	2	1	0	3
19	PC20	Programme Core	2	0	2	3
TOTAL						**52**

Detailed List of Programme Core

S.NO	SUBJECT	L	T	P	C	AREA	CODE
1	Surveying and Levelling	2	1	2	4	Engineering	PC1
2	Introduction to Fluid Mechanics	2	1	2	4	Engineering	PC 3
3	Introduction to Solid Mechanics	2	1	0	3	Engineering	PC 4
4	Structural Engineering-1	2	1	2	4	Engineering	PC5
5	Geotechnical Engineering	2	1	0	3	Engineering	PC6
6	Water Supply Engineering	3	0	0	3	Engineering	PC8
7	Construction Materials	3	0	0	3	Engineering	PC9
8	Structural Engineering-2	2	1	0	3	Engineering	PC10
9	Geotechnical Engineering Lab	0	0	2	1	Engineering	PC16
10	Introduction to GIS	2	0	2	3	Engineering	PC11
11	Design of Basic Concrete Structures	3	1	0	4	Engineering	PC18
12	Transportation Engineering Lab	0	0	2	1	Engineering	PC17
13	Design of Structural Steel Member	2	1	0	3	Engineering	PC19
14	Advanced Structural Design	2	0	0	2	Engineering	PC20
15	Research Methodology	2	0	0	2	Engineering	PC7
16	Project Based Learning (PBL) -1	0	0	4	2	Engineering	PC12
17	Project Based Learning -2	0	0	4	2	Engineering	PC13
18	Project Based Learning - 3	0	0	4	2	Engineering	PC14
19	Project Based Learning – 4	0	0	4	2	Engineering	PC15

List of open elective course

S.NO	CODE	SUBJECT	L	T	P	C	Area
1	OE1	Management Course (from basket)	2	0	0	2	Management
2	OE2	Science Course (from basket)	2	0	0	2	Science
3	OE3	Humanities Course (from basket)	3	0	0	3	Humanities
4	OE4	To be decided by the Student from OE basket or PE/PC Basket of another Engineering department	3	0	0	3	Engineering
5	OE5	To be decided by the Student from OE basket or PE/PC Basket of another Engineering department	2	0	0	2	Humanities
TOTAL						**12**	

Courses

School: SSET		**Batch: 2023-2027**	
Programme: B.Tech.		**Current Academic Year: 2023-2024**	
Branch: CIVIL		**Semester:1**	
1	Course Code	CSE113	
2	Course Title	Programming for Problem Solving	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core	
5	Course Objective	1. Learn basic programming constructs –data types, decision structures, control structures in C 2. learning logic aptitude programming in c language 3. Developing software in c programming	
6	Course Outcomes	The students will be able to: CO1: Define the algorithm, Pseudo-code and flow chart for the given problem. CO2: Explain better understanding of basic concepts of C programming. CO3: Develop logic using array and function. CO4: Construct and implement logic based on the concept of strings and pointers. CO5: Perform user-defined data types and I/O operations in file. CO6: Design and develop solutions to real world problems using C.	
7	Course Description	Programming for problem solving gives the Understanding of C programming and implement code from flowchart or algorithm	
8	Outline syllabus		CO Mapping
	Unit 1	**Logic Building**	
	A	Flowchart: Elements, Identifying and understanding input/ output, Branching and iteration in flowchart	CO1, CO6
	B	Algorithm design: Problem solving approach(top down/bottom up approach)	CO1, CO6
	C	Pseudo Code : Representation of different construct, writing pseudo-code from algorithm and flowchart	CO1, CO6
	Unit 2	**Introduction to C Programming**	
	A	Introduction to C programming language, Data types, Variables, Constants, Identifiers and keywords, Storage classes	CO2, CO6
	B	Operators and expressions, Types of Statements: Assignment, Control, jumping.	CO2, CO6
	C	Control statements: Decisions, Loops, break, continue	CO2, CO6

	Unit 3	**Arrays and Functions**			
	A	Arrays: One dimensional and multi-dimensional arrays: Declaration, Initialization and array manipulation (sorting, searching).			CO3, CO6
	B	Functions: Definition, Declaration/Prototyping and Calling, Types of functions, Parameter passing: Call by value, Call by reference.			CO3, CO6
	C	Passing and Returning Arrays from Functions, Recursive Functions.			CO3, CO6
	Unit 4	**Pre-processors and Pointers**			
	A	Pre-processors: Types, Directives, Pre-processors Operators (#,##,\) , Macros: Types, Use, predefined Macros			CO4
	B	Pointer: Introduction, declaration of pointer variables, Operations on pointers: Pointer arithmetic, Arrays and pointers, Dynamic memory allocation.			CO4, CO6
	C	String: Introduction, predefined string functions, Manipulation of text data, Command Line Arguments.			CO4, CO6
	Unit 5	**User Defined Data Types and File Handling**			
	A	Structure and Unions: Introduction, Declaration, Difference, Application, Nested structure, self-referential structure, Array of structures, Passing structure in function.			CO5, CO6
	B	Files: Introduction, concept of record, I/O Streaming and Buffering, Types of Files: Indexed file, sequential file and random file,			CO5, CO6
	C	Creating a data file, Opening and closing a data file, Various I/O operations on data files: Storing data or records in file, adding records, Retrieving, and updating Sequential file/random file.			CO5, CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text book/s*	Kernighan, Brian, and Dennis Ritchie. *The C Programming Language*			
	Other References	1. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004. 2. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	_	_	1	_	_	_	_	_	_	_	_	_
CO2	2	_	2	_	_	1	_	_	_	_	1	_	_	_	_
CO3	1	_	1	_	_	_	_	_	_	_	_	_	_	_	_
CO4	1	_	1	_	_	_	_	_	_	_	_	_	_	_	_
CO5	1	_	1	_	_	_	_	_	_	_	_	_	_	_	_
CO6	2	2	2	_	_	2	_	_	_	_	1	_	_	_	_

1-Slight (Low) 2-Moderate (Medium) 3 -Substantial (High)

School: SSET		Batch: 2023-2027	
Programme: B.Tech.		Current Academic Year: 2023-2024	
Branch: CIVIL		Semester: 1	
1	Course Code	MTH 141	
2	Course Title	Calculus Analysis and Linear Algebra	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status	Compulsory	
5	Course Objective	The objective of this course is to familiarize the prospective engineers with techniques in basic calculus and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.	
6	Course Outcomes	The student will be able to: CO1: Define the basic Taylor's expansion of a function of two variables and maxima and minima of a function of two variable. CO2: Identify surface using the concepts of double integrals. CO3: Compute basics of determinants, rank of matrices for linear systems. CO4: Solve the basic concept of sets, relation, functions, groups, rings and field. CO5: Estimate the properties of vector spaces and subspaces using by linear transformations. CO6: Resolve the concepts of eigen values, eigen vectors and diagonalisation in linear systems.	
7	Course Description	This course is an introduction to the fundamental of Mathematics. The primary objective of the course is to develop the basic understanding of differential and integral calculus, linear Algebra and Abstract Algebra.	
8	**Outline syllabus: Calculus and Abstract Algebra**		**CO mapping**
	Unit 1	**Calculus**	
	A	Differentiation, Taylor's and Maclaurin theorems with remainders; indeterminate forms, L' Hospital's rule.	CO1,CO6
	B	Maxima and minima, Partial derivatives, Euler's theorem.	CO1, CO6
	C	Total derivative. Evaluation of double integration. Applications of double integral (to calculate area).	CO2, CO6

	Unit 2	**Matrices**			
	A	Matrices, vectors: addition and scalar multiplication, matrix multiplication.			CO3, CO6
	B	Linear systems of equations, linear Independence, rank of a matrix, determinants, Cramer's Rule			CO3, CO6
	C	Inverse of a matrix, Gauss elimination and Gauss-Jordan elimination.			CO3, CO6
	Unit 3	**Basic Algebra**			
	A	Sets, relations and functions.			CO4, CO6
	B	Basics of groups, cyclic groups.			CO4, CO6
	C	Subgroups, basics of Rings and Field.			CO4, CO6
	Unit 4	**Vector spaces**			
	A	Vector Space, linear dependence of vectors, basis, dimension.			CO5, CO6
	B	Linear transformations (maps), range and kernel of a linear map, rank and nullity.			CO5, CO6
	C	Inverse of a linear transformation, Matrix associated with a linear map.			CO5, CO6
	Unit 5	**Vector spaces (Prerequisite Module 2 –Matrices & Module-4 Vector spaces)**			
	A	Eigenvalues, Eigenvectors			CO6, CO6
	B	Symmetric, skew-symmetric, and orthogonal Matrices, Diagonalization			CO6, CO6
	C	Basic introduction of Inner product spaces, Gram-Schmidt orthogonalization.			CO6, CO6
	Mode	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text book/s*	1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002. 2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.			
	Other References	1. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005. 2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008. 3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010. 4. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	-	-	-	-	1	-	-	1	3	3	2
CO2	3	2	3	-	-	-	-	-	1	-	-	1	3	2	3
CO3	3	2	2	-	-	-	-	-	1	-	-	1	3	2	2
CO4	3	3	2	-	-	-	-	-	1	-	-	1	3	3	2
CO5	3	2	2	-	-	-	-	-	1	-	-	1	3	2	2
CO6	3	3	2	-	-	-	-	-	1	-	-	1	3	3	2

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch: 2023-2027**	
Programme: B.Tech		**Current Academic Year: 2023-2024**	
Branch: ME/CE		**Semester: I**	
1	Course Code	PHY127	
2	Course Title	Engineering Physics	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	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. 5. To analyse the Second law of thermodynamics, Carnot Cycle, Kelvin-Planck and Clausius Statements and their Equivalence.	
6	Course Outcomes	The students will be able to: CO1: Find the Elastic moduli, Relation between elastic constants, Poisson's Ratio and Bending of beam. CO2: Summarize the importance of interference, standing waves and resonance. CO3: Illustrate the Zeroth and first laws of Thermodynamics draw free body diagram of any mechanics problem. CO4: Solve Applications of First Law; General Relation between Cp and Cv; Work Done during Isothermal and Adiabatic Processes CO5: Estimate problems of Second Law of Thermodynamics; Concept of Entropy. CO6: Create 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		**CO Mapping**
	Unit 1	**Elasticity**	
	A	Hooke's Law, Stress- Strain Diagram, Elastic moduli, Relation between elastic constants, Poisson's Ratio, Determination of Poisson’s ratio	CO1/CO6
	B	Energy stored per unit volume in a strain; Bending of beam	CO1/CO6
	C	Bending moment, Cantilever	CO1/CO6
	Unit 2	**Waves**	

	A	Transverse and Longitudinal Waves, speed of a travelling wave			CO2/CO6
	B	wave speed on a stretched string, energy and power			CO2/CO6
	C	wave equation, interference, standing waves and resonance.			CO2/CO6
	Unit 3	**Zeroth and first law of thermodynamics**			
	A	Thermodynamic Equilibrium; Zeroth Law of Thermodynamics and Concept of Temperature; Work and Heat Energy			CO3/CO6
	B	First Law of Thermodynamics; Applications of First Law; General Relation between Cp and Cv			CO3/CO6
	C	Work Done during Isothermal and Adiabatic Processes			CO3/CO6
	Unit 4	**Second law of thermodynamics**			
	A	Limitations of first law of thermodynamics, Reversible and Irreversible Processes; Carnot Cycle			CO4/CO6
	B	Kelvin-Planck and Clausius Statements and their Equivalence			CO4/CO6
	C	Second Law of Thermodynamics; Concept of Entropy.			CO4/CO6
	Mode of examination	Theory/Jury/Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	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.			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	-	-	-	-	-	-	-	-	1	2	2	1
CO2	2	2	1	-	-	-	-	-	-	-	-	1	2	2	1
CO3	2	2	1	-	-	-	-	-	-	-	-	1	2	2	1
CO4	2	2	1	-	-	-	-	-	-	-	-	1	2	2	1
CO5	2	2	1	-	-	-	-	-	-	-	-	1	2	2	1
CO6	2	2	1	-	-	-	-	-	-	-	-	1	2	2	1

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch: 2023-2027**	
Programme B. Tech		**Current Academic Year: 2023-2024**	
Branch: All		**Semester: I and II**	
1	Course Code	CVL103	
2	Course Title	Environmental Studies	
3	Credits	0	
4	Contact Hours (L-T-P)	2-0-0	
	Course Status	Compulsory	
5	Course Objective	CO1. Discuss the principles and scope of environmental science. CO2. Describe the structure and composition of atmosphere and factors affecting weather and climate. CO3.Summrise the pollution causes, effects, control and its management CO4. Illustrate ecosystem, biodiversity and strategies for biodiversity conservation. CO5.Understand the social issues of environment. CO6: Establish the relationship between environment and society.	
6	Course Outcomes	The Students will be able to: CO1.Understand the principles and scope of environmental science CO2.Knowledge about various types of natural resources and its conservation CO3.Study about the structure and composition of atmosphere and factors affecting weather and climate CO4.Study about pollution causes, effects and control and solid waste management and various policies to curb pollution problem CO5.About ecosystem and biodiversity and various strategies for biodiversity conservation. CO6.Overall understanding of the concepts of various elements of environment and related phenomenon.	
7	Course Description	Environmental Studies emphasises on various aspects related to environment, its degradation and control measures such as: 1. Population and Environment; Sustainable Development 2. Water: Resources, Pollution and Control 3. Air: Atmosphere, Pollution, Control and Climate Change 4. Land: Resources, Pollution and Management Energy, Mineral and Food Resources and Biodiversity and its Conservation	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction to the course, Population and Environment and Sustainable Development**	
	A	Environmental Studies: Background; Definition; Objectives; Scope; Major environmental issues of concern; Multidisciplinary nature of Environmental	CO1/CO6

		Studies	
	B	Human Population and Environment: Population growth/ explosion and its effects on human health and environment	CO1/CO6
	C	Sustainable Development: Definition; Aim; Sustainability Development Goals (SDGs); Sustainability issues at various levels; Examples/ sustainability initiatives; Pillars of sustainable development; Desired outcomes	CO1/CO6
	Unit 2	**Water: Resources, Pollution and Control**	
	A	Water Resources: Water cycle; Total water on earth; Residence time of water in different compartments; Classification of waters as per salt content; Stresses on water resources/ water crises; Water conservation; Water conflicts	CO2/CO6
	B	Water Pollution: Impurities in water; Water quality parameters; Standards; Major categories of water pollutants and their sources and effects; Surface water versus groundwater quality; Point and non-point sources; Pollution of (i) fresh water streams (DO sag curve/ self-purification), (ii) lakes, (iii) groundwater/ aquifers, and (iv) oceans	CO2/CO6
	C	Water Pollution Control: Water treatment (domestic and municipal); Wastewater treatment (on-site and municipal)	CO2/CO6
	Unit 3	**Air: Atmosphere, Pollution, Control and Climate Change**	
	A	Atmosphere: Composition and structure; Classification of pollutants; Air pollution: sources and effects on humans, plants and materials; AQI and how it is calculated, Plume shapes	CO3/CO6
	B	Air Pollution Control: Laws; Modifications in fuels and engines; Ambient air quality control; Control equipment's (in vehicles and industry); Stack height	CO3/CO6
	C	Climate Change: Global warming and greenhouse effect; Ozone layer depletion and its consequences; Climate Change and its impact on ecosystem; International agreements	CO3/CO6
	Unit 4	**Land: Resources, Pollution and Management**	
	A	Land Resources: Importance; Soil and its formation; Soil profile; Land degradation: causes and effects; Soil conservation through sustainable agriculture	CO4/CO6
	B	Soil/ Land Pollution: Major categories of soil	CO4/CO6

		pollutants: sources and effects			
	C	Solid Waste Management: Classification of solid wastes; Engineering systems for management; Methods of treatment; Bio-medical wastes; Non-degradable wastes; Hazardous wastes; Electronic wastes; Plastic wastes etc.			CO4/CO6
	Unit 5	**Energy, Mineral and Food Resources and Biodiversity and its Conservation**			
	A	Energy Resources: Conventional and non-conventional; Non-renewable and renewable; Fossil fuels: coal, petroleum and natural gas; Solar and wind energy			CO5/CO6
	B	Mineral, Forest and Food Resources: (i) Minerals - Definition; Importance; Minerals in our diet, Metallic and non-metallic minerals, (ii) Forest - Direct and indirect benefits; Depletion of forest resources: causes and effects; and, (iii) Food - Three main calorie providers; Green revolution			CO5/CO6
	C	Biodiversity and its Conservation: Definition; Threats to biodiversity; Extinct, endangered and endemic species; Conservation of biodiversity			CO5/CO6
	Mode of examination	Theory through OMR sheet having 100 MCQs			
	Weightage Distribution	CA	MTE	ETE	
		25%	-	75%	
	Text book/s*	1. Erach Bharucha, Environmental Studies for Undergraduat Students, 3rd Ed., Universities Press, Hyderabad, 2021			
	Other References	1. Joseph, Benny, Environmental Studies, Tata McGraw-Hill, New Delhi, 2022			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	3	2	-	-	-	-	1	-	-	-
CO2	-	-	-	-	-	3	2	-	-	-	-	1	-	-	-
CO3	-	-	-	-	-	3	2	-	-	-	-	1	-	-	-
CO4	-	-	-	-	-	3	3	-	-	-	-	1	-	-	-
CO5	-	-	-	-	-	3	3	-	-	-	-	1	-	-	-
CO6	-	-	-	-	-	3	3	-	-	-	-	1	-	-	-

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch: 2023-2027**	
Programme B Tech		**Current Academic Year: 2023-2024**	
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 Sketch up, to enable them to freely express their ideas in 3D.	
6	Course Outcomes	The students will be able to: CO1: Associate with civil engineering and infrastructural development in India. CO2: Explore different aspects of planning and building materials. CO3: Understand the structural aspects of a building. CO4: Understand the aspects of civil engineering other than buildings. CO5: Express their ideas in 2D/3D drawings. CO6: Identify the various tasks that Civil Engineers are involved with and to express ideas as drawings.	
7	Course Description	Introduce the students to various aspects of Civil Engineering and to Understand the vast interfaces this field has with 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		**CO Mapping**
	Unit 1	**Introduction**	**CO1, CO2**
	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**			**CO3,CO4**
	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**			**CO5, CO6**
	A	Introduction to Sketchup			
	B	Making of 2D Plans			
	C	Making of 3D drawings.			
		Total Hours			
	Mode of examination	Practical			
	Weightage Distribution	CA	CE-VIVA	ETE	
		25%	25%	50%	
	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				

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	-	-	-	1	-	1	-	-	1	-	2	1
CO2	2	1	1	-	-	-	1	-	1	-	-	1	-	2	1
CO3	2	2	1	-	-	-	1	-	1	-	-	1	-	2	1
CO4	2	2	1	-	-	-	1	-	1	-	-	1	-	2	1
CO5	2	3	1	-	-	-	1	-	1	-	-	1	-	2	1
CO6	2	2	1	-	-	-	1		1	-	-	1	-	2	1

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-2027**	
Programme: B.Tech.		**Current Academic Year: 2023-2024**	
Branch: CE		**Semester: I**	
1	Course Code	CSP113	
2	Course Title	Programming for problem solving Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	1. Learn basic programming constructs –data types, decision structures, control structures in C 2. learning logic aptitude programming in C language 3. Developing software in c programming	
6	Course Outcomes	The students will be able to: CO1: Define the algorithm, Pseudo-code and flow chart for the given problem. CO2: Explain the basic concepts of C programming. CO3: Employ logic using array and function. CO4: Solve logic based on the concept of strings and pointers. CO5: Estimate user-defined data types and I/O operations in file. CO6: Design and develop solutions to real world problems using C.	
7	Course Description	Programming for problem solving gives the Understanding of C programming and implement code from flowchart or algorithm	
8		Outline syllabus	CO Mapping
	Unit 1	**Logic Building**	CO1,CO6
		Draw flowchart for finding leap year	
		Write a c Program to Add Two Integers	
		Write a program to create a calculator	
	Unit 2	**Introduction to C Programming**	CO2,CO1
		Write a c program to convert length meter to cm	
		Write a c program to convert temp	
		Write a c program to swap two numbers	
	Unit 3	**Arrays and Functions**	CO3,CO 6
		Write a C program to calculate the average using arrays	
		Write a C program to find the largest element of the array	
	Unit 4	**Pre-processors and Pointers**	CO4,CO6
		Write a C program to swap two values using pointers	
		Write a C program to find largest number from array	

		using pointers			
	Unit 5	**User Defined Data Types and File Handling**			CO5,CO6
		Write a C program to store information of a student using structure			
		Write a C program to store information of a student using union			
	Mode of examination	Practical			
	Weightage Distribution	CA	CE VIVA	ETE	
		25%	25%	50%	
	Text book/s*	Kernighan, Brian, and Dennis Ritchie. *The C Programming Language*			
	Other References	1. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004. 2. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999			
Software		Turbo C			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	_	_	1	_	_	_	_	_	_	1	1	_
CO2	2	_	2	_	_	1	_	_	_	_	1	_	2	2	_
CO3	1	_	1	_	_	_	_	_	_	_	_	_	_	1	_
CO4	1	_	1	_	_	_	_	_	_	_	_	_	_	1	_
CO5	1	_	1	_	_	_	_	_	_	_	_	_	_	1	_
CO6	2	2	2	_	_	2	_	_	_	_	1	_	2	2	1

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-2027**
Programme: B.Tech		**Current Academic Year: 2023-2024**
Branch: Civil Engineering		**Semester: I**
1	Course Code	MEP105
2	Course Title	**Mechanical Workshop**
3	Credits	1.5
4	Contact Hours (L-T-P)	0-0-3
	Course Status	Compulsory
5	Course Objective	The objective of this course is to make the students, familiar with the modern day manufacturing processes, introduce them to various hand tools and equipment, acclimatize with the measuring devices, and perform basic machine tool operations in various machine tools.
6	Course Outcomes	The students will be able to: CO1: Apply 5S (Seiri, Seiton, Seiso, Seiketsu and Shitsuke) methodology at workplace. CO2: Classify various hand tools used in basic Mechanical engineering workshop viz. black smithy, carpentry, assembling, welding etc. CO3: Test different measuring devices according to the job CO4: Explain various machine tools and their operation CO5: Choose suitable tools for machining processes including turning, facing, thread cutting and tapping, milling, drilling and shaping. CO6: Buildup basic knowledge of workshop to manufacture basic metallic or wooden components
7	Course Description	**Black Smithy Shop:** Simple exercises based on black smithy operations such as upsetting, practice of S -Hook from circular bar using hand forging operations. **Carpentry Shop:** Study of different types of wood, Carpentry Tools, Equipment and different joints, Practice of T joint, cross lap joint, Mortise and Tendon T joint, Bridle T joint **Fitting Shop:** Preparation of Square joint, V joint, half round joint, dovetail joints per the given specifications, which contains: Sawing, Filing, Grinding, and Practice marking operations. **Sheet Metal Shop:** Study of galvanized Iron (G.I.) Sheet material properties, hand tools and sheet metal machines, and projective geometry, demonstration of different sheet metal operations and practice of development of Tray, cylinder, hopper, funnel etc. **Welding Shop:** Introduction, Study of Tools and welding Equipment (Gas and Arc welding), Selection of welding electrode and current, Bead practice and Practice of Butt Joint, Lap Joint. **Machine Shop:**

		Study of machine tools in particular Lathe machine (different parts, different operations, study of cutting tools), Demonstration of different operations on Lathe machine, Practice of Facing, Plane Turning, step turning, taper turning, knurling and parting and Study of Quick return mechanism of Shaper.			
8	Outline syllabus				CO Mapping
	Experiment 1	To make a S shaped hook from a given circular rod using hand forging technique.			CO4,CO1
	Experiment 2	To make a dovetail lap joint in Carpentry shop.			CO2,CO3
	Experiment 3	To make a cross-half lap joint in Carpentry shop.			CO2,CO3
	Experiment 4	To make a square fit from the given mild steel pieces in fitting shop.			CO3,CO5
	Experiment 5	To prepare a V-Fit from the given mild steel pieces in fitting shop.			CO3, CO5
	Experiment 6	To make a rectangular tray of specified dimensions in sheet metal shop.			CO2, CO5
	Experiment 7	To make a Lap joint, using the given mild steel pieces using arc welding.			CO3, CO5
	Experiment 8	To perform step turning and taper turning operations on the given work piece			CO5
	Experiment 9	To prepare a sand mould, using the given single piece pattern			CO2,CO6
	Experiment 10	To prepare a sand mould, using the given Split-piece pattern.			CO2,CO6
	Mode of examination	Practical			
	Weight- age Distribution	CA	CE VIVA	ETE	
		25%	25%	50%	
	Text book/s*	1. Raghuwanshi B.S., Workshop Technology Vol. I & II, Dhanpath Rai & Sons. 2. Kannaiah P. and Narayana K.L., Workshop Manual, 2nd Edn, Scitech publishers. 3. John K.C., Civil Workshop Practice. 2nd Edn. PHI 2010. 4. Jeyapoovan T.and Pranitha S., Engineering Practices Lab Manual, 3rd Edn. Vikas Pub.2008.			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	1	1	2	-	-	1	-	-	-
CO2	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-
CO3	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-
CO4	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-
CO5	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-
CO6	1	-	1	-	-	-	1	1	2	-	-	1	-	-	-

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

Schools: SSET		**Batch:** 2023-2027
		Academic Year: 2023-2024
		Semester: 1st
1	Course Code	**ARP101**
2	Course Title	Communicative English-1
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
5	Course Objective	To minimize the linguistic barriers that emerges in varied socio-linguistic environments through the use of English. Help students to understand different accents and standardise their existing English. Guide the students to hone the basic communication skills - listening, speaking, reading and writing while also uplifting their perception of themselves, giving them self-confidence and building positive attitude.
6	Course Outcomes	The students will be able to: CO1: Enumerate advanced grammar rules and write grammatically correct sentences. CO2: Explain wide vocabulary and punctuation rules and learn strategies for error-free communication. CO3: Interpret texts, pictures and improve both reading and writing skills which would help them in their academic as well as professional career CO4: Comprehend language and improve speaking skills in academic and social contexts. CO5: Develop, share and maximise new ideas with the concept of brainstorming and the documentation of key critical thoughts articulated towards preparing for a career based on their potentials and availability of opportunities. CO6: Collaborate effectively in multi-disciplinary teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality.
7	Course Description	The course is designed to equip students, who are at a very basic level of language comprehension, to communicate and work with ease in varied workplace environment. The course begins with basic grammar structure and pronunciation patterns, leading up to apprehension of oneself through written and verbal expression as a first step towards greater employability.
8	Outline syllabus – ARP 101	
	Unit A	**Sentence Structure**	**CO Mapping**
	Topic 1	Subject Verb Agreement	CO1
	Topic 2	Parts of speech	
	Topic 3	Writing well-formed sentences	

	Unit B	**Vocabulary Building & Punctuation**	
	Topic 1	Homonyms/ homophones, Synonyms/Antonyms	CO1, CO2
	Topic 2	Punctuation/ Spellings (Prefixes-suffixes/Unjumbled Words)	CO1, CO2
	Topic 3	Conjunctions/Compound Sentences	CO1, CO2
	Unit C	**Writing Skills**	
	Topic 1	Picture Description – Student Group Activity	CO3
	Topic 2	Positive Thinking - Dead Poets Society-Full-length feature film - Paragraph Writing inculcating the positive attitude of a learner through the movie | SWOT Analysis – Know yourself	CO3, CO2, CO3
	Topic 3	Story Completion Exercise –Building positive attitude - The Man from Earth (Watching a Full length Feature Film)	CO2, CO3
	Topic 4	Digital Literacy | Effective Use of Social Media	CO3
	Unit D	**Speaking Skill**	
	Topic 1	Self-introduction/Greeting/Meeting people – Self branding	CO4
	Topic 2	Describing people and situations - To Sir With Love (Watching a Full length Feature Film)	CO4
	Topic 3	Dialogues/conversations (Situation based Role Plays)	CO4
	Unit E	**Professional Skills | Career Skills**	
	Topic 1	Exploring Career Opportunities	CO4, CO5
	Topic 2	Brainstorming Techniques & Models	CO4, CO5
	Topic 3	Social and Cultural Etiquettes	CO4, CO5
	Topic 4	Internal Communication	CO4, CO5
	Unit F	**Leadership and Management Skills**	
	Topic 1	Managerial Skills	CO6
	Topic 2	Entrepreneurial Skills	CO6
9	Evaluations	*Class Assignments/Free Speech Exercises / JAM Group Presentations/Problem Solving Scenarios/GD/Simulations (50% CA and 50% ETE*	*N/A*
10	Texts & References | Library Links	• Blum, M. Rosen. *How to Build Better Vocabulary*. London: Bloomsbury Publication • Comfort, Jeremy (et.al). *Speaking Effectively*. Cambridge University Press	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	1	3	-	2	-	-	-
CO2	-	-	-	-	-	-	-	-	1	3	-	2	-	-	-
CO3	-	-	-	-	-	-	-	-	1	3	-	2	-	-	-
CO4	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO5	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO6	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-2027**	
Programme: B.Tech.		**Current Academic Year: 2023-2024**	
Branch: Physics		**Semester: I**	
1	Course Code	PHY 162	
2	Course Title	Physics Lab II	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.	
6	Course Outcomes	The students will be able to: CO1: List basic physics experiments based on simple harmonic motion. CO2: Identify modulus of rigidity, Young's modulus of engineering materials. CO3: Examine moment of inertia of different bodies. CO4: Operate the characteristic curves of different electronic components. CO5: Estimate the frequency of an electrically maintained tuning fork using Melde's Experiment CO6: Develop the understanding of mathematical concepts/equations to obtain quantitative results and ability to conduct, analyze and interpret experiments	
7	Outline Syllabus		CO Mapping
	Unit 1		
	A B C	1. To verify the relation of time period using simple pendulum. 2. To determine the acceleration due to gravity and radius of Gyration of compound pendulum and compare with theoretical value.	CO1 CO2,CO6
	Unit 2		
	A B C	3. To measure the moment of inertia of a flywheel. 4. To determine the Young's modulus of a beam using cantilever beam experiment apparatus. 5. To determine vertical distance between two points using sextant.	CO2,CO6
	Unit3		
	A B	6. To determine the modulus of rigidity of a material of a given wire with an inertia table	CO3,CO6

	C	(torsion pendulum) by dynamical method. 7. To calculate Moment of inertia of different irregular shapes.	CO4,CO6
	Unit 4		
	A B C	8. To determine the frequency of an electrically maintained tuning fork using Melde's Apparatus. (i) Transverse mode of vibration (ii) Longitudinal mode of vibration. 9. To determine the coefficient of viscosity of water by Poiseuille's method.	CO4,CO6
	Unit 5		
	A B C	10. To draw the characteristic curve of a PN junction diode. 11. To trace the circuit of a Half Wave Rectifier circuit and determine efficiencies and ripple factors with capacitor and inductor filters. 12. To trace the circuit of a Full Wave Rectifier circuit and determine efficiencies and ripple factors with capacitor and inductor filters. 26.	CO5,CO6 CO5,CO6
	Mode of Examination	Practical/Viva	
	Weightage Distribution	CA: 25% / CE VIVA: 25% / ETE: 50%	
	Text books	1. B.Sc. Practical Physics- Harnam Singh, S. Chand Publishing. 2. B.Sc. Practical Physics- C L Arora, S. Chand Publishing.	
	Other References	1. Geeta Sanon, BSc Practical Physics, 1st Edn. (2007), R. Chand & Co. 2. B. L. Worsnop and H. T. Flint, Advanced Practical Physics, Asia Publishing House, New	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	1	-	-	-	-	1	-	-	1	-	-	-
CO2	2	2	2	1	-	-	-	-	1	-	-	1	-	-	-
CO3	2	2	2	1	-	-	-	-	1	-	-	1	-	-	-
CO4	2	2	2	1	-	-	-	-	1	-	-	1	-	-	-
CO5	2	2	2	1	-	-	-	-	1	-	-	1	-	-	-
CO6	2	2	2	1	-	-	-	-	1	-	-	1	-	-	-

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-2027**	
Programme: B.Tech		**Current Academic Year: 2023-2024**	
Branch: CSE		**Semester: II**	
1	Course Code	CSE114	
2	Course Title	Application Based Programming in Python	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	Emphasis is placed on procedural programming, algorithm design, and language constructs common to most high-level languages through Python Programming.	
6	Course Outcomes	The students will be able to: CO1: Define decision and repetition structures in program design. CO2: Identify methods and functions to improve readability of programs. CO3: Demonstrate the use of Python lists, tuples and dictionaries. CO4: Detail object-oriented programming methodology. CO5: Build top-down concepts in algorithm design. CO6: Develop Python programs to illustrate concise and efficient algorithms	
7	Course Description	Python is a language with a simple syntax, and a powerful set of libraries. It is widely used in many scientific areas for data exploration. This course is an introduction to the Python programming language for students without prior programming experience. We cover data types, control flow, object-oriented programming.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction**	
	A	Python Environment, Variables, Data Types, Operators.	CO1,CO6
	B	**Conditional Statements:** If, If- else, Nested if-else. **Looping:** For, While, Nested loops.	CO1,CO6
	C	**Control Statements:** Break, Continue, And Pass. Comments	CO1,CO6
	Unit 2	**List, Tuple and Dictionaries**	
	A	**Lists and Nested List:** Introduction, Accessing list, Operations, Working with lists, Library Function and Methods with Lists.	CO1, CO2
	B	Strings: Introduction, Accessing items of a string, Operations, Working, Library Functions and Methods with strings. **Tuple:** Introduction, Accessing tuples, Operations, Working, Library Functions and Methods with Tuples.	CO1, CO2
	C	Sets: Introduction, Operations, Working, functions with sets. Difference between set and lists. **Dictionaries:** Introduction, Accessing values in dictionaries, Working with dictionaries, Library Functions	CO1, CO2

	Unit 3	**Functions and Exception Handling**			
	A	**Functions:** Defining a function, Calling a function, Types of functions, Function Arguments.			CO3
	B	Anonymous functions, Global and local variables			C03
	C	**Exception Handling**: Definition, Except clause, Try, finally clause, User Defined Exceptions			CO3
	Unit 4	**OOP and File Handling**			
	A	**OOPs concept**: Class and object, Attributes, Abstraction, Encapsulation, Polymorphism and Inheritance			C04,CO6
	B	Static and Final Keyword, Access Modifiers and specifiers, scope of a class			CO4,CO6
	C	File Handling: Introduction, File Operations			CO4,CO6
	Unit 5	**Application based programming**			
	A	**Modules& packages:** Importing module, Math module, Random module, creating Modules			CO5,CO6
	B	Introduction to Numpy, pandas, Matplotlib			CO5,CO6
	C	**Applications: Searching Linear Search, Binary Search. Sorting: Bubble Sort**			CO5,CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text book/s*	1. The Complete Reference Python, Martin C. Brown, McGraw Hill			
	Other References	1. Introduction to computing in problem solving using Python, E Balahurusamy, McGraw Hill 2. Introduction to programming using Python, Y. Daniel Liang, Pearson 3. Mastering Python, Rick Van Hatten, Packet Publishing House Starting out with Python, Tony Gaddis, Pearson			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	2	2	1	-	-	-	1	-	1	-	-	-	-
CO2	3	3	3	3	3	-	-	-	3	-	3	-	-	-	-
CO3	3	3	3	3	2	-	-	-	3	-	2	-	-	-	-
CO4	2	2	2	1	2	-	-	-	2	-	1	-	-	-	-
CO5	2	3	2	1	2	-	-	-	1	-	2	-	-	-	-
CO6	1	2	1	2	1	-	-	-	1	-	1	-	-	-	-

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023- 2027**	
Programme: B.Tech.		**Current Academic Year: 2023-2024**	
Branch: CE		**Semester: II**	
1	Course Code	MTH 144	
2	Course Title	DIFFERENTIAL EQUATIONS, SPECIAL TRANSFORMS AND STATISTICS	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status	Compulsory	
5	Course Objective	The objective of this course is to familiarize the prospective engineers with techniques in multivariate integration, ordinary and partial differential equations and statistical model. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.	
6	Course Outcomes	The students will be able to: CO1: Define the concept of differential equations, illustrate the first and second order linear differential equations with constant coefficients. CO2: Classify the major classification of PDEs and the qualitative differences between the classes of equations. CO3: Solve linear differential equations using the Laplace transform and **Z** transform technique. CO4: Calculate basic problems in probability theory, including problems involving the binomial, geometric, exponential, Poisson, and normal distributions. CO5: Choose appropriate regression analysis, and compute and interpret the coefficient of correlation. CO6: Perform parametric testing techniques including single and multi-sample tests for mean and proportion and regression	
7	Course Description	The primary objective of the course is to develop the basic understanding of differential equations, special transforms and statistics.	
8	**Outline syllabus :Differential Equations, Special Transforms And Statistics**		**CO Mapping**
	Unit 1	**Ordinary differential equations**	
	A	Exact differential equations, Second order linear differential equations with constant coefficients,	CO1
	B	Method of variation of parameters, Cauchy-Euler equation; Power series solutions;	CO1
	C	Legendre polynomials, Bessel functions of the first kind and their properties.	CO1
	Unit 2	**Partial differential equations**	
	A	Definition, classification of partial differential equation, method of separation of variables	CO2

	B	Solution of wave equation,			CO2
	C	Heat equation and Laplace equation using method of separation of variables.			CO2
	Unit 3	**Laplace Transform and Z Transform**			
	A	Laplace transform of some standard functions and its properties			CO3
	B	Inverse Laplace transform and Convolution theorem			CO3
	C	Introduction to Z transforms.			CO3
	Unit 4	**Probability and Statistics I**			
	A	Probability, Random variables, Expectation of Random Variables			CO4
	B	Probability distributions: Binomial, Poisson, Normal distribution			CO4
	C	Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves			CO4
	Unit 5	**Probability and Statistics II**			
	A	Moments, Skewness and Kurtosis,			CO5, CO6
	B	Correlation and regression, Rank correlation			CO5, CO6
	C	Tests of small samples- Student's T test, Chi-square test for goodness of fit.			CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text book/s*	1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006. 2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.			
	Other References	1 Biostatistics, Wayne W. Daniel, John Wiley & sons, Inc., reprint: Wiley India, New Delhi. 1. Probability and Statistics for Engineers and Scientists, Walpole R. E., Mayers R. H., S. I., Ye. K. 7th Edition, Pearson, 2002. 2. Statistics for Biologists, Campbell R. C., Cambridge University Press 1988. The Principles of Scientific Research, Freedman P., Pergamon Press, New York.			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-
CO5	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-
CO6	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-2027**	
Programme: B.Tech		**Current Academic Year: 2023-2024**	
Branch: Civil Engineering		**Semester: 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 equipment used in engineering applications.	
6	Course Outcomes	The students will be able to: CO1: Find basic electrical circuits. CO3: Explain the working principle of transformer. CO3: Explain the working principle of dc and ac motors. CO4: Practice the basics of diode to describe the working of rectifier circuits such as half and full wave rectifiers. CO5: Choose the concepts of basic electronic devices to design various circuits. CO6: Combine the basic concepts in Electrical and Electronics Engineering for multi-disciplinary tasks.	
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		CO Mapping
	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	CO1,CO6
	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	CO1,CO6
	C	Introduction to three phase system, relationship between phase voltages and line voltages,	CO1,CO6

	Unit 2	**Transformer(4 lectures)**			
	A	Working principle and construction of transformer, EMF equation			CO2,CO6
	B	Efficiency of transformer, Power and distribution transformer and difference between them			CO2,CO6
	C	Transformer applications in transmission and distribution of electrical power			CO2,CO6,
	Unit 4	**Electrical Motors (6 lectures)**			
	A	Construction, working principle, torque-speed characteristic and applications of dc motor.			CO3,CO6
	B	Construction, working principle and applications of a three-phase induction motor, significance of torque-slip characteristic			CO3,CO6
	C	Working principle starting methods and applications of single phase induction motor			CO3,CO6
	Unit 4	**Semiconductor Diode and Rectifier (5 lectures)**			
	A	PN junction and its biasing			CO4,CO6
	B	Semiconductor diode, ideal versus practical diode , VI characteristics of diode			CO4,CO6
	C	Half wave and full wave rectifiers with and without filters.			CO4,CO6
	Unit 5	**Transistors (5 lectures)**			
	A	Bipolar Junction Transistor (BJT) –Construction, working principle and input-output characteristics			CO5,CO6
	B	BJT as CE amplifier and as a switch			CO5,CO6
	C	Introduction to JFET			CO5,CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	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.			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	-	-	-	-	-	-	-	-	-	2	-	-	-
CO2	2	1	-	-	-	-	-	-	-	-	-	2	-	-	-
CO3	2	1	-	-	-	-	-	-	-	-	-	2	-	-	-
CO4	2	2	-	-	-	-	-	-	-	-	-	2	-	-	-
CO5	2	1	-	-	-	-	-	-	-	-	-	2	-	-	-
CO6	2	2	-	-	-	-	-	-	-	-	-	2	-	-	-

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

Schools: SSET Programme: B.Tech		Batch: 2023-2027 Current Academic Year: 2023-2024 Semester: II	
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	The students will be able to: CO1: Locate Vision, Goals and Strategies through Audio-visual Language Texts CO2: Explain complex concepts and present them in creative writing. CO3: Adapt MTI Reduction/Neutral Accent through Classroom Sessions & Practice CO4: Calculate their role in achieving team success through defining strategies for effective communication with different people CO5: Realize their potentials as human beings and conduct themselves properly in the ways of world. CO6: Create satisfactory competency in use of Quantitative aptitude and Logical Reasoning.	
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 102		
	Unit 1	**Acquiring Vision, Goals and Strategies through Audio-visual Language Texts**	**CO Mapping**
	Topic 1	Pursuit of Happiness / Goal Setting & Value Proposition in life	CO1

	Topic 2	12 Angry Men / Ethics & Principles	
	Topic 3	The King's Speech / Mission statement in life | strategies & Action Plans in Life	
	Unit 2	**Creative Writing**	
	Topic 1	Story Reconstruction - Positive Thinking	CO2
	Topic 2	Theme based Story Writing - Positive attitude	
	Topic 3	Learning Diary Learning Log – Self-introspection	
	Unit 3	**Writing Skills 1**	
	Topic 1	Precis	CO2
	Topic 2	Paraphrasing	
	Topic 3	Essays (Simple essays)	
	Unit 4	**MTI Reduction/Neutral Accent through Classroom Sessions & Practice**	
	Topic 1	Vowel, Consonant, sound correction, speech sounds, Monothongs, Dipthongs and Tripthongs	CO3
	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 5	**Gauging MTI Reduction Effectiveness through Free Speech**	
	Topic 1	Jam sessions	CO3
	Topic 2	Extempore	
	Topic 3	Situation-based Role Play	
	Unit 6	**Leadership and Management Skills**	
	Topic 1	Innovative Leadership and Design Thinking	CO4
	Topic 2	Ethics and Integrity	CO4
	Unit 7	**Universal Human Values**	
	Topic 1	Love & Compassion, Non-Violence &	CO5

		Truth	
	Topic 2	Righteousness, Peace	CO5
	Topic 3	Service, Renunciation (Sacrifice)	CO5
	Unit 8	**Introduction to Quantitative aptitude & Logical Reasoning**	
	Topic 1	Analytical Reasoning & Puzzle Solving	CO6
	Topic 2	Number Systems and its Application in Solving Problems	CO6
9	Evaluations	*Class Assignments/Free Speech Exercises / JAM Group Presentations/Problem Solving Scenarios/GD/Simulations (50% CA and 50% ETE*	*N/A*
10	Texts & References | Library Links	1. Wren, P.C.&Martin H. *High English Grammar and Composition*, S.Chand& Company Ltd, New Delhi. 2. Blum, M. Rosen. *How to Build Better Vocabulary*. London: Bloomsbury Publication 3. Comfort, Jeremy (et.al). *Speaking Effectively*. Cambridge University Press. 4. The Luncheon by W.Somerset Maugham - http://mistera.co.nf/files/sm_luncheon.pdf	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	1	3	1	2	-	-	-
CO2	-	-	-	-	-	-	-	-	1	3	1	2	-	-	-
CO3	-	-	-	-	-	-	-	-	1	3	1	2	-	-	-
CO4	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO5	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO6	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		Batch: 2023-2027		
Programme: B.Tech.		Current Academic Year: 2023-2024		
Branch: Civil Engineering		Semester: II		
1	Course Code	HMM111		
2	Course Name	Human values and Ethics		
3	Credits	2		
4	Contact Hours (L-T-P)C	(2-0-0)2		
5	Course Objective	To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence		
6	Course Outcomes	The students will be able to: CO1: Define the importance of human values and ethics in technical education. CO2: Examine the importance of 'I' and 'Body'. CO3: Infer the importance of harmony in the self, family and the society for mutual fulfilment. CO4: Infer the importance of harmony among human beings, other living beings and entire nature for universal equilibrium and mutual co-existence. CO5: Apply the ethical approach in profession for continuous happiness and sustained prosperity. CO6: Infer the importance of values and ethics in corporate sector		
7	Outline of syllabus:			CO Mapping
7.01	HMM126.A	Unit 1	The Need and Process for Value Education	CO Mapping
7.02	HMM126.A1	Unit 1 Topic 1	The need, basic guidelines, content and process for Value Education	CO1
7.03	HMM126.A2	Unit 1 Topic 2	Concept of 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration; Continuous Happiness and Prosperity- A look at basic Human Aspirations	CO1
7.04	HMM126.A3	Unit 1 Topic 3	Right understanding, Relationship and Physical Facilities- the basic requirements for fulfilment of aspirations of every human being with their correct priority	CO1

7.05	HMM126.B	Unit 2	Understanding Harmony in the Human Being - Harmony in Myself	CO2
7.06	HMM126.B1	Unit 2 Topic 1	Human being as a co-existence of the sentient 'I' and the material 'Body'	CO2
7.07	HMM126.B2	Unit 2 Topic 2	The needs of Self ('I') and 'Body' ; Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)	CO2, CO3
7.08	HMM126.B3	Unit 2 Topic 3	The characteristics and activities of 'I' and harmony in 'I' ; Understanding the harmony of I with the Body: Correct appraisal of Physical needs, meaning of Prosperity in detail	CO2, CO3
7.09	HMM126.C	Unit 3	Harmony in the Family and Society	CO3, CO4
7.10	HMM126.C1	Unit 3 Topic 1	Values in human-human relationship; Trust and Respect as the foundational values of relationship	CO3, CO5
7.11	HMM126.C2	Unit 3 Topic 2	Understanding the meaning of Trust; Difference between intention and competence; The meaning of Respect; Difference between respect and differentiation; the other salient values in relationship	CO3, CO5
7.12	HMM126.C3	Unit 3 Topic 3	Harmony in the society (society being an extension of family; Visualizing a universal harmonious order in society - from family to world family	CO3, CO6
7.13	HMM126.D	Unit 4	Harmony in the Nature and Existence	
7.14	HMM126.D1	Unit 4 Topic 1	The harmony in the Nature	CO4, CO5
7.15	HMM126.D2	Unit 4 Topic 2	Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature	CO4, CO5
7.16	HMM126.D3	Unit 4 Topic 3	Understanding Existence as Co-existence of mutually interacting units in all-pervasive space	CO4, CO6
7.17	HMM126.E	Unit 5	Competence in professional ethics	CO4, CO6
7.18	HMM126.E1	Unit 5 Topic 1	Ability to utilize the professional competence for augmenting universal human order	CO5, CO6
7.19	HMM126.E2	Unit 5 Topic 2	Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,	CO5, CO6
7.20	HMM126.E3	Unit 5	Ability to identify and develop	CO5, CO6

		Topic 3	appropriate technologies and management patterns for above production systems.	
8	Course Evaluation			
8.1	Course work: 25 marks			
8.11	Attendance	None		
8.12	Homework	4 assignments, no weight		
8.13	Quizzes/Class Tests	Two		
8.14	Projects	None		
8.15	Presentations	None		
8.16	Any other	None		
8.2	MTE	one, 25 marks		
8.3	End-term examination: 50 marks			
9.1	Text books	1. R.R Gaur, R Sangal, G P Bagaria, "A foundation course in Human Values and professional Ethics", Excel books, New Delhi		
9.2	Other references	1. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. 2. A.N. Tripathy, 2003, Human Values, New Age International Publishers. 3. PL Dhar, RR Gaur, Science and Humanism, Commonwealth Purblishers.		

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	2	-	2	1	3	-	1	-	-	-
CO2	-	-	-	-	-	2	-	2	1	3	-	1	-	-	-
CO3	-	-	-	-	-	2	-	2	1	3	-	1	-	-	-
CO4	-	-	-	-	-	2	-	2	1	3	-	1	-	-	-
CO5	-	-	-	-	-	2	-	2	1	3	-	1	-	-	-
CO6	-	-	-	-	-	2	-	2	1	3	-	1	-	-	-

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch: 2023-2027**	
Programme: B.Tech		**Current Academic Year: 2023-2024**	
Branch: CE		**Semester: II**	
1	Course Code	MEP 106	
2	Course Title	Computer Aided Design & Drafting Laboratory	
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	The students will be able to: CO1: Identify the fundamental features of CAD, AutoCAD workspace and user interface. CO2: Apply knowledge of drawing, editing and viewing tool to create two-dimensional engineering drawings in AutoCAD. CO3: Choose advanced features to present an engineering drawing in AutoCAD. CO4: Create an engineering drawing by implementing dimension techniques. CO5: Construct orthographic projections from a pictorial view. CO6: Apply the knowledge of AutoCAD in various industrial practice.	
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 in 3D modeling, manufacturing, and engineering will also be explored. No drafting or computer experience is necessary.	
8	Outline syllabus		CO Mapping
	Experiment 1	Introduction to AutoCAD and its interface	CO1
	Experiment 2	Working with coordinates, Drawing of line, circle, arc, polygon and creating sketches	CO2
	Experiment 3	Editing of drawing by using editing Tools and Power	CO2

		tools			
	Experiment 4	Creating of advanced feature like fillet, chamfer, hatch and using of block			CO3
	Experiment 5	Representing text and dimensioning in AutoCAD			CO4
	Experiment 6	Creating the drawings of Civil components by using AutoCAD features.			CO2, CO3
	Experiment 7	Creating the electrical circuit drawings in AutoCAD.			CO2
	Experiment 8	Drawing plan and elevation of various buildings in AutoCAD.			CO2, CO4
	Experiment 9	Creating the drawing of renowned constructions such as Taj Mahal in AutoCAD			CO3, CO6
	Experiment 10	Creating of orthographic projections from a pictorial views			CO5, CO6
	Mode	Practical			
	Weightage	CA	CE VIVA	ETE	
		25%	25%	50%	
	Text book/s*	1. Ibrahim Zaid, "CAD/CAM- Theory and Practice", McGraw Hill, International Edition.			
	Software	Auto CAD			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	1	2	2	-	-	-	1	-	-	1	-	-	-
CO2	1	-	-	2	3	-	-	-	1	-	-	1	-	-	-
CO3	2	-	-	-	3	-	-	-	-	-	-	1	-	-	-
CO4	1	-	-	-	3	-	-	-	-	-	-	1	-	-	-
CO5	2	-	-	2	-	-	-	-	-	-	-	1	-	-	-
CO6	2	-	1	2	3	-	-	-	1	-	1	1	-	-	-

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch: 2023-2027**		
Programme: B.Tech		**Current Academic Year: 2023-2024**		
Branch: CIVIL		**Semester: III**		
1	Course number	**BTY223**		
2	Course Title	**Introduction to Biology for Engineers**		
3	Credits	1		
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 Civil, 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	The 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:			CO Mapping
7.01	A	**Unit A**	**UNIT I: Introduction to Biotechnology**	
7.02	A1	Unit A Topic 1	History and origin of Biotechnology	CO1, CO2
7.03	A2	Unit A Topic 2	Traditional and Modern Biotechnology	
7.04	A3	Unit A Topic 3	Important events in history of biotechnology.	
7.05	B	**Unit B**	**UNIT II: Scope of Biotechnology**	CO3
7.06	B1	Unit B Topic 1	Areas of Biotechnology	
7.07	B2	Unit B Topic 2	Medicine and health care	
7.08	B3	Unit B Topic 3	Agriculture and industrial biotechnology	
7.09	C	**Unit C**	**UNIT III: Biotechnology as interdisciplinary science**	CO4

7.10	C1	Unit C Topic 1	Introduction to Bioinformatics and Computational Biology	
7.11	.C2	Unit C Topic 2	Role of Biotechnology in maintaining sustainable environment	
7.12	C3	Unit C Topic 3	Basics of Convergence of biotechnology and electronics	
7.13	D	**Unit D**	**UNIT IV: Basics of Gene Technology**	CO5
7.14	D1	Unit D Topic 1	DNA as blue print of life	
7.15	D2	Unit D Topic 2	Introduction to rDNA Technology	
7.16	D3	Unit D Topic 3	Transgenesis and Cisgenesis	
7.17	E	**Unit E**	**UNIT V: Current advances in Biotechnology**	CO6
7.18	E1	Unit E Topic 1	Introduction to Stem cells,	
7.19	E2	Unit E Topic 2	Tissue engineering and	
7.20	E3	Unit E Topic 3	Gene therapy	
8	Course Evaluation			
8.1	Course work: 25% 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. Ravi, Indu, Baunthiyal, Mamta, Saxena, Jyoti. Advances in Biotechnology, Springer 2014.		

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	2	2	1	-	-	-	-	2	3	2	1
CO2	3	2	1	1	2	2	1	-	-	-	-	2	3	2	1
CO3	3	2	1	1	2	2	1	-	-	-	-	2	3	2	1
CO4	3	2	1	1	2	2	1	-	-	-	-	2	3	2	1
CO5	3	2	1	1	3	2	1	-	-	-	-	2	3	2	1
CO6	3	2	2	1	3	2	1	-	-	-	-	2	3	2	1

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-27**		
Programme: B.Tech		**Current Academic Year: 2023-24**		
Branch: Civil		**Semester: III**		
1	Course Code	CVL234	Course Name: NUMERICAL TECHNIQUES CIVIL IN ENGINEERING	
2	Course Title	NUMERICAL TECHNIQUES IN CIVIL ENGINEERING		
3	Credits	1		
4	Contact Hours (L-T-P)	1-0-0		
	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	The students will be able to: 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			CO Mapping
	Unit 1	**Linear Algebra, Eigen Values and Vectors**		CO1, CO6
	A	Linear systems of equations, matrices and determinants, Row Reduction Method, Cramer's rule.		
	B	Basis of eigenvectors		
	Unit 2	**Power, Iterative and Factorization Methods**		CO2, CO6
	A	Iterative methods: Gauss-Seidel and power methods		
	B	Echelon Form of Matrix		
	Unit 3	**Interpolation and Approximation**		CO3, CO6

	A	Newton's Approximation Technique			
	B	Central Difference Method			
	C	Lagrange's Unequal Interval			
	Unit 4	**Linear Programming Problems**			CO4, CO6
	A	Introduction			
	B	LPP formulation			
	C	Graphical Method			
	Unit 5	**Dynamic Programming Problems**			CO5, CO6
	A	Introduction			
	B	Sequencing Technique			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	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.			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-
CO5	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-
CO6	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch: 2023-27**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
Branch: Civil		**Semester: III**	
1	Course Code	CVP234	
2	Course Title	NUMERICAL TECHNIQUES IN CIVIL 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	The students will be able to: 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 the 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		CO Mapping
	Unit 1	**Eigen Value Problems**	CO1, CO6
		Exp 1- Basic matrix operations using Excel/SciLAB	
	Unit 2	**Linear Algebra**	CO2, CO6
		Exp 2 – Gauss Elimination method using Excel/SciLAB	
	Unit 3	**Interpolation Problem**	CO3, CO6
		Exp 3 – Interpolation using Excel/SciLAB	
	Unit 4	**Solving Linear Programming Problem**	CO4, CO6
		Exp 4 – Linear Programming using Excel	
	Unit 5	**Dynamic Programming Problem**	CO5, CO6
		Exp 5 – Dynamic Programming using Excel	
	Unit 6	**Application of Numerical Methods in Civil Engineering**	CO5, CO6
		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	CE-Viva	ESE	
		25%	25%	50%	
	Reference	LAB MANUAL			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-
CO5	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-
CO6	3	3	2	-	-	-	-	-	-	-	-	1	-	-	-

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch: 2023-2027**	
Programme: B.Tech		**Current Academic Year: 2012-2023**	
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	The students will be able to: CO1. Understand the basic principles of Surveying CO2. Perform linear and angular measurements CO3. Implement angular and linear measurements for contouring and levelling CO4. Plan different types of Engineering surveys CO5. Organise setting out for different construction activities CO6. Conduct different surveys and setting 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		CO Mapping
	Unit 1	**Introduction to Surveying**	**CO1, CO2**
	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**	**CO3, CO4**
	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**			**CO2, CO5**
	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**			**CO4**
	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**			**CO5, CO6**
	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	
		25%	25%	50%	
	Text book/s *	Arora, K.R., “Surveying”, Vol. I & II, Thirteenth edition, Standard Book House, Rajsons Publications, 1705-A Nai Sarak, Delhi -110006			
	Other References	1. T .P. Kanetkar& S. V. Kulkarni, “Surveying and Levelling” Part I and II, ,Twenty Fourth Edition, Vidhyarthi Griha Prakashan, 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. Subramanian, R. “Surveying and Levelling”, Second Edition, Oxford University Press.

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	2	2	-	-	-	-	-	-	1	3	1	2
CO2	3	2	-	2	2	-	-	-	-	-	-	1	3	1	2
CO3	3	2	-	2	2	-	-	-	-	-	-	1	3	1	2
CO4	3	2	-	2	2	-	-	-	-	-	-	1	3	1	2
CO5	3	2	-	2	2	-	-	-	-	-	-	1	3	1	2
CO6	3	2	-	2	2	-	-	-	-	-	-	1	3	1	2

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch: 2023-27**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
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	The students will be able to: CO1. Enumerate properties and kinematics of fluid flows at rest and in motion. CO2. Interpret the concepts of fluids, buoyancy and floatation. CO3. Analyse the flow measurements, pipe flows and forces acting on the submerged bodies. CO4. Assess equations of motion of fluids, determine the head losses and flow characteristics. CO5. Synthesize relationships among physical parameters and perform model analysis. CO6. Design the fluid flow systems for pipes and open channels	
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		CO Mapping
	Unit 1	**Introduction**	**CO1, CO2**
	A	Properties of fluids	
	B	Kinematics of Fluid Flow	
	C	Equations of motion	
	Unit 2	**Fluid Statics**	**CO3,**

	A	Fluid Pressure and its application to manometers			**CO4**
	B	Hydrostatic forces on surfaces			
	C	Buoyancy and floatation			
	Unit 3	**Flow through Pipes**			**CO3**
	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**			**CO4, CO5**
	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**			**CO5, CO6**
	A	Buckingham`s π theorem			
	B	Model Analysis			
	C	Introduction to pumps and Turbines			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text book/s*	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			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	-	-	-	-	-	-	-	2	2	3	2
CO2	3	2	3	2	-	-	-	-	-	-	-	2	2	3	2
CO3	3	2	3	2	-	-	-	-	-	-	-	2	2	3	2
CO4	3	2	3	2	-	-	-	-	-	-	-	2	2	3	2
CO5	3	2	3	2	-	-	-	-	-	-	-	2	2	2	2
CO6	3	2	3	2	-	-	-	-	-	-	-	2	2	3	3

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High

School: SSET		**Batch: 2023-27**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
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	The students will be able to: 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 Civil 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		CO Mapping
	Unit 1	**Simple Stresses and Strains**	**CO1, CO2**
	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**			**CO2, CO3**
	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**			**CO3, CO4**
	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**			**CO4, CO5**
	A	Assumptions – Derivation of bending equation, Determination of bending stresses-focusing on Numerical			
	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**			**CO5, CO6**
	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	
		25%	25%	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. 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.			

		2. Strength of Materials by R. Subramanian, Oxford University Press, New Delhi.	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	1	-	-	2	1	-	1	2	-	-
CO2	3	2	1	1	2	1	-	-	2	1	-	2	2	-	-
CO3	3	2	1	1	1	1	2	-	2	1	-	2	2	-	-
CO4	3	2	1	1	1	1	-	-	2	1	-	1	2	-	-
CO5	3	2	1	1	2	1	2	-	2	1	-	1	2	-	-
CO6	3	2	1	1	1	1	-	-	2	1	-	1	2	-	-

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High

School: SSET		Batch: 2023-27	
		Current Academic Year: 2023-24	
		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	The students will be able to: CO1: Ascertain a competency level through Building Essential Language and Life Skills CO2: Build positive emotional competence in self and learn GOAL Setting and SMART Goals techniques. CO3: Apply positive thinking, goal setting and success-focused attitudes. which would help them in their academic as well as professional career. CO4: Acquire satisfactory competency in use of aptitude, logical and analytical reasoning. CO5: Develop strategic thinking and diverse mathematical concepts through building number puzzles. CO6: Demonstrate an ability to apply various quantitative aptitude tools for making business decisions.	
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	CO Mapping
	Unit 1	**BELLS (Building Essential Language and Life Skills)**	
	A	Subject Verb Agreement | One word substitution, writing well-	CO1,

		formed sentences, tense, preposition,	CO6
	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**	**CO2, CO3**
	A	Syllogism | Letter Series | Coding, Decoding , Ranking & Their Comparison Level-1	
	B	Number Puzzles	
	C	Selection Based On Given Conditions	
	Unit 3	**Quantitative Aptitude**	**CO$, CO5**
	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 – 50% | Group Presentations/Mock Interviews/GD/ Reasoning, Quant & Aptitude – 50%	
	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	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	1	-	-	-	1	3	-	2	-	-	-
CO2	-	-	-	-	1	-	-	-	1	3	-	2	-	-	-
CO3	-	-	-	-	1	-	-	-	1	3	-	2	-	-	-
CO4	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO5	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO6	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-

1-Slight (Low) **2-Moderate (Medium) 3 -Substantial (High)**

School: SSET		**Batch: 2023-27**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
Branch: CE		**Semester: III**	
1	Course Code	CVP225	
2	Course Title	SURVEYING AND LEVELLING LAB	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	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	The students will be able to: CO1. Conduct linear measurement. CO2. Perform angular measurements. CO3. Generate triangulation sheets CO4. Estimate elevation using levelling. CO5. Construct contour maps. CO6. Organize conduct of engineering surveys	
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		CO Mapping
	Unit 1	**Linear Measurement**	
		Exp 1- Instruments and Techniques Exp 2- Closed Traverse Exp 3- Chaining Across Obstacles	CO1, CO2
	Unit 2	**Angular Measurement**	
		Exp 4 - Distance between Two Inaccessible Points Exp 5 - Closed Traverse	CO3, CO4
	Unit 3	**Plane Table**	

		Exp 6: Radiation Method Exp 7: Intersection Method Exp 8: Two-Point Problem Exp 9: Three-Point Problem Exp 10: Traversing			CO3, CO4, CO5
	Unit 4	**Levelling**			
		Exp 11: Fly Levelling Exp 12: Longitudinal and Cross Sectioning			CO3, CO4
	Unit 5	**Contouring**			
		Exp 13: Contouring			CO5, CO6
	Mode of examination	Practical			
	Weightage Distribution	CA	CE VIVA	ETE	
		25%	25%	50%	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	-	-	-	3	2	-	2	3	1	2
CO2	3	2	1	1	1	-	-	-	3	2	-	2	3	1	2
CO3	3	2	1	1	1	-	-	-	3	2	-	2	3	1	2
CO4	3	2	1	1	1	-	-	-	3	2	-	2	3	1	2
CO5	3	2	1	1	1	-	-	-	3	2	-	2	3	1	2
CO6	3	2	1	1	1	-	-	-	3	2	-	2	3	1	2

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch : 2023-2027**	
Programme: B.Tech		**Current Academic Year: 2023-2024**	
Branch: Civil		**Semester: 3rd**	
1	Course Code	**CVP288**	
2	Course Title	Project Based Learning -1	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	• To align student's skill and interests with a realistic problem or project • To understand the significance of problem and its scope • Students will make decisions within a frame work	
6	Course Outcomes	The students will be able to: CO1: Identify and formulate problem statement with systematic approach. CO2: Develop teamwork and problem-solving skills, along with the ability to communicate effectively with others. CO3: Design the problem solution as per the problem statement framed. CO4: Classify and understand techniques for software verification and validation of project successfully. CO5: Fabricate and implement the solution by using different aspects of programming language. CO6: Develop a glory of the need to engage in life-long learning.	
7	Course Description	In PBL-1, the students will learn how to define the problem for developing projects, identifying the skills required for developing the project based on given a set of specifications and all subjects of that Semester.	
8	Outline syllabus		CO Mapping
	Unit 1	Problem Definition, Team/Group formation and Project Assignment. Finalizing the problem statement, resource requirement, if any.	CO1, CO2
	Unit 2	Develop a work flow or block diagram for the proposed System / software.	CO2,CO3
	Unit 3	Design algorithms for the proposed problem.	CO3
	Unit 4	Implementation of work under the guidance of a faculty member and obtain the appropriate results.	CO3, CO4
	Unit 5	Demonstrate and execute Project with the team. Validate and verify the project modules.	CO4, CO5, CO6

		Report should include Abstract, Hardware/Software Requirement, Problem Statement, Design/Algorithm, and Implementation Detail. Validation Reports. References if any. The presentation, report, work done during the term. Supported by the documentation, forms the basis of assessment.			
	Mode of examination	Practical /Viva			
	Weight age Distribution	CA	CE VIVA	ETE	
		25%	25%	50%	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	3	-	-	-	-	3	3	2	3	2	2	1
CO2	3	2	-	3	-	-	2	-	3	3	2	3	-	-	1
CO3	3	2	-	-	2	-	-	-	3	3	2	3	2	2	-
CO4	3	3	-	-	-	2	-	-	3	3	2	3	-	2	-
CO5	3	3	2	2	2	2	3	3	3	3	2	3	2	2	
CO6	3	3	-	3	-	-	-	-	3	3	2	3	-	-	1

1-Slight (Low) 2-Moderate (Medium) 3 -Substantial (High)

School: SSET		**Batch: 2023-2027**
Programme: B.Tech		**Current Academic Year: 2023-2024**
Branch: Civil Engineering		**Semester: III**
1	Course Code	CVP195
2	Course Title	Industrial Internship I
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	To expose engineering students to the real industrial scenario, which is not possible in the classroom? Familiarize with various materials, processes, products and their applications along with relevant aspects of quality control and shop floor management. Understand the psychology of the workers and their habits, attitudes and approach to problem solving. Understand the social, economic and administrative considerations that influence the working environment of industrial organizations. Learn about team work, collaboration and leadership. Importance of time management, discipline, self-learning and effective communication. To apply the engineering knowledge in real industrial situations. To gain experience in writing reports in engineering works/projects. To enhance the employability of the students. Get exposed to the current technological developments relevant to the subject area to which the training pertains. To develop self-esteem for employment after graduation
6	Course Outcomes	The students will be able to: CO1: Infer the working environment of industry. CO2: Analyze the resources in practice. CO3: Apply Engineering Knowledge for Problem analysis CO4: Decide investigative procedure to sort out complex industrial problems CO5: Interpret the importance of working in a team CO6: Maximize his/her ability to make work related presentations.
7	Course Description	This practical course is intended to expose the students to real life scenario in industry with the intention to make them future ready for their professional role. In this, the students undergo in reputed Private / Public Sector / Government organization / companies for four weeks/one month in summer vacation after II semester. It is expected that the skills student gain via internship with an organization will help him/her perform better in the assigned job after graduation. Apart from

		this, the industrial internship enhances the chance for students to obtain employment after graduation. It is pertinent to mention that developing an awareness of general workplace behaviour and interpersonal skills are expected from students at the end of the Industrial internship. The student should be able relate, apply and adapt relevant knowledge and concepts within industrial ambience and ethics.	
8	Outline		CO Mapping
	A	**INTERNSHIP DIARY**	
		An internship diary is provided by the university for collecting the information during industrial internship on daily basis. It also helps the student for writing his/her report. The objective of maintaining daily diary is to cultivate the habit of documenting and encourage him/her to search for details. It develops the students' own thought process and reasoning abilities. The students should record in the daily training diary the day to day account of the observations, impressions and information gathered. It should contain the sketches & drawings related to the observations made by the students. On the basis of recorded data in the diary, the student will prepare a report.	CO1, CO2, CO3, CO5
	B	**INTERSHIP REPORT**	
		A student should learn about equipments, machines, plant layout and other industrial practices in industry. After collecting the information, one should prepare a comprehensive internship report at the end of one's internship to demonstrate what one has learnt in this period. Daily diary will facilitate to a great extent in writing the report. It is mandatory for the student to submit a hard copy of report to one's assigned coordinator for corrections and subsequently, submitting a final spiral bound copy to department. The assigned coordinator will check the followings things in the draft submitted by the student: Report is made as per the format approved by the department. Originality of the report very adequate and purposeful write-up. Organization, drawings, sketches, format, style, language, fig no, table no and references etc. Variety and relevance of learning experience. After doing correction the corrected copies will be submitted at the time of presentation, duly signed by the faculty coordinator and Head of Department.	CO6

	C	**INDUSTRIAL INTERNSHIP EVALUATION PROCESS**	
		The Industrial Internship Evaluation is done in the presence of assigned Department Faculty coordinator and External Examiner, duly approved by The controller of Examination. The evaluation process includes a seminar presentation and viva-voce, done on the basis of following criteria. The Power Point Presentation Proper Planning of Presentation Effectiveness of Presentations Depth of knowledge and skills. Records in which internship diary and reports are analyzed along with presentation and viva voce	CO4, CO6
	Mode of examination	Practical	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	1	3	1	-	-	-	2	2	2	2
CO2	-	-	-	-	-	-	2	-	-	-	-	2	2	2	2
CO3	-	-	-	-	-	2	1	-	-	-	-	2	2	2	2
CO4	-	-	-	-	-	2	-	-	-	-	-	2	2	2	2
CO5	-	-	-	-	-	-	1	1	-	-	-	2	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	3	3	3	3

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High**

School: SSET		**Batch: 2023-27**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
Branch: CE		**Semester: III**	
1	Course Code	CVP226	
2	Course Title	Introduction to fluid mechanics	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	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	The students will be able to: CO1 Measure the dynamic and kinematic viscosity of liquids. CO2 Determine buoyancy and floatation properties of fluids CO3 Calibration of notches and flow through pipes CO4 Determine the coefficient of discharge of venturimeter and orifice meter. CO5 Verify the Bernoulli's theorem. CO6 To determine minor and major losses in pipe flow.	
7	Course Description	Testing application of an understanding of fluid mechanics and its applications in a variety of engineering problems and learning as well as applications of the basic principles and equations of fluid mechanics for solving the real life fluid mechanics problems.	
8	Outline syllabus		CO Mapping
	Unit 1	Practical related to properties of fluids and equations of motion.	
		Exp. 1: Reynold's experiment	CO1, CO2
		Exp. 2: Measurement of Impact of Jet	
	Unit 2	Practical related to fluid statistics	
		Exp. 3: To find metacentric height of a floating body.	CO1, CO3
	Unit 3	Practical related to calibration of notches and flow through pipes	
		Exp. 4: Calibration of V notch	CO1, CO4

		Exp. 5: Calibration of rectangular notch			
		Exp. 6: Energy Losses in Pipe			
		Exp. 7: Friction in Pipes			
	Unit 4	Dynamics of fluid flow			
		Exp. 8: Calibration of Venturimeter			CO4, CO5
		Exp. 9 Validation of Bernouli's theorem			
		Exp. 10: Flow measurement through orifices			
	Weightage Distribution	CA	CE VIVA	ETE	
		25%	25%	50%	
	Text books	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. Frank M. White, "Fluid Mechanics", Mc- Graw Hill, 1994.			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	1	1	-	-	-	1	-	2	2	3	-
CO2	3	3	3	1	1	1	-	-	-	1	-	2	2	3	1
CO3	3	3	3	2	2	1	-	-	-	1	-	2	2	3	1
CO4	2	3	3	2	1	1	-	-	-	1	-	2	2	3	1
CO5	3	3	3	2	2	1	-	-	-	1	-	2	2	3	1
CO6	3	3	3	2	2	1	-	-	-	1	-	2	2	3	1

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High**

School: SSET		**Batch: 2023-27**	
Programme: B.Tech		**Current Academic Year: 2023-2024**	
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	The students will be able to: CO1: Distinguish between determinate and indeterminate structure. CO2: Examine the behaviour of determinate beams, trusses under static loading conditions. CO3: Determine the effect of rolling loads on simply supported girders using ILD. CO4: Analyze arches using analytical method. CO5: Inspect the behaviour of cables. CO6: Assess determinate structures under the influence of the relevant loads and actions.	
7	Course Description	Introduction to various support conditions, types of structures, Methods of analysing 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	CO1
	B	Castigliano's theorem, Deflection of determinate structures by Principle of virtual work (unit load method)	CO1, CO6
	C	Betti and Maxwell reciprocal theorems	CO1
	Unit 2	**Deflection of statically determinate structures& Truss Analysis**	
	A	Conjugate beam method, Moment area method	CO2
	B	Unit Load Method	CO2
	C	Perfect, Deficient and Redundant trusses, Assumptions and Nature of Forces in Members. Method of Joints, Method of	CO2, CO6

		Sections.		
	Unit 3	**Rolling Loads**		
	A	Influence lines for simply supported beams and overhanging beams		CO3
	B	Maximum Shear force and bending moment due to moving load for simply supported beam		CO3
	C	Absolute shear force and bending Moment, Equivalent UDL		CO3, CO6
	Unit 4	**Three hinged Parabolic arches**		
	A	Determination of normal thrust		CO4
	B	Determination of shear force		CO4
	C	Determination of Bending Moment		CO4, CO6
	Unit 5	**Suspension bridges**		
	A	Suspension cable with three hinged stiffening girder		CO5
	B	Determination of Horizontal tension in the cable		CO5
	C	Determination of Shear force and Bending Moment		CO5, CO6
	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.		

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	2	-	-	-	-	-	-	-	2	1	3	2
CO2	3	3	1	2	-	-	-	-	-	-	-	2	1	3	2
CO3	3	3	1	2	-	-	-	-	-	-	-	2	1	3	2
CO4	3	3	1	2	-	-	-	-	-	-	-	2	1	3	2
CO5	3	3	1	2	-	-	-	-	-	-	-	2	1	3	2
CO6	3	3	1	2	-	-	-	-	-	-	-	2	1	3	2

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-27**	
Programme: B Tech		**Current Academic Year: 2023-2024**	
Branch: CE		**Semester: IV**	
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	The students will be able to: CO1: Classify soils for its suitability in foundation, embankment, and highway. CO2: Synthesize three phases of soil components, analyze total and effective stress. CO3: Evaluate compaction and consolidation characteristics and interpret field results. CO4: Determine shear strength and compressibility parameters. CO5: Compute the passive and active lateral earth pressures. CO6: Analyze engineering properties and behaviour of soil.	
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		CO Mapping
	Unit 1	**Soil Formation and Classification**	
	A	Formation of Soil from rocks, Civil engineering problems related to soil	CO1, CO2
	B	Three phase diagram and index properties of soils	
	C	Classification of soil, Consistency of clays-Atterberg's limits	
	Unit 2	**Principle of effective stress, Capillarity and Permeability**	
	A	Principle of effective stress, Physical meaning of effective stress	CO2
	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			CO3
	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			CO4
	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			CO5
	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	
		25%	25%	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.			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	2	-	-	-	-	-	-	-	2	3	3	2
CO2	3	3	1	2	-	-	-	-	-	-	-	2	3	3	2
CO3	3	3	1	2	-	-	-	-	-	-	-	2	3	3	2
CO4	3	3	1	2	-	-	-	-	-	-	-	2	3	3	2
CO5	3	3	1	2	-	-	-	-	-	-	-	2	3	3	2
CO6	3	3	1	2	-	-	-	-	-	-	-	2	3	3	2

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High**

School: SSET		**Batch: 2023-27**	
Programme: B.Tech		**Current Academic Year: 2023-2024**	
Branch: Civil		**Semester: II**	
1	Course Code	CVL105	Course Name: Construction Materials
2	Course Title	Construction 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 ef which affects the choice of materials, along with the orientation of the building a byelaws used for the construction. The students are also exposed to some of the materials which have been introduced in recent times.	
	Course Outcome	The students will be able to: CO1. Define and explain the basic properties of materials used in construction. CO2. Identify the composition and properties of the most common building materials. CO3. Make use of simple calculation about the strength and other properties to select the appropriateness in construction. CO4. Examine the proportion of materials and produce concrete and test for the strength of manufactured concrete. CO5. Evaluate the appropriateness of the conventional and new materials in construction. CO6: Propose suitable materials to be used in construction	
7	Course Description	This course demands that each student develops an understanding of the behavior 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	CO Mapping
	Unit 1	**Introduction and Planning of a Building**	CO1, CO6
	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**	CO2, CO6
	A	Brick as most commonly used clay product, Types, Characteristics, Brick Masonry, Bricks made with Alternate materials Clay products - Clay products and its composition, Steps for manufacturing,	
	B	Stone: Characteristics of stones, Deterioration of stone, Types of stone, Prevention of decay / maintenance of stones, Uses of stone, Use of Stone dust, Stone masonry.	
	C	Glass – Introduction, Steps for manufacturing, Ingredients for manufacturing, Properties of glass, Different types of glass, Types of glass Special properties.	
	Unit 3	**Building Materials-1**	CO3, CO6
	A	Cement, Manufacturing of cement, Composition of cement, Hydration of cement, Gel Space Ratio, Setting of cement, Heat of hydration, Types of cement;	
	B	Definition of coarse aggregate, Classification of coarse aggregate, Coarse aggregate size and Grading, Definition of Fine Aggregate, Sand as fine aggregate, grading of sand, Bulking of sand. Introduction to concrete - What is concrete, Basic constituents of concrete, Making of concrete, Tests of concrete, uses of concrete,	
	C	Wood - What is wood, Classification of wood, Processing of wood, Types of Seasoning, Types of Conversion, Ways of Preservation, Properties of wood Commercial classification of wood; Defects of wood and Wood joinery; Engineered wood- What is engineered wood, Different types of engineered wood: Use, Advantages, Disadvantages. Introduction to bamboo- Advantages of Bamboo, Limitations, Application of Bamboo;	
	Unit 4	**Building Materials-2**	CO4, CO6
	A	Ferrous metals - Steel manufacturing, Properties of steel, Rolling of steel, Joining of metals, Steel reinforcement bars and use, Corrosion and its prevention, Light gauge steel; Non-ferrous metals- Introduction to non-ferrous metals, Metals extraction properties & use, Aluminum, Copper, Zinc, Lead;	
	B	Ceramic tiles and vitrified tiles- Introduction, Manufacturing,	

		Ceramic wall tiles, Ceramic floor tiles, Vitrified tiles;			
	C	Paint - What are paints, Purpose of paint, Characteristics of good paint, Composition and function of ingredients, Steps for manufacturing of paint How does paint work? Defects of paints, Types of paints Application of paint, Special paints, Nano application in paints; Plastics - What are plastics, Thermoplasts and thermosets, Characteristics of plastics, Constituents of plastic, Different types of plastics and applications			
	Unit 5	**Composite Materials**			CO5, CO6
	A	Prefabricated Construction - Introduction to prefabricated items, Advantages of use, Limitations of use.			
	B	Prefabs: Wall Panels and fixing details - Precast wall panels, Characteristics and Ingredients, Prefabs: Floor panels column and foundation - Floor panels for small span, Floor panel for long span.			
	C	Composites - What are composites, Applications in buildings, Composites in structural systems, Nano material applications;			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text book/s*	1. Building Materials – S.K. Duggal - New Age Int'l Publication, New Delhi. ISBN: 978-81-224-3379-1			
	Other References	1. Building Materials – Gambhir and Jamwal (McGraw Hill, New Delhi) 2. Don A. Watson, Construction Materials and Process, McGraw Hill Co., 1972			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	1	-	-	-	-	1	1	-	1	3	1	1
CO2	3	1	1	1	-	1	-	-	1	1	-	1	3	2	2
CO3	2	1	1	1	-	1	1	-	1	1	-	1	1	3	2
CO4	2	1	1	1	-	-	-	-	1	1	-	1	1	3	1
CO5	2	1	1	1	-	-	-	-	1	1	-	1	1	3	2
CO6	2	1	1	1	-	-	-	-	2	1	-	1	1	2	3

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch: 2023-2027**	
Programme: B.Tech		**Current Academic Year: 2023-2024**	
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 impart in-depth knowledge of the hydrological processes and hydraulic engineering to the students and applications of the same for solving the real life hydrological and hydraulic engineering problems.	
6	Course Outcomes	The students will be able to: CO1. Enumerate the principles of engineering hydrology, analysis and synthesis of flow hydrographs. CO2. Interpret types of free surface flows and estimate the economical cross-sections of the rigid boundary channels. CO3. Apply the concepts of specific energy and its computations in open channel flow hydraulics. CO4. Analyse specific forces and control sections for hydraulics engineering problems. CO5. Assess and evaluate gradually varied flows, hydraulic jumps and surges to predict the energy losses. CO6. Design economical and efficient cross-sections for rigid boundary channels.	
7	Course Description	This course aims to comprehensively deal with the various concepts of engineering hydrology i.e., estimation of rainfall, infiltration, stream flows and evapotranspiration; analysis and synthesis of hydrographs, open channel hydraulics, energy and momentum principles of flow hydraulics; gradually varied flow and evaluation of hydraulic jumps in rectangular channels as well as the principles of surges in hydraulic engineering.	
8	Outline syllabus		CO Mapping
	Unit 1	**Engineering Hydrology**	
	A	Components of hydrologic cycle	CO1
	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			CO2, CO3, CO6
	B	Uniform Flow			
	C	Rigid Boundary Channel			
	Unit 3	**Energy and Momentum Principles**			
	A	Specific energy			CO3, CO4
	B	Critical depth & its computations			
	C	Specific force and Control Sections			
	Unit 4	**Gradually Varied Flow in Open Channels**			
	A	Gradually varied flow computations			CO5
	B	Classification of gradually varied flows			
	C	Features of Surface profile curves			
	Unit 5	**Hydraulic Jump**			
	A	Introduction			CO5
	B	Hydraulic jump evaluation in rectangular channel			
	C	Surges in open channel			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text books	1. K. Subramanya, Engineering Hydrology, 5th Edition, McGraw Hill, 2020. 2. K. Subramanya, Flow in Open Channels, 5th Edition, McGraw Hill, 2019. 3. H.M. Raghunath, Hydrology: Principles, Analysis, Design Principles, Analysis and Design, New Age International Pvt Ltd. 4. P.N. Modi and S.M. Seth, Hydraulics, Fluid Mechanics including Hydraulics Machines, Standard Book House, New Delhi. 5. E.M. Wilson, Engineering Hydrology, Red Globe Press, ISBN-13: 978-0333517178, ISBN-10: 0333517172			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	-	-	-	-	-	-	-	2	2	3	1
CO2	3	3	3	2	-	-	-	-	-	-	-	2	2	3	1
CO3	3	3	3	2	-	-	-	-	-	-	-	2	2	3	1
CO4	3	3	3	2	-	-	-	-	-	-	-	2	2	3	1
CO5	3	3	3	2	-	-	-	-	-	-	-	2	2	3	1
CO6	3	3	3	2	-	-	-	-	-	-	-	2	2	3	1

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-2027**		
Programme: B.Tech		**Current Academic Year: 2023-2024**		
Branch: Civil		**Semester: IV**		
1	Course Code	CVL320	Course Name: Water Supply Engineering	
2	Course Title	Water Supply Engineering		
3	Credits	2		
4	Contact Hours (L-T-P)	2-0-0		
	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	The students will be able to: CO1: Characterize, and classify water sources CO2: Examine the key characteristics of drinking water along with forecasting population and water demand CO3: Design the water treatment plant. CO4: Plan the water conveyance network and pipe layouts. CO5: Propose the necessity of water conservation, principle of house drainage and sanitation system. CO6: Correlate the key qualitative and quantitative parameters with water supply system		
7	Course Description	Introduction, water quality and demand, water treatment, water transportation, water conservation and house sanitation.		
8	Outline syllabus			CO Mapping
	Unit 1	**Introduction**		CO1, CO6
	A	Introduction to planned water supply		
	B	Sources of Water Supply		
	C	Water Collection- Intake Structures		
	Unit 2	**Water Quality and Demand**		CO2, CO6
	A	Physical, chemical & Biological characteristics		
	B	Water demands, factors affecting demand		
	C	Population Forecasting, design flows		

	Unit 3	**Water Treatment**			CO3, CO6
	A	Conventional treatment process design.			
	B	Advanced water treatment processes			
	C	Domestic water purification			
	Unit 4	**Water Transportation**			CO4, CO6
	A	Pipe materials, head loss			
	B	Distribution Network, Layout			
	C	Service connection and appurtenances, system of plumbing			
	Unit 5	**Water conservation and house sanitation**			CO5, CO6
	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	
		25%	25%	50%	
	Text Books	1. Garg, S. K. "Water Supply Engineering", Khanna Publishers.2012 2.SawyerandMcCarty"ChemistryforEnvironmentalEngineeringand Science", McGraw Hills.2000			
	Other references	1.Peavy,H.S.,Rowe,D.R.andTchobanoglous,G"Introductionto 2. Environmental Engineering" McGraw Hill. 1986 Davis, M.L.and Cornwell, D.A., "Introduction to Environmental Engineering", McGraw Hill. 1998. 3.Masters,G.M.,"IntroductiontoEnvironmentalEngineeringandScience" Prentice Hall OfIndia.1998			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	1	-	-	3	-	-	-	-	1	3	1	3
CO2	2	3	3	1	-	-	3	-	-	-	-	1	3	1	3
CO3	2	3	3	1	-	-	3	-	-	-	-	1	3	1	3
CO4	2	3	3	1	-	-	3	-	-	-	-	1	3	1	3
CO5	2	3	3	1	-	-	3	-	-	-	-	1	3	1	3
CO6	2	3	3	1	-	-	3	-	-	-	-	1	3	1	3

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-27**	
Programme B Tech		**Current Academic Year: 2023-24**	
Branch: Civil		**Semester: IV**	
1	Course Code	CVP320	Course Name: Water Supply Engineering Lab
2	Course Title	Water Supply Engineering Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Basic Engineering	
5	Course Objective	1. Perform common environmental experiments relating to water and wastewater quality, and know which tests are appropriate for given environmental problems 2. Understand and use the water and wastewater sampling procedures and sample preservations 3. Obtain the necessary background for subsequent courses in environmental engineering. Demonstrate the ability to write clear technical laboratorial reports	
6	Course Outcomes	The students will be able to: CO1.Examine important physical characteristics of water and Waste water. CO2. Determine basic chemical parameters of water and Waste water CO3.Evaluate and interpret key chemical characteristics. CO4. Inspect the pollution strength of water and waste water CO5. Test the advanced characteristics of Waste water CO6.Propose suitable physical and chemical tests of water and waste water	
7	Course Description	Application of basic chemistry and chemical calculations to measure physical, chemical, and bacteriological parameters of water and wastewater. Laboratory methods and interpretation of results with regard to environmental engineering applications such as design and operation of water and wastewater treatment processes, and to the control of the quality of natural water.	
Outline syllabus			CO Mapping
	Unit 1	**Physical Characteristics of water &waste Water**	CO1, CO6
	A	Determination of turbidity of a water sample	
	B	Determination of TDS of a water sample	

	C	Determination of total solids, total dissolved solids and total suspended solids of a water sample	
	Unit 2	**Chemical Characteristics of Water and Waste water-I**	CO2, CO6
	A	Determination of pH of a water sample	
	B	Determination of Acidity of water sample	
	C	Determination of Alkalinity of a water sample	
	Unit 3	**Chemical Characteristics of Water and Waste water-II**	CO3, CO6
	A	Determination of chloride content of a water sample	
	B	Determination of hardness of a water sample	
	C	Determination of residual chlorine of a water sample	
	Unit 4	**Chemical Characteristics of Waste water**	CO4, CO6
	A	Determination of dissolved oxygen content in waste water sample	
	B	Determination of BOD of a wastewater sample	
	C	Determination of COD of a wastewater sample	
	Unit 5	**Value Added experiments**	CO5, CO6
	A	Determination of Volatile Solids and Fixed Solids in Waste Water Sample	
	B	Determination of nitrate content in water sample	
	C	Determination of physical and chemical characteristics of an unknown water sample sourced from a location of student's choice.	

Mode of examination	Practical			
Weightage Distribution	CA	CE-Viva	ESE	
	25%	25%	50%	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	1	-	1	3	-	2	3	-	1	1	2	3
CO2	2	-	-	1	-	1	3	-	2	3	-	1	1	2	3
CO3	2	-	-	1	-	1	3	-	2	3	-	1	1	2	3
CO4	2	-	-	1	-	1	3	-	2	3	-	1	1	2	3
CO5	2	-	-	1	-	1	3	-	2	3	-	1	1	2	3
CO6	2	-	-	1	-	1	3	-	2	3	-	1	1	2	3

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch:** 2023-2027	
Programme: B.Tech		**Academic Year: 2023-2024**	
Branch: Civil		**Semester:** IV	
1	Course Code	**ARP204**	
2	Course Title	**Quantitative and Qualitative Aptitude Skill Building**	
3	Credits	2	
4	Contact Hours (L-T-P)	1-0-2	
	Course Status	Active	
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	The students will be able to: CO1: Develop and deliver the effective presentations to interpret the deeper meaning of life. CO2: Improve listening skills so as to understand complex business communication in a variety of global English accents through proper pronunciation. CO3: Demonstrate a good understanding of effective business writing. and telephone handling Skills CO4: Acquire higher level competency in use of aptitude, logical and analytical reasoning. CO5: Develop higher level strategic thinking and diverse mathematical concepts through building number puzzles. CO6: Demonstrate higher level quantitative aptitude tools for making business decisions.	
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		CO MAPPING
	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	CO1

		& STAR 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 |The Art of Giving Feedbacks| Feedback Skills | Asking fact finding questions- Probing Skills	CO2
	C	Email Etiquette | Business Writing Skills Telephone Etiquette Skills (Telephone Handling Skills) |Non Verbal Communication-Kinesthetics, Proxemics, Paralanguage | MTI Reduction Program | Verbal Abilities - 2	CO3
	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**	
	A	Coding Decoding , Ranking & Their Comparison Level-2	CO4
	B	Series, Blood Relations & Number Puzzle	CO5
	Unit 3	**Quantitative Aptitude**	
	A	Number System Level 2	CO5
	B	Vedic Maths Level-2 | Probability | Permutation & Combination	CO6
	C	Percentage, Profit & Loss ,Partnership, Simple Interest & Compound Interest	CO6
	Weightage Distribution	*(CA)Class Assignment/Free Speech Exercises / JAM – 50% | (ETE) Group Presentations/Mock Interviews/GD/ Reasoning, Quant & Aptitude – 50%*	
	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	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO2	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO3	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO4	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO5	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO6	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-2027**	
Programme: B.Tech		**Current Academic Year: 2023-2024**	
Branch: Civil		**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	The students will be able to: CO1: Examine the various types of strengths of material. CO2: Assess the hardness and toughness of mild steel using various apparatus. CO3: Correlate the theoretical knowledge with practical condition. CO4: Predict the behaviour of structural members under different type of loadings. CO5: Estimate the flexural rigidity of structural member. CO6: Conduct experiments predicting strength and behavior of structural member.	
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		CO Mapping
	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.	CO1, CO2
		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**	**CO2, CO3**
		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**	**CO4, CO5**
		Exp 8- Verification of Maxwell-Betti's Law.	
		Exp 9- Verification of moment area theorem.	
	Unit 4	**Practical related to behaviour study under loading**	**CO4, CO5**
		Exp 10- Study the behaviour of various types of column.	
		Exp 11- Study the behaviour of three hinged arch.	
		Exp 12- Study the behaviour 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**	**CO4, CO5, CO6**
		Exp 14- Determination of flexural rigidity of beam.	
	Mode of examination	Jury/Practical/Viva	
Weightage Distribution	CA	MTE	ETE
	25%	25%	50%

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	1	-	-	-	-	2	2	3	2	1	3	1
CO2	3	3	-	1	-	-	-	-	2	2	3	2	1	3	1
CO3	3	3	-	1	-	-	-	-	2	2	3	2	1	3	1
CO4	3	3	-	1	-	-	-	-	2	2	3	2	1	3	1
CO5	3	3	-	1	-	-	-	-	2	2	3	2	1	3	1
CO6	3	3	-	1	-	-	-	-	2	2	3	2	1	3	1

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-2027**	
Programme: B.Tech		**Current Academic Year: 2023-2024**	
Branch: Civil		**Semester: 4**	
1	Course Code	**CVP289**	
2	Course Title	Project Based Learning -2	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1. To align student's skill and interests with a realistic problem or project 2. To understand the significance of problem and its scope 3. Students will make decisions within a frame work	
6	Course Outcomes	The students will be able to: CO1: Create better work habits towards learning CO2: Take part in brain storming activities CO3: Formulate their goals and objectives towards the research problem CO4: Improve their soft skills like communication, presentation etc. CO5: Evaluate the extent to which goals are achieved CO6: Make use of Technology to convert ideas into products	
7	Course Description	In PBL-2, the students will learn how to define the problem for developing projects, identifying the skills required for developing the project based on given a set of specifications and all subjects of that Semester.	
8	Outline syllabus		CO Mapping
	Unit 1	Problem Definition, Team/Group formation and Project Assignment. Finalizing the problem statement, resource requirement, if any.	CO1, CO2
	Unit 2	Develop a work flow or block diagram for the proposed system / software.	CO2,CO3
	Unit 3	Design algorithms for the proposed problem.	CO3
	Unit 4	Implementation of work under the guidance of a faculty member and obtain the appropriate results.	CO3, CO4
	Unit 5	Demonstrate and execute Project with the team. Validate and verify the project modules.	CO4, CO5, CO6
		Report should include Abstract, Hardware/Software Requirement, Problem Statement, Design/Algorithm, and Implementation Detail. Validation Reports. References if any. The presentation, report, work done during the term Supported by the documentation, forms the basis of assessment.	

	Mode of examination	Practical /Viva			
	Weight age Distribution	CA	CE VIVA	ETE	
		25%	25%	50%	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	3	-	-	-	-	3	3	2	3	2	2	1
CO2	3	2	-	3	-	-	2	-	3	3	2	3	-	-	1
CO3	3	2	-	-	2	-	-	-	3	3	2	3	2	2	-
CO4	3	3	-	-	-	2	-	-	3	3	2	3	-	2	-
CO5	3	3	2	2	2	2	3	3	3	3	2	3	2	2	-
CO6	3	3	-	3	-	-	-	-	3	3	2	3	-	-	1

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch: 2023-2027**	
Programme: B.Tech.		**Current Academic Year: 2023-24**	
Branch: Civil		**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	The students will be able to: CO1: Examine beams and frames using Slope deflection method. CO2: Estimate moments and deflection using moment distribution method. CO3: Analyze continuous beams & frames by Kani's Method, CO4: Predict forces and moments of frames by portal and cantilever method. CO5: Understand the basic concept of Matrix Method. CO6: Assess indeterminate structures by various analysis 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		CO Mapping
	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	CO1, CO6
	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	CO2, CO6
	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	CO3, CO6
	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	CO4, CO6
	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	CO5, CO6
	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: 25% / MTE: 25% / ETE: 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.	
	Other References	1. Analysis of structures Vol. I & II by Vazrani and Ratwani. Khanna publications. 2. Wang C.K. Intermediate structural analysis, McGraw Hill, New York.	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3		3								3	2	1	3
CO2	2	3		3								3	2	1	3
CO3	2	3		3								3	2	1	3
CO4	2	3		3								3	2	1	3
CO5	2	3		3								3	2	1	3
CO6	2	3		3								3	2	1	3

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch: 2023-2027**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
Branch: Civil		**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	Elective	
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 and skills and expertise necessary for management of GIS projects	
6	Course Outcomes	The students will be able to: CO1: Understand the spatial concept, its application to Civil Engineering. 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: Implement the geospatial concepts to Civil Engineering problems and finding solutions	
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	CO Mapping
	Unit 1	**Systems and Study**	CO1,CO6
	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**	CO2,CO6
	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**			CO3,CO6
	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**			CO4,CO6
	A	Raster and Vector Data query			
	B	Geo-spatial measurements			
	C	Overlay, Network and Surface Analysis			
	Unit 5	**Geo-visualisation and Implementation**			CO5,CO6
	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	
		25%	25%	50%	
	Textbook/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.			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	1	2	1	-	-	-	-	-	2	3	-	1
CO2	3	1	1	1	2	1	-	-	-	-	-	2	3	-	1
CO3	2	2	2	2	2	1	-	-	-	-	-	2	1	-	2
CO4	2	3	3	2	2	1	-	-	-	-	-	2	2	-	2
CO5	1	2	2	3	2	1	-	-	2	2	-	2	1	-	3
CO6	2	2	1	1	2	1	-	-	2	2	3	2	1	-	3

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-2027**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
Branch: Civil		**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	The students will be able to: CO1: Characterize municipal waste wate and propose a process flow sheet for STP. CO2: Choose suitable primary and secondary suspended growth processes for biological treatment. CO3: Structure attached growth systems for biological treatment operations. CO4: Illustrate tertiary treatment and evaluate various sustainability options for an STP. CO5: Design sewage collection systems CO6: Construct unit operations of STP 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		CO Mapping
	Unit 1	**Introduction**	**CO1, CO2**
	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	CO2, CO3
	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**			**CO1, CO4**
	A	Theory of attached growth			
	B	Design of attached growth systems: Trickling filter			
	C	Rotating Biological Contactors (RBC)			
	Unit 4	**Treatment process-III**			**CO3, CO5**
	A	Anaerobic treatment, digester design			
	B	Tertiary treatment, Sustainable wastewater treatment			
	C	STP layout and design			
	Unit 5	**Wastewater Conveyance**			**CO4, CO6**
	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	
		25%	25%	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 8. Karia and Christian, "Wastewater Treatment: Concepts and design approach", Prentice Hall of India.			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	-	-	2	3	-	-	-	-	2	1	1	3
CO2	3	1	3	-	-	2	3	-	-	-	-	2	1	1	3
CO3	3	1	3	-	-	2	3	-	-	-	-	2	1	1	3
CO4	3	1	3	-	-	2	3	-	-	-	-	2	1	1	3
CO5	3	1	3	-	-	2	3	-	-	-	-	2	1	1	3
CO6	3	1	3	-	-	2	3	-	-	-	-	2	1	1	3

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch:** 2023-2027	
Programme		**Academic Year:** 2023-2024	
Branch: ME		**Semester: V**	
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	
	Course Status	Active	
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 3rd phase of employability enhancement and skill building activity exercise.	
6	Course Outcomes	The students will be able to: CO1: Apply skills of personality development which will help a student groom to meet the needed social strata for establishing themselves in the society CO2: Build a positive behavioural attitude and attributes developing interpersonal skills for building positive and meaningful social and professional relationships CO3: Review and revise development plans to adapt to technological aspirations, circumstances and working environments CO4: Acquire higher level competency in use of numbers and digits, logical and analytical reasoning CO5: Develop higher level strategic thinking and diverse mathematical concepts through building cubes and cuboids. CO6: Demonstrate higher level quantitative aptitude such as analytical and statistical tools for making business decisions.	
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**	**CO MAPPING**
	A	What is Personality?|Creating a positive impression – The 3 V's of Impression |Individual Differences and Personalities	CO1

	B	Personality Development and Transformation | Building Self Confidence | Behavioural and Interpersonal Skills	CO2
	C	Avoiding Arguments | The Art of Assertiveness | Constructive Criticism | The Personal Effectiveness Grid | Assessing our Strengths & Limitations and Creating an Action Plan for Learning with the 4M Model | Verbal Abilities-3	CO3
	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**	
	A	Numbers & Digits , Mathematical Operations | Analytical Reasoning	CO4
	B	Cubes & Cuboids | Statement & Assumptions	CO5
	C	Strong & Weak Argument	CO5
	Unit 3	**Quantitative Aptitude**	
	A	Work & Time ,Pipes & Cistern	CO6
	B	Time ,Speed & Distance, Quadratic & Linear Equations, Logs & Inequalities	CO6
	C	Sequence & Series, Logarithms, Data Interpretation | Data sufficiency - Level 1	CO6
	Weightage Distribution	*(CA)Class Assignment/Free Speech Exercises / JAM – 50% | (ETE) Group Presentations/Mock Interviews/GD/ Reasoning, Quant & Aptitude – 50%*	
	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	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	1	-	-	1	2	1	2	-	-	-
CO2	-	-	-	-	-	1	-	-	1	2	1	2	-	-	-
CO3	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO4	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO5	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO6	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High**

School: SSET			**Batch: 2023-2027**
Programme: B.Tech			**Current Academic Year: 2023-2024**
Branch: Civil			**Semester: V**
1	Course Code		**CVP388**
2	Course Title		Project Based Learning -3
3	Credits		2
4	Contact Hours(L-T-P)		0-0-4
	Course Status		Compulsory
5	Course Objective		1. To align student's skill and interests with a realisticproblem or project 2. To understand the significance of problem and its scope 3. Students will make decisions within a framework
6	Course Outcomes		The students will be able to: CO1: Adapt general metacognitive knowledge strategies CO2:Solve the complex problems efficiently CO3: Relate deeply with the target content CO4:Develop constructive cumulative goal orientationacquisition process CO5: Build scientific writing skills by means of regular progress presentation CO6: Utilize technology-based knowledge to improvise the existing designs
7	Course Description		In PBL-3, the students will learn how to define the problem for developing projects, identifying the skills required for developing the project based on given a set of specifications and all subjects of that Semester.
8	Outline syllabus		CO Mapping
	Unit 1	Problem Definition, Team/Group formation and Project Assignment. Finalizing the problem statement, resourcerequirement, if any.	CO1, CO6
	Unit 2	Develop a work flow or block diagram for the proposedsystem / software.	CO2, CO6
	Unit 3	Design algorithms for the proposed problem.	CO3, CO6
	Unit 4	Implementation of work under the guidance of a faculty member and obtain the appropriate results.	CO4, CO6
	Unit 5	Demonstrate and execute Project with the team. Validate and verify the project modules.	CO5,CO6

		Report should include Abstract, Hardware / Software Requirement, Problem Statement, Design/Algorithm, Implementation Detail. Validation Reports. References if any. The presentation, report, work done during the termsupported by the documentation, forms the basis ofassessment.			
	Mode of examination	Practical /Viva			
	Weight age Distribution	CA	CE VIVA	ETE	
		25%	25%	50%	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	2	-	2	-	-	-	2	-	-	2	2	2	2
CO2	3	2	2	-	2	-	-	-	2	-	-	2	2	2	2
CO3	3	3	-	3	3	-	-	-	2	-	-	2	3	2	3
CO4	3	2	-	-	2	-	-	-	2	-	-	2	2	2	2
CO5	3	-	-	-	2	-	-	-	2	2	2	2	3	2	3
CO6	3	3	3	-	2	-	-	-	3	2	2	2	3	2	3

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

<table>
<tr><td colspan="2">School: SSET</td><td colspan="2">Batch: 2023-2027 Semester- V</td><td></td></tr>
<tr><td colspan="2">Programme: B.Tech</td><td colspan="2">Current Academic Year: 2024-2025</td><td></td></tr>
<tr><td>1</td><td>Course code</td><td colspan="2">ECC301</td><td></td></tr>
<tr><td>2</td><td>Course Title</td><td colspan="2">Community Connect</td><td></td></tr>
<tr><td>3</td><td>Credits</td><td colspan="2">2</td><td></td></tr>
<tr><td>3.01</td><td>(L-T-P)</td><td colspan="2">(0-0-4)</td><td></td></tr>
<tr><td>4</td><td>Learning Hours</td><td colspan="2"><table><tr><td>Contact Hours</td><td>60</td></tr><tr><td>Project/Field Work</td><td>40</td></tr><tr><td>Assessment</td><td>00</td></tr><tr><td>Guided Study</td><td>20</td></tr><tr><td>Total hours</td><td>60</td></tr></table></td><td></td></tr>
<tr><td>5</td><td>Course Objectives</td><td colspan="2">1. To connect the students to the community.
2. To conduct survey of community people and record responses and identify the issues faced by the community.
3. To do detailed analysis of data collected in the survey and student will use their learning to propose suitable solution for these issues.
4. To enhance skills of students on communication, data analysis and report writing skills.
5.To conduct survey on general awareness.</td><td></td></tr>
<tr><td>6</td><td>Course Outcomes</td><td colspan="2">The students will be able to:
CO1. Interpret knowledge on different issues faced by the community in better way.
CO2. Analyze data and identify problems
CO3. Solve the complex problems efficiently
CO4. Construct documentation, data analysis and report on any project.
CO5. Estimate the engineering and societal values of the developed solution for the problem
CO6. Utilize technology-based knowledge to improvise the existing solution for the problem</td><td></td></tr>
<tr><td>7</td><td>Theme</td><td colspan="2">Major Sub-themes for research:
1. Energy solutions, saving and management
2. Electronics solution in everyday life
3. Civil works like transportation, drainage, water, construction etc.
4. Agriculture and irrigation, crop production
5. IoT and smart solutions
6. Medical and Healthcare issues
7. Environmental issues
8. Security and surveillance
9. Education and skills</td><td>CO1, CO2, CO3, CO4, C05, CO6</td></tr>
</table>

		10. Waste management **10.** Any other issues	
8.1	**Guidelines for Faculty Members**	• Any one of the sub-themes can be taken as survey topics • It will be a group assignment. • There should be not more than 10 students in each group. • The faculty guide will guide the students to complete the survey and help the student in preparing final report. • The questionnaire should be well design by the school and it should carry at least 40 questions (Including demographic questions). • The faculty will guide each group of students to prepare the PPT. • Each group should **submit the report** to CCC-Coordinator signed by the faculty guide before one week of last date of instruction mentioned in the Academic Calendar. • The students have to send the hard copy of the **report and PPT**, and then only they will be allowed for ETE.	•
8.2	**Role of CCC-Coordinator**	The CCC Coordinator will supervise the whole process and assign students to faculty members.	
8.3	**Layout of the Report**	Abstract (250 words) • Introduction • Literature review(optional) • Objective of the research • Research Methodology • Finding and discussion • Conclusion and recommendation • References • Research report should base on primary data.	
8.4	**Guideline for Report Writing**	Title Page: The following elements must be included: • Title of the article; • Name(s) and initial(s) of author(s), preferably with first names spelled out; • Affiliation(s) of author(s); • Name of the faculty guide and Co-guide Abstract: Each article is to be preceded by a succinct	

		abstract, of up to 250 words, that highlights the objectives, methods, results, and conclusions of the paper. Text: Manuscripts should be submitted in Word. ● Use a normal, plain font (e.g., 12-point Times Roman) for text. ● Use italics for emphasis. ● *Use the automatic page numbering function to number the pages.* ● *Save your file in docx format* (Word 2007 or higher) or doc format (older Word versions) Reference list: The list of references should only include works that are cited in the text and that have been published or accepted for publication. The soft copy of final report should be submitted along with the hard copy signed by faculty / guide and countersigned by HoD / Dean. The report will be subject to plagiarism check as per the guidelines given in the notification.	
8.5	**Format:**	The report should be Spiral / softbound The Design of the Cover page to report will be given by the Coordinator- CCC Cover page Acknowledgement Content Project report Appendices	
8.6	**Important Dates:**	Students will complete their community survey before last instruction date of the running semester and submit the same to concern faculty member. (Each group should complete min 50 questionnaires). Faculty members should guide students for report writing. The students should submit the hard copy and soft copy of the report to CCC-Coordinator signed by the faculty guide. The students should submit the soft copy of the PPT to CCC-Coordinator signed by the faculty guide before 1 week of final presentation. The final presentation and evaluation should be organized by the School before last instruction date.	
8.7	**ETE**	**The students will be evaluated by panel of internal faculty members on the basis of their presentation.**	

9	**Course Evaluation**	
9.01	**Continuous Assessment**	**50%**
	Noting responses to the questionnaire	**20 Marks**
	Data analysis and Report Writing	**40 Marks**
9.02	**ETE (PPT presentation)**	**50%**

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	-	1	2	-	-	-	1	1	1	1	-
CO2	2	1	1	1	-	1	2	-	-	-	1	1	1	1	-
CO3	2	1	1	1	-	1	2	-	-	-	1	1	1	1	-
CO4	2	1	1	1	-	1	2	-	-	-	1	1	1	1	-
CO5	2	1	1	1	-	2	2	-	-	-	1	1	1	1	-
CO6	2	1	1	1	-	1	2	-	-	-	1	1	1	1	-

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-27**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
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	The students will be able to: CO1.Examine important physical characteristics of water and wastewater. CO2. Determine basic chemical parameters of water and wastewater. CO3.Evaluate and interpret key chemical characteristics. CO4. Inspect the pollution strength of water and wastewater. CO5. Test the advanced characteristics of wastewater. CO6.Propose suitable physical and chemical tests of water and wastewater.	
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		CO Mapping
	Unit 1	**Introduction to the software**	CO1
		Introduction to the GIS software, Installation, details User-interface and data storage format	
	Unit 2	**Geo-referencing and Spatial Data Capture**	CO2
		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**	CO3

		Map cleaning, editing and topology building, Link the field collected and captured data to the map			
	Unit 4	**Query Building and Analysis**			CO4
		Build spatial and non-spatial query using SQL, perform different type of analysis and data manipulations			
	Unit 5	**Data representation and Visualisation**			CO4
		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	CE VIVA	ETE	
		25%	25%	50%	
	Text book/s*	-			
	Other References				

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	1	-	1	3	-	2	3	-	1	1	2	3
CO2	2	-	-	1	-	1	3	-	2	3	-	1	1	2	3
CO3	2	-	-	1	-	1	3	-	2	3	-	1	1	2	3
CO4	2	-	-	1	-	1	3	-	2	3	-	1	1	2	3
CO5	2	-	-	1	-	1	3	-	2	3	-	1	1	2	3
CO6	2	-	-	1	-	1	3	-	2	3	-	1	1	2	3

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch: 2023-2027**		
Programme: B.Tech.		**Current Academic Year: 2023-24**		
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 analyze and design reinforced concrete structural elements for both serviceability and ultimate limit states. 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	The students will be able to: CO1: Identify the different types of structural members and load acting on it. CO2: Analyze and design members to meet collapse and serviceability requirements CO3: Choose the cross section of rectangular and flanged beams to resist flexure, shear and torsion CO4: Forecast reinforcement requirements of simple slabs subjected to flexure and shear. CO5: Design short columns subjected axial and bending loads CO6: Propose concrete structures as per IS 456:200 recommendations.		
7	Course Description	This course is for analysis and design of basic concrete structural component like Beam, column, and slab		
8	Outline syllabus: Structural design of basic component of structure.			CO Mapping
	Unit 1	**Limit State of Collapse - Flexure**		
	A	Introduction of Philosophies of Design by Limit State Method		CO1, CO2, CO6
	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		CO2, CO3, CO6
	B	Flanged Beams T-L beam		
	C	Design of T and L beam.		
	Unit 3	**Design for Shear, Bond, Anchorage, Development**		

		Length and Torsion			
	A	Limit State of Collapse in Shear			CO3, CO6
	B	Bond, Anchorage, Development Length			
	C	Torsion in Beams			
	Unit 4	**Reinforced Concrete Slab**			
	A	Introduction of slab			CO4, CO6
	B	Design of One-way Slabs			
	C	Design of Two-way Slabs			
	Unit 5	**Design of Compression Members**			
	A	Definitions, Classifications, Guidelines and Assumptions for Short Axially Loaded Compression Members			CO5, CO6
	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	
		25%	25%	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*", PHI Learning Private Limited.			

COURSE ARTICULATION MATRIX

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO2	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO3	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO4	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO5	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO6	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-2027**	
Programme BTech		**Current Academic Year: 2023-24**	
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	The students will be able to: CO1: Identify methods of soil exploration to determine thicknesses of soil strata. CO2: Analyze shallow foundations. CO3: Analyze and propose pile and well foundation. CO4: Design earth retaining walls and sheet piles. CO5: Apply the techniques of ground improvement. CO6: Correlate site investigation reports for selection among different foundation types	
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		CO Mapping
	Unit 1	**Soil Investigation**	**CO1**
	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**	**CO2**
	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**	**CO3, CO6**
	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**	**CO4, CO6**
	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**	**CO5, CO6**
	A	Principles of ground improvement, Civil 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: 25%	MTE: 25%	ETE: 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)	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	2	2	-	-	-	-	-	-	2	3	3	2
CO2	3	3	1	2	2	-	-	-	-	-	-	2	3	3	2
CO3	3	3	1	2	2	-	-	-	-	-	-	2	3	3	2
CO4	3	3	1	2	2	-	-	-	-	-	-	2	3	3	2
CO5	3	3	1	2	2	-	-	-	-	-	-	2	3	3	2
CO6	3	3	1	2	2	-	-	-	-	-	-	2	3	3	2

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-27**		
Programme: B.Tech		**Current Academic Year: 2023-24**		
Branch: Civil		**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	The students will be able to: CO1: Understand the basic elements of management in construction industry. CO2: Develop the concepts of equipment management. CO3: Apply the concepts of material management. CO4: Practice the concepts of safety management. CO5: Apply the knowledge of planning and scheduling activities. CO6: Utilise project management skills for management of projects		
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			CO Mapping
	Unit 1	**Elements of Management**		**CO1**
	A	Project Cycle, Organization, Planning		
	B	Scheduling, Monitoring and updating		
	C	Management System in Construction		
	Unit 2	**Material Management**		**CO2**
	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**		**CO3, CO6**
	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**	**CO4, CO6**
	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**	**CO5, CO6**
	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: 25% / MTE: 25% / ETE: 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.	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	1	-	-	-	-	1	-	-	3	2	2	-
CO2	3	2	-	1	-	-	-	-	1	-	-	3	2	2	-
CO3	3	2	-	1	-	-	-	-	1	-	-	3	2	2	-
CO4	3	2	-	1	-	-	-	-	1	-	-	3	2	2	-
CO5	3	2	-	1	-	-	-	-	1	-	-	3	2	2	-
CO6	3	2	-	1	-	-	-	-	1	-	-	3	2	2	-

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch:** 2023-2027
Programme		**Current Academic Year:** 2023-2024
Branch: Civil		**Semester: VI**
1	Course Code	**ARP 302**
2	Course Title	**Campus to Corporate**
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
	Course Status	Active
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 4thphase of employability enhancement and skill building activity exercise.
6	Course Outcomes	The students will be able to: CO1: Develop a creative resumes, cover letters, interpret job descriptions and interpret KRA and KPI statements and art of conflict management. CO2: Build negotiation skills to get maximum benefits from deals in practical life scenarios. CO3: Develop skills of personal branding to create a brand image and self-branding CO4: Acquire higher level competency in use of logical and analytical reasoning such as direction sense, strong and weak arguments CO5: Develop higher level strategic thinking and diverse mathematical concepts through building analogies, odd one out CO6: Demonstrate higher level quantitative aptitude such as average, ratio & proportions, mixtures & allegation for making business decisions.
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**	**CO MAPPING**
	A	HR Sensitization (Role Clarity | KRA | KPI | Understanding JD) | Conflict Management	CO1
	B	Negotiation Skills | Personal Branding	CO3, CO4
	C	Uploading & Curating Resumes in Job Portals, getting Your Resumes Noticed | Writing Cover Letters |	CO1, CO3

		Relationship Management | Verbal Abilities-4	
	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**	
	A	Sitting Arrangement & Venn Diagrams | Puzzles | Distribution | Selection	CO4
	B	Direction Sense | Statement & Conclusion | Strong & Weak Arguments	CO4
	C	Analogies, Odd One out | Cause & Effect	CO5
	Unit 3	**Quantitative Aptitude**	
	A	Average , Ratio & Proportions, Mixtures & Allegation	CO6
	B	Geometry-Lines, Angles & Triangles	CO6
	C	Problem of Ages | Data Sufficiency - L2	CO6
	Weightage Distribution	*(CA)Class Assignment/Free Speech Exercises / JAM – 50% | (ETE) Group Presentations/Mock Interviews/GD/ Reasoning, Quant & Aptitude – 50%*	
	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*	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO2	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO3	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO4	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO5	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
CO6	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-2027**	
Programme: B.Tech		**Current Academic Year: 2024-2025**	
Branch: Civil		**Semester: VI**	
1	Course Code	**CVP389**	
2	Course Title	Project Based Learning -4	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1. To align student's skill and interests with a realistic problem or project 2. To understand the significance of problem and its scope 3. Students will make decisions within a frame work	
6	Course Outcomes	The students will be able to: CO1: Build self-directed learning. CO2: Demonstrate the acquired knowledge in solving complex realistic problem. CO3: Utilize and analyse various software, designing and modelling tools. CO4: Develop a product that would be suitable as well as sustainable. CO5: Solve the realistic problems of academia and industry. CO6: Estimate the engineering and societal values of the developed process or product	
7	Course Description	In PBL-4, the students will learn how to define the problem for developing projects, identifying the skills required for developing the project based on given a set of specifications and all subjects of that Semester.	
8	Outline syllabus		CO Mapping
	Unit 1	Problem Definition, Team/Group formation and Project Assignment. Finalizing the problem statement, resource requirement, if any.	CO1, CO2
	Unit 2	Develop a work flow or block diagram for the proposed system / software.	CO2,CO3
	Unit 3	Design algorithms for the proposed problem.	CO3
	Unit 4	Implementation of work under the guidance of a faculty member and obtain the appropriate results.	CO3, CO4
	Unit 5	Demonstrate and execute Project with the team. Validate and verify the project modules.	CO4, CO5, CO6

		Report should include Abstract, Hardware/Software Requirement, Problem Statement, Design/Algorithm, and Implementation Detail. Validation Reports. References if any. The presentation, report, work done during the term Supported by the documentation, forms the basis of assessment.			
	Mode of examination	Practical /Viva			
	Weight age Distribution	CA	CE VIVA	ETE	
		25%	25%	50%	

COURSE ARTICULATION MATRIX

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	3	-	-	-	-	3	3	2	3	2	2	1
CO2	3	2	-	3	-	-	2	-	3	3	2	3	-	-	1
CO3	3	2	-	-	2	-	-	-	3	3	2	3	2	2	-
CO4	3	3	-	-	-	2	-	-	3	3	2	3	-	2	-
CO5	3	3	2	2	2	2	3	3	3	3	2	3	2	2	-
CO6	3	3	-	3	-	-	-	-	3	3	2	3	-	-	1

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SET		**Batch: 2023-27**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
Branch: CE		**Semester: VI**	
1	Course Code	CVL432	Course Name: ESTIMATION AND COSTING
2	Course Title	ESTIMATION AND COSTING	
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	The students will be able to: CO1. Identify different types of estimates and understand the technical specifications. Calculate preliminary estimates for a Project. CO2. Analyse the structure by detailed estimates of building components CO3. Make bar bending schedule and calculate earth work for roads and canals. CO4. Analyse the rates for various items of work commonly used. CO5. Understand competitive bidding, contract management and dispute resolution in contracts. CO6. Plan and formulate strategies to complete estimation and costing of a building and know the nuances of contracts and its management.	
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		CO Mapping
	Unit 1	**Estimation and Building Drawing**	
	A	General items of work in Building – Standard Units Data for Estimates.	CO1
	B	Types of estimates, 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			CO2
	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.			CO2
	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.			CO2, CO3
	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			CO4, CO5
	B	Tender, tender notice, tender form, Technical Bid, and Financial Bid, Earnest money, and Security money			
	C	Arbitration Act and Arbitration			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	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			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	1	1	-	-	-	-	1	2	3	3	3
CO2	3	2	1	-	1	1	-	-	-	-	1	2	3	3	2
CO3	3	2	1	-	1	1	-	-	-	-	1	2	3	2	2
CO4	3	2	1	-	1	1	-	-	-	-	1	2	3	2	2
CO5	3	3	2	-	1	1	-	-	-	-	1	2	3	2	2
CO6	3	3	2	-	1	1	-	-	-	-	1	2	3	3	2

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-27**		
Programme: B.Tech		**Current Academic Year: 2023-24**		
Branch: CE		**Semester: VI**		
1	Course Code	CVL333	Course Name: Transportation Engineering	
2	Course Title	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	The students will be able to: CO1: Identify the geometric features of the highway. CO2: Analyse the traffic studies necessary for making changes to or designing new road infrastructure. Design of traffic signals CO3: Choose suitable materials for construction of pavements. CO4: Design of flexible and rigid pavements CO5: Assess the conditions of pavements and apply maintenance measures. CO6: Analyze and design road geometrics and pavements using suitable materials		
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			C
	Unit 1	**Highway Geometric Design**		CO1, CO6
	A	Introduction to highway elements, 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 2	**Traffic engineering**		CO2, CO6
	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 3	**Highway Materials**	CO3, CO6
	A	Soil classifications, evaluation of soil strength	
	B	Stone aggregates, tests on bitumen	
	C	Design of bitumen mixes	
	Unit 4	**Design of Highway Pavements**	CO4, CO6
	A	Types of pavement structure, design factors	
	B	Design of flexible pavements, California bearing ratio method	
	C	Design of Rigid Pavements	
	Unit 5	**Highway Maintenance**	CO5, CO6
	A	Deterioration and damages in road infrastructure, maintenance requirement for road components	
	B	Maintenance measures, structural evaluation and strengthening of flexible pavements	
	C	Distress and maintenance measures for rigid pavements	
	Mode of examination	Theory	
	Weightage Distribution	CA | MTE | ETE	
		25% | 25% | 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 Singapore, Singapore, CRC Press	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	-	-	-	-	-	1	1	-	2	3	2	1
CO2	2	2	1	1	1	-	-	-	1	1	-	2	3	2	1
CO3	2	2	3	3	1	-	-	-	1	1	-	2	3	2	1
CO4	2	2	1	3	1	-	-	-	1	1	-	2	3	2	1
CO5	2	2	3	1	1	-	-	-	1	1	-	2	3	2	1
CO6	2	2	3	2	2	-	-	-	1	1	-	2	3	2	1

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-27**	
Programme BTech		**Current Academic Year: 2023 – 24**	
Branch: Civil		**Semester: V**	
1	Course Code	CVP33 | Course Name: Transportation Engineering Lab	
2	Course Title	Transportation Engineering Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Core	
5	Course Objective	1. To enhance the technical skill of the students. 2. To teach the latest in management of civil engineering tenders, labour regulations. 3. Quality control at project sites. 4. Fire safety norms and green buildings technology.	
6	Course Outcomes	The students will be able to: CO1: Identify physical property of aggregate. CO2: Estimate physical property of bitumen. CO3: Assess the engineering property of soil and bitumen. CO4: Estimate the engineering property such as ductility. CO5: Test strength characteristics of soil. CO6: Propose soils with respect to moisture content	
7	Course Description	Teach students practical aspects of civil engineering to include construction contracts, Tenders, labour regulations, quality assurance and green buildings.	
8	Outline syllabus		CO Mapping
	Unit 1	**Experiments Part-1**	**06**
	A	To determine the aggregate crushing value.	CO1, C06
	B	To determine the aggregate impact value.	
	C	To determine the aggregate abrasion value.	
	Unit 2	**Experiments Part-2**	**04**
	A	Softening point (Ring and ball test) of bitumen.	CO2, C06
	B	Penetration test value of bitumen.	
	Unit-3	**Experiments Part-3**	**06**
	A	Marshall stability test.	CO3, C06
	B	To determine the CBR value for soaked sample.	
	C	To determine the CBR value for unsoaked sample.	
	Unit 4	**Experiments Part-4**	**04**
	A	Specific gravity for coarse and fine aggregate.	CO4, C06
	B	Sieve analysis	
	Unit 5	**Experiments Part-5**	**06**

	A	Shape test of aggregates			CO5, C06
	B	Ductility test on bitumen			
	C	Water absorption for coarse and fine aggregate.			
		Total Hours			**26**
	Mode of examination	Practical			
	Weightage Distribution	CA	CE-Viva	ESE	
		25%	25%	50%	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	-	-	2	-	-	-	1	2	2	2	2	1
CO2	3	2	2	-	-	2	-	-	-	1	2	2	2	2	1
CO3	3	2	2	-	-	2	-	-	-	1	2	2	2	2	1
CO4	3	3	2	-	-	2	-	-	-	1	2	2	2	2	1
CO5	3	2	2	-	-	2	3	-	-	1	2	2	2	2	3
CO6	3	2	2	-	-	2	3	-	-	1	2	2	2	2	3

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch : 2023-2027**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
Branch: Civil		**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	The students will be able to: CO1: Inspect and build connections, tension members. CO2: Examine and adapt different types of steel compression members. CO3: Analyze and design flexural members subjected to different loading conditions. CO4: Plan the foundation for steel structures. CO5: Propose and check the cross section of plate girders. CO6: Produce safe steel structures as per IS recommendations.	
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.		CO Mapping
	Unit 1	**Introduction, Bolted Connection, Welded Connection and Tension Member**	**CO1**
	A	Philosophies of Design by Limit State Method.Design 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**	**CO2**
	A	Struts	
	B	Axially loaded columns	

	C	Built up columns by using batten			
	Unit 3	**Flexure members**			**CO3, CO6**
	A	Introduction to flexure member			
	B	Laterally supported beam			
	C	Laterally supported beam			
	Unit 4	**Foundation**			**CO4, CO6**
	A	Slab base			
	B	Gusset base			
	C	Design of slab base and gusset base			
	Unit 5	**Plate girder**			**CO5, CO6**
	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	
		25%	25%	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. IS 800-2007, “Indian Standard Code of practice for general construction of steel. 3. Ramamrutham.S(2013). “Design of steel structure”, Dhanpat Rai publishing Company(P) Ltd.			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	1	1	-	-	3	-	-	-	3	1	3	3
CO2	3	2	3	1	1	-	-	3	-	-	-	3	1	3	2
CO3	3	2	3	1	1	-	-	3	-	-	-	3	1	2	2
CO4	3	2	3	1	1	-	-	3	-	-	-	3	1	2	2
CO5	3	3	3	1	1	-	-	3	-	-	-	3	1	2	2
CO6	3	3	3	1	1	-	-	3	-	-	-	3	1	3	2

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch: 2023-2027**	
Programme: B.Tech		**Current Academic Year: 2025-2026**	
Branch: Civil		**Semester: VII**	
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 harbour engineering.	
6	Course Outcomes	The students will be able to: CO1: Understand the development and planning in railways. CO2: Develop geometric design of a railway track. CO3: Explain components of a harbour, it's accessories used for anchorage of ships, navigational aids, and coastal structures. CO4: Understand development and planning of airways. CO5: Design a runway and taxiway. CO6: Analyse and design airports and rail tracks	
7	Course Description	Introduction to railways, different components of railways, rails and its types, rail failure, Geometric design of railways, design of turnout, harbour, docks, ports, mooring accessories, development of airways in India, airport planning, runway design, taxiway design.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction to Railways engineering**	**CO1**
	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**	**CO2**
	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 signalling, Civil devices for inter locking	
	Unit 3	**Harbour Engineering**	**CO3, CO6**
	A	Definition of Terms- Harbours, 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**	**CO4, CO6**
	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**	**CO5, CO6**
	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: 25% / MTE: 25% / ETE: 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

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	1	-	-	-	-	-	-	-	2	3	3	1
CO2	3	3	3	1	-	-	-	-	-	-	-	2	3	3	1
CO3	3	3	2	1	-	-	-	-	-	-	-	2	3	3	1
CO4	3	3	3	1	-	-	-	-	-	-	-	2	3	3	1
CO5	3	3	3	1	-	-	-	-	-	-	-	2	3	3	1
CO6	3	3	3	1	-	-	-	-	-	-	-	2	3	3	1

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-27**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
Branch: Civil		**Semester: VII**	
1	Course Code	CVL428 | Course Name: Advance Structural 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	The students will be able to: CO1: Design of various types of foundations CO2: Adapt different types of retaining walls CO3: Structure various types of water tanks CO4: Assess gantry girder to support moving loads. CO5: Analyze and design steel members for plastic behaviour conditions CO6: Propose steel and concrete structures as per Indian Standards.	
7	Course Description	Foundation, Retaining Walls, Water Tank and Domes, Gantry Girder Design, Plastic Analysis and Design	
8	Outline syllabus		CO Mapping
	Unit 1	**Design of Foundations**	
	A	Introduction	CO1, CO6
	B	Design of Combined footing	
	C	Design of Pile and Pile Cap	
	Unit 2	**Design of Retaining Walls**	
	A	Analysis of cantilever retaining wall	CO2, CO6
	B	Design of Heel and Toe slab	
	C	Design of Vertical stem	
	Unit 3	**Water Tank**	
	A	Types of Water Tank and Indian Standard Specifications	CO3, CO6
	B	Circular tank on ground (with flexible connection with base)	
	C	Circular tank on ground (with rigid connection with base)	
	Unit 4	**Gantry Girder**	
	A	Introduction	CO4, CO6
	B	Load Consideration	
	C	Design of Gantry Girder	
	Unit 5	**Plastic Analysis and Design**	

	A	Introduction to plastic analysis, Concept of Limit load analysis			CO5, CO6
	B	Plastic analysis of beams using mechanism method			
	C	Plastic Design of Beams			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	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			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO2	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO3	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO4	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO5	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO6	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SSET		**Batch : 2023-2027**		
Programme: B.Tech		**Current Academic Year: 2023-2024**		
Branch: CE		**Semester: VII**		
1	Course Code	**CVP496**		
2	Course Title	**Major Project I**		
3	Credits	2		
4	Contact Hours (L-T-P)	0-0-4		
	Course Status	Compulsory		
5	Course Objective	The course provides an in-depth understanding and skill in the field of Civil Engineering and its associated fields.		
6	Course Outcomes	The students will be able to: CO1: Identify problem statement in selected field of interest. CO2: Analyze the gathered information required to develop a project methodology. CO3: Participate in different teams and to focus on getting a working project done on time with each student being held accountable for their part of the project. CO4: Prepare the designs/experimental requirements, functional and conceptual. CO5: Initiate the actual implementation of the project work to produce the deliverables. CO6: Communicate project work effectively in written and oral forms.		
7	Course Description	The course provides an in-depth understanding and skill in the field of Civil Engineering and its associated fields.		
	Mode of examination	Project report and Viva-Voce		
	Weightage Distribution	CA	CE VIVA	ETE
		25%	25%	50%
	Text book/s*	As per the field/specialization		
	http:/	Google scholar, Research gate. Science direct, Springer, Taylor and Francis		

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	2	1	2	3	3	3	3	3	3	3
CO2	3	3	3	3	3	2	1	2	3	3	3	3	3	3	3
CO3	3	3	3	3	3	2	1	2	3	3	3	3	3	3	3
CO4	3	3	3	3	3	2	1	2	3	3	3	3	3	3	3
CO5	3	3	3	3	3	2	1	2	3	3	3	3	3	3	3
CO6	3	3	3	3	3	2	1	2	3	3	3	3	3	3	3

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-27**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
Branch: Civil		**Semester: VII**	
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	The students will be able to: CO1: Identify suitable cement for specific construction work. CO2: Develop design mix of concrete and evaluate fresh properties. CO3: Examine mechanical properties and understand durability aspect of concrete. CO4: Practice of existing structures by using NDT. CO5: Apply the concept of chemical admixtures in concrete. CO6: Propose 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		CO Mapping
	Unit 1	**Introduction to Cement**	**CO1**
	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**	**CO2**
	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**	**CO3,CO6**
	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**	**CO4,CO6**
	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**	**CO5,CO6**
	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
		25%	25%	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.		

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO2	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO3	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO4	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO5	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO6	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch : 2023-2027**
Programme: B.Tech		**Current Academic Year: 2023-2024**
Branch: CE		**Semester: VII**
1	Course Code	CVP395
2	Course Title	Industrial Internship
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	To expose engineering students to the real industrial scenario, which is not possible in the classroom? Familiarize with various materials, processes, products and their applications along with relevant aspects of quality control and shop floor management. Understand the psychology of the workers and their habits, attitudes and approach to problem solving. Understand the social, economic and administrative considerations that influence the working environment of industrial organizations. Learn about team work, collaboration and leadership. Importance of time management, discipline, self-learning and effective communication. To apply the engineering knowledge in real industrial situations. To gain experience in writing reports in engineering works/projects. To enhance the employability of the students. Get exposed to the current technological developments relevant to the subject area to which the training pertains. To develop self-esteem for employment after graduation
6	Course Outcomes	The students will be able to: CO1: Understand the working environment of industry. CO2: Analyze the resources in practice. CO3: Apply Engineering Knowledge for Problem analysis CO4: Predict the procedure to sort out complex industrial problems CO5: Show the importance of working in a team CO6: Propose the work related presentations.
7	Course Description	This practical course is intended to expose the students to real life scenario in industry with the intention to make them future ready for their professional role. In this, the students undergo in reputed Private / Public Sector / Government organization / companies for four weeks/one month in summer vacation after II semester. It is expected that the skills student gain via internship with an organization will help him/her perform better in the assigned job after graduation. Apart from this, the industrial internship enhances the chance for students to obtain

		employment after graduation. It is pertinent to mention that developing an awareness of general workplace behaviour and interpersonal skills are expected from students at the end of the Industrial internship. The student should be able relate, apply and adapt relevant knowledge and concepts within industrial ambience and ethics.	
8	Outline		CO Mapping
	A	**INTERNSHIP DIARY**	
		An internship diary is provided by the university for collecting the information during industrial internship on daily basis. It also helps the student for writing his/her report. The objective of maintaining daily diary is to cultivate the habit of documenting and encourage him/her to search for details. It develops the students' own thought process and reasoning abilities. The students should record in the daily training diary the day to day account of the observations, impressions and information gathered. It should contain the sketches & drawings related to the observations made by the students. On the basis of recorded data in the diary, the student will prepare a report.	CO1, CO2, CO3, CO5
	B	**INTERSHIP REPORT**	
		A student should learn about equipment's, machines, plant layout and other industrial practices in industry. After collecting the information, one should prepare a comprehensive internship report at the end of one's internship to demonstrate what one has learnt in this period. Daily diary will facilitate to a great extent in writing the report. It is mandatory for the student to submit a hard copy of report to one's assigned coordinator for corrections and subsequently, submitting a final spiral bound copy to department. The assigned coordinator will check the followings things in the draft submitted by the student: Report is made as per the format approved by the department. Originality of the report. Very adequate and purposeful write-up. Organization, drawings, sketches, format, style, language, fig no, table no and references etc. Variety and relevance of learning experience. After doing correction the corrected copies will be submitted at the time of presentation, duly signed by the faculty coordinator and Head of Department.	CO6
	C	**INDUSTRIAL INTERNSHIP EVALUATION PROCESS**	

		The Industrial Internship Evaluation is done in the presence of assigned Department Faculty coordinator and External Examiner, duly approved by The controller of Examination. The evaluation process includes a seminar presentation and viva-voce, done on the basis of following criteria. The Power Point Presentation Proper Planning of Presentation Effectiveness of Presentations Depth of knowledge and skills. Records in which internship diary and reports are analyzed along with presentation and viva voce	CO4, CO6
	Mode of examination	Practical	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	1	3	1	-	-	-	2	2	2	2
CO2	-	-	-	-	-	-	2	-	-	-	-	2	2	2	2
CO3	-	-	-	-	-	2	1	-	-	-	-	2	2	2	2
CO4	-	-	-	-	-	2	-	-	-	-	-	2	2	2	2
CO5	-	-	-	-	-	-	1	1	-	-	-	2	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	3	3	3	3

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch : 2023-2027**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
Branch: Civil		**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.	
6	Course Outcomes	The students will be able to: CO1: Identify model using design software. CO2: Analyse beams, frames and trusses. CO3: Examine the behaviour of 2D buildings under static loads. CO4: Evaluate and design of 3D buildings under static loads. CO5: Assess the behaviour of structures under dynamic loads. CO6: Propose integrate theoretical and practical concepts through the use of design software.	
7	Course Description	Subject consist of practical related to structural analysis and design using the use of design software. Students will learn the use of design software in various structural engineering problems of analysis and design.	
8	Outline syllabus		CO Mapping
	Unit 1	**Basics of Structural Analysis**	**CO1**
		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**	**CO2**
		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**	**CO3, CO6**
		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**	**CO4, CO6**
		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**			**CO5, CO6**
		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	CE VIVA	ETE	
		25%	25%	50%	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	1	3	-	-	3	1	3	-	3	2	3	3
CO2	3	2	3	1	3	-	-	3	1	3	-	3	2	3	3
CO3	3	2	3	1	3	-	-	3	1	3	-	3	2	3	3
CO4	3	2	3	1	3	-	-	3	1	3	-	3	2	3	3
CO5	3	2	3	1	3	-	-	3	1	3	-	3	2	3	3
CO6	3	2	3	1	3	-	-	3	1	3	-	3	2	3	3

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-27**
Programme: B.Tech		**Current Academic Year: 2023-24**
Branch: CE		**Semester: VII**
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. Examine 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. Practice of Feasibility Report preparation of an irrigation project. CO3. Evaluate 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. Assess requirement of exact machines and equipment for construction of irrigation structures.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.. CO5. Apply professional and ethical skills required in planning of irrigation, engineering hydrology and integrated water resources development and management. CO6. Propose 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		CO Mapping
	Unit 1	**IRRIGATION**	CO1
	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**	CO2
	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**	CO3, CO6
	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**	CO4, CO6
	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**	CO5, CO6
	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	Theory	

	examination			
	Weightage Distribution	CA	MTE	ETE
		25%	25%	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.		

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO2	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO3	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO4	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO5	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO6	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High**

School: SSET		**Batch : 2023-27**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
Branch: Civil		**Semester: V**	
1	Course Code	CVL401	Course Name: IRRIGATION ENGINEERING
2	Course Title	IRRIGATION ENGINEERING	
3	Credits	2	
4	Contact Hours (L-T-P)	2-0-0	
	Course Status	Core	
5	Course Objective	The objective of this course is to impart in-depth knowledge of irrigation engineering for solving the real-life problems of irrigation considering the current requirements and recent developments in irrigation engineering.	
6	Course Outcomes	The students will be able to: CO1. Identify irrigation requirement and its planning and applications in India. CO2. Develop the concept of water requirements of crops and methods of irrigation. CO3. Apply approaches of surface water hydrological analysis for irrigation engineering and ground water irrigation methods. CO4. Analyse water storage and canal diversion hydraulic structures. CO5. Evaluate alignment of canals, canal curves and apply Kennedy's and Lacey's theories for irrigation channels. CO6. Design canals and lift irrigation systems.	
7	Course Description	This course aims to comprehensively deal with requirements and scope of irrigation engineering; development of irrigation in India, planning of irrigation projects, concept of multi-purpose projects, major, medium and minor irrigation schemes, water storage and canal diversion hydraulic structures; design of alluvial and non-alluvial channels, waterlogging and canal lining and lift irrigation systems.	
8	Outline syllabus		CO Mapping
	Unit 1	**Irrigation and its planning and application in India**	
	A	Necessity and importance of irrigation, scope of irrigation engineering, benefits and ill effects of irrigation.	CO1
	B	Development of irrigation in India, planning of irrigation projects, concept of multi-purpose projects, major, medium and minor irrigation schemes.	
	C	Administration, economics and financing of irrigation works and need for increasing irrigation efficiency.	
	Unit 2	**Water requirements of crops and methods of irrigation**	

	A	Functions of irrigation water, quality of irrigation water			CO2
	B	Types of soils, preparation of land for irrigation, classification of soil water, depth and frequency of irrigation, irrigation efficiencies, assessment of irrigation water.			
	C	Types of irrigation, methods of applying water to crops, surface irrigation, flooding by contour laterals, boarder strip flooding, furrow method, contour farming, sprinkler irrigation and drip irrigation.			
	Unit 3	**Surface water hydrology and ground water irrigation**			
	A	Analysis of meteorological and hydrological data, rainfall abstractions, evaporation, infiltration, evapotranspiration, estimation of missing rainfall, estimation of average rainfall, water availability analysis, flow duration curves, water budget.			CO3
	B	Estimation of runoff, empirical formulas, rational formula, flood frequency analysis, flood hydrograph analysis, assessment of dependable flows from surface and ground water resources, consumptive use of water.			
	C	Types of aquifers, storage coefficient, determination of aquifer constant, well hydraulics, tube wells, estimation of yield of wells, advantages and disadvantages of well irrigation over canal irrigation.			
	Unit 4	**Water Storage and canal diversion hydraulic structures**			
	A	Components of water storage and canal diversion hydraulic structures, zones of storages in reservoirs, types of dams, selection of site for location of reservoirs, principles of design of gravity, earth, rock fill dams and foundations.			CO4, CO6
	B	Spillways, spillway crest gates, energy dissipation hydraulic structures for design of canals, cross drainage works.			
	C	Components of diversion headworks, weirs and barrages, divide walls, fish ladder, canal head regulator and silt control at headworks.			
	Unit 5	**Design of canals and lift irrigation systems**			
	A	Classification of canals, alignment of canals, canal curves and inundation canals, measurement of discharge in canals.			CO5, CO6
	B	Kennedy's method of channel design and its drawbacks, Lacey's method for channel design and its limitations, comparison of Kennedy's and Lacey's theories and recent improvements in these methods.			
	C	Design of alluvial and non-alluvial channels, lift irrigation systems, waterlogging and canal lining.			
	Mode of examination	Theory			
	Weightage	CA	MTE	ETE	

	Distribution	25%	25%	50%	
	Text books	6. B.C. Punmia and B.B. Lal. "Irrigation and Water Power Engineering", Laxmi Publications (P) Ltd., Daryaganj, New Delhi, 110002. 7. Bharat Singh," Fundamentals of Irrigation Engineering" Nem Chand & Bros. Roorkee, 8. S.K. Garg "Irrigation Engineering and Hydraulic Structures", Khanna Publishers, Delhi. 9. S.K. Sharma. "Irrigation Engineering and Hydraulic Structures", S. Chand and Company Ltd., Ram Nagr Delhi 10. A. M. Michael, "Irrigation Theory and Practice", Second edition, Vikas Publishing House Pvt. Ltd., Sector-8, Noida (Distributors: UBS Publishers Distributors Pvt. Ltd.). 11. K. Subramanya, "Engineering Hydrology", Tata McGraw-Hill Publishing Co. Ltd. New Delhi.			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	-	-	-	-	-	-	-	2	2	3	1
CO2	3	3	3	2	-	-	-	-	-	-	-	2	2	3	1
CO3	3	3	3	2	-	-	-	-	-	-	-	2	2	3	1
CO4	3	3	3	2	-	-	-	-	-	-	-	2	2	3	1
CO5	3	3	3	2	-	-	-	-	-	-	-	2	2	3	1
CO6	3	3	3	2	-	-	-	-	-	-	-	2	2	3	1

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-27**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
Branch: Civil		**Semester: VI**	
1	Course Code	CVP321	
2	Course Title	Geotechnical Engineering Lab	
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	The students will be able to: CO1: Identify physical property of soil. CO2: Examine index property of soi. CO3: Assess the engineering property of soil. CO4: Estimate the engineering property of soil such as density. CO5: Understand strength characteristics of soil CO6: Access the classification of soils with respect to moisture content	
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		CO Mapping
	Unit 1	**Physical Property Test on Soils**	CO1, CO6
		Exp 1- Determination of specific gravity of A) coarse grained B) fine-grained soils. Exp 2- Sieve analysis Exp 3- Hydrometer analysis	
	Unit 2	**Index Property Test on Soils**	CO2, CO6
		Exp 4 - Determination of liquid limit of fine-grained soils. Exp 5 - Determination of plastic limit of fine-grained soils. Exp 6 - Determination of shrinkage limit of fine-grained soils.	
	Unit 3	**Engineering Property Tests on Soils**	CO3, CO6
		Exp 7 - Determination of in situ dry density by Core cutter method Exp 8 - Determination of in situ dry density by Sand	

		Replacement Method			
	Unit 4	**Engineering Property Tests on Soils**			CO4, CO6
		Exp 9: Determination of coefficient of permeability of soils Exp 10: Determination of compaction characteristics of soils Exp 11: Direct Shear Test.			
	Unit 5	**Engineering Property Tests on Soils**			CO5, CO6
		Exp 12: To determine natural moisture content of soil sample by calcium carbide method and oven dry method. Exp 13: Determine unconfined compressive strength of soil.			
	Mode of examination	Practical			
	Weightage Distribution	CA	CE-Viva	ESE	
		25%	25%	50%	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	3	1	2	3	-	2	2	-	2	2	2	1
CO2	3	2	-	3	1	2	3	-	2	2	-	2	2	2	1
CO3	3	2	-	3	1	-	-	-	2	2	-	2	2	2	1
CO4	3	2	-	3	1	-	-	-	2	2	-	2	2	2	1
CO5	3	2	-	3	1	-	-	-	2	2	-	2	2	2	1
CO6	3	2	-	3	1	2	2	-	2	2	-	2	2	2	1

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch:2023-27**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
Branch: Civil		**Semester: VII**	
1	Course Code	CVL431 Course Name: Advance Structural Design	
2	Course Title	Advance Structure Design	
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 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	The students will be able to: CO1: Design of various types of foundations. CO2: Adapt different types of retaining walls. CO3: Examine various types of water tanks. CO4: Assess gantry girder to support moving loads. CO5: Analyse and design steel members for plastic behaviour conditions CO6: Propose steel and concrete structures as per Indian Standards.	
7	Course Description	Foundation, Retaining Walls, Water Tank and Domes, Gantry Girder Design, Plastic Analysis and Design	
8	Outline syllabus		CO Mapping
	Unit 1	**Design of Foundations**	
	A	Introduction	CO1, CO6
	B	Design of Combined footing	
	C	Design of Pile and Pile Cap	
	Unit 2	**Design of Retaining Walls**	
	A	Analysis of cantilever retaining wall	CO2, CO6
	B	Design of Heel and Toe slab	
	C	Design of Vertical stem	
	Unit 3	**Water Tank**	
	A	Types of Water Tank and Indian Standard Specifications	CO3, CO6
	B	Circular tank on ground (with flexible connection with base)	
	C	Circular tank on ground (with rigid connection with base)	

	Unit 4	**Gantry Girder**			
	A	Introduction			CO4, CO6
	B	Load Consideration			
	C	Design of Gantry Girder			
	Unit 5	**Plastic Analysis and Design**			
	A	Introduction to plastic analysis, Concept of Limit load analysis			CO5, CO6
	B	Plastic analysis of beams using mechanism method			
	C	Plastic Design of Beams			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	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	6. Indian standard on "PLAIN AND REINFORCED CONCRETE -CODE OF PRACTICE," Bureau of Indian Standard, 2000 – IS456:2000 7. Unnikrishna Pillai, S, Devdas Menon (2003). "Reinforced Concrete Design", Tata McGraw-Hill Education Private Limited. 8. Varghese, P.C. (2004). "Limit State Design of Reinforced Concrete", PHI Learning Private Limited. 9. IS: 800 – 2007 "Use of Structural Steel in General Building Constructions", BIS. 10. Steel Table by BIS			

COURSE ARTICULATION MATRIX

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO2	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO3	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO4	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO5	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO6	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch:2023-27**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
Branch: Civil		**Semester: VII**	
1	Course Code	CVL402 | Course Name: Earthquake Engineering	
2	Course Title	Earthquake Engineering	
3	Credits	2	
4	Contact Hours (L-T-P)	2-0-0	
	Course Status	Elective	
5	Course Objective	To provide a coherent development to the students for the courses in sector of earthquake engineering • To present the foundations of many basic engineering concepts related earthquake Engineering • To give an experience in the implementation of engineering concepts which are applied in field of earthquake engineering • To involve the application of scientific and technological principles of planning, analysis, design of buildings according to earthquake design philosophy.	
6	Course Outcomes	The students will be able to: CO1: Understand the implementation of Earthquake Engineering on engineering concepts which are applied in field Structural Engineering. CO2: Analyse Earthquake engineering practices applied to real life problems CO3: Analyse the theoretical and practical aspects of earthquake engineering along with the planning and design aspects. CO4: Determine the loads on earthquake resistant structures CO5: Analyze and design earthquake resistant structures. CO6: Propose steel and concrete structures as per Indian Standards.	
7	Course Description	Foundation, Retaining Walls, Water Tank and Domes, Gantry Girder Design, Plastic Analysis and Design	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction to Dynamic Loads**	
	A	Static Load Vs Dynamic Load	CO1, CO6
	B	Type of Dynamic Forces	
	C	Force control and Displacement Control	
	Unit 2	**Basic of Seismology**	

	A	Earth and its interior, Plate Tectonics, Convection Currents,			CO2, CO6
	B	The Earth quake, Inter Plate Earthquake (Convergent Boundaries, Divergent Boundaries and Transform Boundaries),			
	C	Intra Plate Earthquake (Faults and Types of Faults), Seismic Waves, Basic Terminology, Measuring Units and Instruments			
	Unit 3	**Behavior of Structures During Earthquake and Earthquake Resistant Features of Structure**			
	A	Inertia forces in structures			CO3, CO6
	B	Behavior of RC Structures:			
	C	Earthquake Design Philosophy			
	Unit 4	**Fundamentals of Earthquake Vibrations of Structures**			
	A	Equation of Motion			CO4, CO6
	B	Simplified Single Degree of Freedom			
	C	Equation of Motion for Forced Vibration for Damped and Un damped System			
	Unit 5	**Earthquake Load Analysis on Structures**			
	A	Introduction to methods of Earthquake Load Analysis			CO5, CO6
	B	Analysis of Structure by Linear Static Method			
	C	Analysis of Structure by Linear Dynamic Method			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text book/s*	1. Earthquake Resistant Design of Structures By Pankaj Agarwal & Manish Shrikhande, PHI Publications			
	Other References	1. S. K. Duggal; Earthquake Resistance Design of Structures; Oxford University Press, New Delhi 2. A. K. Chopra; Dynamics of Structures, Pearson, New Delhi 3. Clough & Penzin; Dynamics of Structures 4. Park & Pauly; Behavior of R.C Structures 5. John M. Biggs; Introduction to Structural Dynamics 8. S S Rao; Mechanical Vibration; Pearson, New Delhiu 6. IS: 1893 (Part-I) 2002, Criteria for Earthquake Resistant Design General Provision to Building 7. IS: 13920 (1993), Code of Practice for Ductile Detailing of RC Structures			

COURSE ARTICULATION MATRIX

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO2	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO3	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO4	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO5	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO6	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-27**	
Programme: B.Tech		**Current Academic Year: 2023-24**	
Branch: Civil		**Semester: VII**	
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	The students will be able to: CO1: Identify 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: Examine 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: Apply various pre-stressed and post-stressed members as per Indian standard recommendations. CO6: 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		CO Mapping
	Unit 1	**Introduction**	**CO1**
	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 Prestressed**			**CO2**
	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 Prestressed and Deflection**			**CO3, CO6**
	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**			**CO4, CO6**
	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**			**CO5, CO6**
	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	
		25%	25%	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			

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO2	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO3	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO4	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO5	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO6	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SSET		**Batch: 2023-27**	
Programme B. Tech		**Current Academic Year: 2023-24**	
Branch: Civil		**Semester: VII**	
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	The students will able to: 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: Detail about the Disaster Management Organisation of India and working of various National Disaster Management Agencies. CO5: Understand the basic of Application of Science and Technology in Disaster Management. CO6: Propose 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		CO Mapping
	Unit 1	**Introduction**	**CO1**
	A	Concept and definition of Disaster, Hazard, Vulnerability	
	B	Risk, Capacity – Disaster and Development	
	C	Disaster management history.	
	Unit 2	**Types of Disaster**	**CO2**
	A	Geological Disasters	
	B	Hydro-Meteorological Disasters	

	C	Technological Disasters	
	D	Biological Disasters	
	E	Man-made Disaster	
	Unit 3	**Disaster Management Cycle and Framework**	**CO3, CO6**
	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**	**CO4, CO6**
	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**	**CO5, CO6**
	A	GIS	
	B	GPS	
	C	Remote Sensing	
		Total Hours	
	Mode of examination	Theory	
	Weightage Distribution	CA / MTE / ETE	
		25% / 25% / 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		

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO2	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO3	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO4	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO5	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2

CO6	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High**

School: SSET		**Batch: 2023-27**		
Programme		**Current Academic Year: 2023-24**		
Branch: Civil		**Semester: 7**		
1	Course Code	CVL439	Course Name: DAMAGE ASSESSMENT, REPAIR AND RETROFITTING OF STRUCTURES	
2	Course Title	DAMAGE ASSESSMENT, REPAIR AND RETROFITTING OF STRUCTURES		
3	Credits	3		
4	Contact Hours (L-T-P)	3-0-0		
	Course Status	Elective		
5	Course Objective	The objective of the course is to understand the importance of damage assessment of structures and adopt various methods for repair and retrofitting of structures.		
6	Course Outcomes	The students will able to: CO1: Understand the need for rehabilitation of structures. CO2: Classify types of damages, sources and effect of damages in the structure. CO3: Assess various evaluation models, need for damage assessment and procedures of damage assessment in structures. CO4: Determine the retrofitting techniques in the structure. CO5: Choose the appropriate method of repair in structures. CO6: Design the concept of damage assessment, need for repair and retrofitting in structures.		
7	Course Description	Introduction, Distress in structures, Damage Assessment and Evaluation Models, Retrofitting of structures, Repair of structures.		
8	Outline syllabus			
	Unit 1	**Introduction**		**CO1**
	A	Introduction		
	B	Deterioration of structures with aging		
	C	Need for rehabilitation		
	Unit 2	**Distress in Structures**		**CO2**
	A	Types of Damages		
	B	Sources of Damage		
	C	Effect of Damages and Case Studies		
	Unit 3	**Damage Assessment and Evaluation Models**		**CO3, CO6**
	A	Purpose of Assessment, Rapid Assessment, Surface and Structural Cracks		
	B	Damage Assessment Procedures		
	C	Destructive, Semi-Destructive and Non-Destructive Methods		
	Unit 4	**Retrofitting of Structures**		**CO4, CO6**

	A	Introduction, Consideration in retrofitting of structures, Source of weakness in RC framed buildings, Structural Damage due to discontinuous load path, Structural Damage due to lack of deformation, Quality of workmanship and material	
	B	Classification of retrofitting techniques, Retrofitting strategies for RC buildings, Global and Local Retrofitting Methods	
	C	Comparative Analysis of methods of retrofitting.	
	Unit 5	**Repair of Structures**	**CO5, CO6**
	A	Grouting, Detailing, Imbalance of Structural Stability, Rust eliminators and polymers coating for rebar during repair, foamed concrete, mortar and dry pack, vacuum concrete	
	B	Gunite and Shot-crete, Epoxy injection, Mortar repair for cracks, shoring and underpinning	
	C	Methods of corrosion protection, corrosion inhibitors, corrosion resistant steels, coatings and cathodic protection	
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / MTE: 25% / ETE: 50%	
	Text book/s*	1. Earthquake Resistant Design of Structures by Pankaj Agarwal and Manish Shrikhande, PHI, 2006.	
	Other References	1. Handbook on Repair and Rehabilitation of RCC buildings, Published by CPWD, Delhi, 2002.	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO2	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO3	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO4	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO5	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2
CO6	3	-	3	-	-	-	1	3	-	-	-	3	1	3	2

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High**

School: SSET		**Batch : 2023-2027**		
Programme: B.Tech		**Current Academic Year: 2023-2024**		
Branch: Civil Engineering		**Semester: VIII**		
1	Course Code	**CVP497**		
2	Course Title	**Major Project II**		
3	Credits	8		
4	Contact Hours (L-T-P)	0-0-16		
	Course Status	Compulsory		
5	Course Objective	The course provides an in-depth understanding and skill in the field of Mechanical Engineering and its associated fields.		
6	Course Outcomes	The students will able to: CO1: Carry out experiments/simulation as proposed CO2: Analyse recorded results for errors CO3: Interpret and tabulate the results CO4: Relate the results with the deliverables CO5: Recommendations for future work CO6: Communicate project work effectively in written and oral forms.		
7	Course Description	The course provides an in-depth understanding and skill in the field of Mechanical Engineering and its associated fields.		
	Mode of examination	Project report and Viva-Voce		
	Weightage Distribution	CA	CE VIVA	ETE
		25%	25%	50%
	Text book/s*	As per the field/specialization		
	http:/	Google scholar, Research gate.		

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	2	1	2	3	3	3	3	3	3	3
CO2	3	3	3	3	3	2	1	2	3	3	3	3	3	3	3
CO3	3	3	3	3	3	2	1	2	3	3	3	3	3	3	3
CO4	3	3	3	3	3	2	1	2	3	3	3	3	3	3	3
CO5	3	3	3	3	3	2	1	2	3	3	3	3	3	3	3
CO6	3	3	3	3	3	2	1	2	3	3	3	3	3	3	3

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**