Mapping of COs with POs and PSOs

Course Articulation Matrix (2021 Course)

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	**1**	**Differential Calculus**	**C101**		**3**	**3**	**3**	**3**	**2**	**0**	**0**	**0**	**1**	**2**	**1**	**3**	**2**	**3**
	1		C101.1	Understand rank of matrix and apply it to solve system of linear equation	3	3	3	3	2				1	2	1	3	2	3
	1		C101.2	Understand the DeMoiver's theorem, hyperbolic functions and apply it in engineering problems	3	3	3	3	2				1	2	1	3	2	3
	1		C101.3	Understand the Leibnitz's rule and apply it to find nth derivative of a function	3	3	3	3	2				1	2	1	3	2	3
	1		C101.4	Understand fundamental concepts of convergence, divergence of infinite series and its tests.	3	3	3	3	2				1	2	1	3	2	3
	1		C101.5	Understand the concept of partial differentiation and apply it to find total derivative	3	3	3	3	2				1	2	1	3	2	3
	1		C101.6	Evaluate the maxima and minima of any two variables functions	3	3	3	3	2				1	2	1	3	2	3
2	**1**	**Apllied Chemistry**	**C102**		**1.67**	**1.5**	**1.67**	**1.67**	**1.17**	**2**	**1.84**	**0.34**	**0.34**	**0**	**0.67**	**1.34**	**1**	**0.67**
	1		C102.1	Apply their knowledge for protection of different metals from corrosion	2	1	2	2		1	2				1	1		
	1		C102.2	Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost	2	2	2	2	2	3	2	1	1		1	2	2	1
	1		C102.3	Identify the sources of air pollution and its implications on the environment	2	2	2	2	2	3	2	1	1			1	1	1
	1		C102.4	To learn fundamentals of energy storage systems such as battery, solar cell	1	1			1	2	2				1	2	1	1
	1		C102.5	Outline the importance of testing of	3	3	3	3	1	2	2				1	2	2	1

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					1	2	3	4	5	6	7	8	9	10	11	12	1	2
				cement and its properties and applications														
	1		C102.6	To understand and analyze the necessity of making an alloy and its applications in various industries			1	1	1	1	1							
3	**1**	**Construction and Materials**	**C103**		**3**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**1**	**0**	**0**	**3**	**3**	**0**
	1		C103.1	Elaborate the types of structures and components of building	3					2			1			3	3	
	1		C103.2	Explain building foundation, types of masonry	3					2			1			3	3	
	1		C103.3	identify the types of doors, windows and design various staircases	3					2			1			3	3	
	1		C103.4	Select and apply the proper type of floors and types of roofs	3					2			1			3	3	
	1		C103.5	Illustrate the types of plasters, pointing and paints	3					2			1			3	3	
	1		C103.6	Apply the proper formwork and scaffolding, use proper construction safety	3					2			1			3	3	
4	**1**	**Civil Engineering Structures and Geology**	**C104**		**1.67**	**0.5**	**0.17**	**0**	**0.34**	**0.67**	**0.5**	**0**	**0**	**0**	**0.17**	**0**	**0.5**	**0.17**
	1		C104.1	Identify and know various civil engineering structures based on their function	2					1								
	1		C104.2	Identify and know various civil engineering structures based on their behaviour	2	1												
	1		C104.3	Identify and know various civil engineering structures based on their performance	1													

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					1	2	3	4	5	6	7	8	9	10	11	12	1	2
	1		C104.4	identify different rocks & minerals.	2	1			1	1	1							
	1		C104.5	identify different Geological structures to decide location and type of civil engineering structure.	1					1	1						2	1
	1		C104.6	carry out preliminary geological investigation for Tunnel, Dam & Bridge.	2	1	1		1	1	1				1		1	
5	**1**	**Introduction and Opportunities in Civil Engineering**	**C105**		**2.5**	**1.5**	**1.67**	**0.84**	**1.17**	**0**	**0**	**0.34**	**1.67**	**1.84**	**1.67**	**1.5**	**1**	**0.5**
	1		C105.1	Explain the introduction to civil engineering and various discipline	3	1							1	1		2		
	1		C105.2	Elaborate Scope and role of civil engineering in all sectors	2	1						2	3	2	1	2		
	1		C105.3	Identify the Civil Engineering project and process.	2	2	2	1	1				1	2	3		2	1
	1		C105.4	Select the approvals required for Civil Engineering Construction Projects	2	2	2	1	2				1	2	2			1
	1		C105.5	Illustrate the Recent Developments in Civil Engineering	3	1	3	2	2				2	1	2	3	2	1
	1		C105.6	Apply the Opportunities in Civil Engineering	3	2	3	1	2				2	3	2	2	2	
6	**1**	**Graphics for Civil Engineering**	**C106**		**3**	**2.34**	**0.67**	**0.67**	**2**	**0**	**0**	**0**	**0.67**	**2**	**0.5**	**1.17**	**0.84**	**0**
	1		C106.1	Understand dimensioning methods and drawing of engineering curves	3	1			2					2	2	2	1	
	1		C106.2	Draw orthographic projections using 1st angle method of projection	3	1	1		2					2		2		
	1		C106.3	Draw Isometric views from given orthographic projections	3	3	1	2	2				2	3		2	2	
	1		C106.4	Draw projection of Lines, its traces and projections of planes	3	3	2		2				2	3	1	1	2	

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					1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
	1		C106.5	Draw projection of different solids	3	3		1	2					1				
	1		C106.6	Draw development of lateral surfaces of solids	3	3		1	2					1				
7	**1**	**Workshop Technology**	**C107**		**1**	**1**	**2.67**	**0.67**	**2**	**0**	**0.34**	**0**	**0**	**0**	**2**	**0.67**	**2**	**0.67**
	1		C107.1	Understand the basic Manufacturing Processes used in the industry.	1	1	2	1	3		1				2	1	2	1
	1		C107.2	Understand various tools and apply suitable tools for suitable operations in civil work	1	2	3	1	2						2	1	2	1
	1		C107.3	Understand the importance of safety.	1		3		1						2		2	
8	**1**	**Fundamentals of Problem Solving Logic(Using C)**	**C108**		**3**	**2.5**	**2.5**	**2.5**	**3**	**0**	**0**	**0**	**3**	**0**	**0**	**3**	**2**	**0**
	1		C108.1	Know computer systems	3				3				3			3	2	
	1		C108.2	Understand concept and steps towards problem solving	3	3	3	3	3				3			3	2	
	1		C108.3	Understand concept and steps towards problem solving	3	3	3	3	3				3			3	2	
	1		C108.4	Use decision control structures	3	3	3	3	3				3			3	2	
	1		C108.5	Use modular programming approach	3	3	3	3	3				3			3	2	
	1		C108.6	Use of arrays and structures	3	3	3	3	3				3			3	2	
9	**2**	**Integral Calculus**	**C109**		**3**	**3**	**3**	**3**	**2**	**0**	**0**	**0**	**1**	**2**	**1**	**3**	**2**	**3**
	2		C109.1	Understand and evaluate first order and first degree differential equations.	3	3	3	3	2				1	2	1	3	2	3
	2		C109.2	Understand the formulation of physical systems as first order, first degree differential equation and evaluate particular solution of it	3	3	3	3	2				1	2	1	3	2	3

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					1	2	3	4	5	6	7	8	9	10	11	12	1	2
	2		C109.3	Understand the Fourier series and apply it to represent periodic function	3	3	3	3	2				1	2	1	3	2	3
	2		C109.4	Understand and evaluate methods of integral calculus and curve tracing	3	3	3	3	2				1	2	1	3	2	3
	2		C109.5	Understand co-ordinate system and apply it to solve locus problems	3	3	3	3	2				1	2	1	3	2	3
	2		C109.6	Understand concept of multiple integral and apply it to evaluate area, volume, centre of gravity and moment of inertia.	3	3	3	3	2				1	2	1	3	2	3
10	**2**	**Acoustics and Modern Physics**	**C110**		**2.5**	**1**	**1.17**	**0.84**	**0.67**	**0.67**	**0.34**	**0**	**0.17**	**0**	**0.17**	**0.34**	**0.5**	**0.34**
	2		C110.1	Summarise the terms damping constant, characteristic frequency, kinetic and potential energy of a spring	3	2	1	1	1									
	2		C110.2	Relate the problems associated with architectural acoustics and give their remedies	3	2	2	1	1	2	1				1	1	1	1
	2		C110.3	connect the problems associated with defects and use ultrasonic as a tool in industry for nondestructive testing	3		1	1	1	1							1	
	2		C110.4	Summarise and solve the engineering problems on Electromagnetism.	2													
	2		C110.5	Correlate the principles of different types of polarization and structural phase transitions phenomena in ferroelectric systems	1													
	2		C110.6	Infer the wave nature of light and apply it to measure stress, pressure and dimension etc	3	2	3	2	1	1	1		1			1	1	1
11	**2**	**Statics and Dynamics**	**C111**		**3**	**2.67**	**1.34**	**1.84**	**1.34**	**2.34**	**1.5**	**1.5**	**2.5**	**2**	**1.34**	**2.17**	**1.84**	**1.84**
	2		C111.1	calculate resultant and apply conditions of equilibrium.	3	3	1	2	1	2	1	2	3	3	1	2	1	2

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					1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
	2		C111.2	calculate friction force and its effect	3	3	1	3	1	2	1	2	3	3	1	3	2	2
	2		C111.3	analyze the truss	3	3	1	1	1	2	1	1	2	1	1	1	2	2
	2		C111.4	calculate centroid and moment of inertia	3	2	1	1	1	2	2	2	3	3	1	3	2	1
	2		C111.5	evaluate kinematic effect of forces	3	3	2	2	2	3	2	1	2	1	2	2	2	2
	2		C111.6	evaluate kinetic effect of forces	3	2	2	2	2	3	2	1	2	1	2	2	2	2
12	**2**	**Basic Land Surveying**	**C112**		**2.84**	**1.67**	**0.5**	**0.17**	**2**	**1**	**0.5**	**1.84**	**2**	**2.17**	**0.67**	**1.67**	**2.17**	**1**
	2		C112.1	Use instruments for linear measurements and prismatic compass for angular measurements	3	3			2	1			3	1	2	2	2	
	2		C112.2	Use instruments for levelling and compute reduced levels of ground points	3	2			2	1		2	1	3		2	2	
	2		C112.3	Use Vernier theodolite for angular measurements and for other applications.	2	3	3	1			2	2	3	3		1	2	
	2		C112.4	Use of Tacheometer for computation of distances and reduced levels. Use plane table and its accessories for surveying	3				3			2	1	2		1	2	
	2		C112.5	Set out simple circular curves by various methods.	3	2			2	2	1	3	2	3	1	2	2	3
	2		C112.6	Conduct surveys for various construction projects and explainuse of modern instruments	3				3	2		2	2	1	1	2	3	3
13	**2**	**Construction Design & Drawing**	**C113**		**3**	**2.17**	**2.5**	**1.84**	**0**	**3**	**2.5**	**3**	**2**	**1.67**	**0.5**	**2.84**	**1.5**	**2.17**
	2		C113.1	apply various Principals of planning and building byelaws.	3	2	2	2		3	3	3	2	1	1	3	2	3
	2		C113.2	apply design considerations for climate, ventilation, Noise & Acoustics in building planning.	3	3	3	2		3	3	3	3	2	1	2	2	3

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					1	2	3	4	5	6	7	8	9	10	11	12	1	2
	2		C113.3	apply design considerations for various building services & fire protection in building planning.	3	2	3	2		3	3	3	2	2		3	1	2
	2		C113.4	apply design considerations for plumbing services in building planning.	3	2	2	2		3	2	3	1	2		3	2	2
	2		C113.5	Understand the concept of .development plan	3	2	3	1		3	3	3	2	1		3	1	2
	2		C113.6	define the legal aspects of plan sanctioning	3	2	2	2		3	1	3	2	2	1	3	1	1
14	**2**	**Civil Engineering Software – I (AutoCAD)**	**C114**		**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2.5**	**2**	**2**	**1.75**	**3**	**1.75**	**2.75**
	2		C114.1	draw various Engineering drawing using AutoCAD	3	3	3	2	3	3	2	2	2	2	2	3	2	3
	2		C114.2	draw various elements of a building.	3	3	3	2	3	3	2	3	2	2	2	3	2	3
	2		C114.3	draw various elevation and sections of the building.	3	3	3	2	3	3	2	3	2	2	2	3	2	3
	2		C114.4	Draw and explain various modelling concepts of building construction and building drawing by using AutoCAD	3	3	3	2	3	3	2	2	2	2	1	3	1	2
15	**2**	**Object-Oriented Programming (Using C++)**	**C115**		**3**	**3**	**2**	**2**	**3**	**0**	**0**	**0**	**2**	**0**	**0**	**3**	**0**	**0**
	2		C115.1	Explain different Concepts of OOP, Characteristics of OOP	3	3			3				2			3		
	2		C115.2	Demonstrate the use of Data type , Keywords ,Tokens and Control Structures to Solve given Problem	3	3			3				2			3		
	2		C115.3	Demonstrate the use of functions to solve real world problem.	3	3	3	3	3				2			3		
	2		C115.4	Compare different types of inheritance	3	3	3	3	3				2			3		

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	2	3	4	5	6	7	8	9	10	11	12	1	2
				to solve given problem														
	2		C115.5	Explain different Types of Constructor and Destructor.	3	3	3	3	3				2			3		
	2		C115.6	Develop OOP applications using file Handling.	3	3	3	3	3				2			3		
16	**3**	**Mechanics of Soilids**	**C201**		**3**	**3**	**3**	**3**	**2**	**2**	**1**	**2**	**2**	**1**	**1**	**2**	**1**	**1**
	3		C201.1	determine axial stresses in the member.	3	3	3	3	2	2	1	2	2	1	1	2	1	1
	3		C201.2	draw shear force and bending moment diagram for determinate beams.	3	3	3	3	2	2	1	2	2	1	1	2	1	1
	3		C201.3	calculate bending stresses and deflection of beam.	3	3	3	3	2	2	1	2	2	1	1	2	1	1
	3		C201.4	calculate shear stresses due to shear force and torsion	3	3	3	3	2	2	1	2	2	1	1	2	1	1
	3		C201.5	calculate critical load on column.	3	3	3	3	2	2	1	2	2	1	1	2	1	1
	3		C201.6	compute principal stresses using analytical and graphical method	3	3	3	3	2	2	1	2	2	1	1	2	1	1
17	**3**	**Construction Equipment and Methods**	**C202**		**1.5**	**2**	**1.17**	**1.84**	**2.67**	**1.34**	**1.67**	**1.17**	**1.34**	**1.67**	**2**	**2.34**	**2**	**1**
	3		C202.1	explain various advanced construction techniques.	1	2	1	1	1	2	2	1	1	2	2	3	2	1
	3		C202.2	apply different construction techniques for underwater construction	2	2	2	2	3	1	2	1	2	2	3	3	2	1
	3		C202.3	identify and find output of earth moving equipment	2	2	1	3	3	1	2	1	1	1	1	2	2	1
	3		C202.4	describe hoisting & conveying equipment	1	1	1	1	3	1	1	1	1	1	3	2	2	1
	3		C202.5	Understand equipment key features, cost and find out its performance.	2	3	1	3	3	1	2	1	2	1	1	2	2	1
	3		C202.6	describe dewatering, paving equipment & concrete pumps	1	2	1	1	3	2	1	2	1	3	2	2	2	1
1	**3**	**Fluid**	**C203**		**3**	**3**	**3**	**3**	**3**	**1**	**1**	**0**	**1**	**0**	**0**	**2**	**3**	**1**

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					1	2	3	4	5	6	7	8	9	10	11	12	1	2
8		**Mechanics**																
	3		C203.1	describe basic properties of fluids and measure its properties in static conditions	3	3	3	3	3	1	1		1			2	3	1
	3		C203.2	apply knowledge of fluid kinematics and dynamics conditions	3	3	3	3	3	1	1		1			2	3	1
	3		C203.3	analyse physical phenomenon dimensionally	3	3	3	3	3	1	1		1			2	3	1
	3		C203.4	explain laminar flow and flow through pipes	3	3	3	3	3	1	1		1			2	3	1
	3		C203.5	explain of boundary layer theory.	3	3	3	3	3	1	1		1			2	3	1
	3		C203.6	describe turbulent flow	3	3	3	3	3	1	1		1			2	3	1
19	**3**	**Economics and Finance**	**C204**		**3**	**2**	**2**	**1**	**0**	**1**	**0**	**0**	**1**	**2**	**2**	**1**	**1**	**0**
	3		C204.1	explain the concept of Engineering Economics.	3	2	2	1		1			1	2	2	1	1	
	3		C204.2	estimate time value of money.	3	2	2	1		1			1	2	2	1	1	
	3		C204.3	select best project	3	2	2	1		1			1	2	2	1	1	
	3		C204.4	find out depreciation cost	3	2	2	1		1			1	2	2	1	1	
	3		C204.5	prepare balance sheet	3	2	2	1		1			1	2	2	1	1	
	3		C204.6	generate finance for organization	3	2	2	1		1			1	2	2	1	1	
20	**3**	**Concrete Technology***	**C205**		**2.34**	**2.17**	**1.34**	**1.67**	**1.34**	**1.17**	**1**	**1**	**2.34**	**1**	**1**	**3**	**1.5**	**1.17**
	3		C205.1	test ingredients of concrete	2	2	1	1	1	1	1	1	2	1	1	3	1	1
	3		C205.2	measure workability of concrete	1	1	1	1	1	1	1	1	3	1	1	3	1	1
	3		C205.3	measure strength of hardened concrete	3	3	1	2	2	1	1	1	3	1	1	3	2	1
	3		C205.4	describe durability of concrete	3	3	1	2	2	1	1	1	2	1	1	3	2	1
	3		C205.5	apply special concreting techniques	2	3	1	2	1	1	1	1	2	1	1	3	1	1
	3		C205.6	design of concrete mix	3	1	3	2	1	2	1	1	2	1	1	3	2	2
21	**3**	**Vocational Course-I :**	**C206**		**3**	**2**	**3**	**1**	**3**	**3**	**2**	**3**	**2**	**3**	**1**	**3**	**3**	**3**

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					1	2	3	4	5	6	7	8	9	10	11	12	1	2
		AutoCAD 3D																
	3		C206.1	draw various Engineering drawing using AutoCAD 3 D	3	2	3	1	3	3	2	3	2	3	1	3	3	3
	3		C206.2	draw various 3D elements of a building from 2d profiles.	3	2	3	1	3	3	2	3	2	3	1	3	3	3
	3		C206.3	draw various 3D elevation and sections of the building	3	2	3	1	3	3	2	3	2	3	1	3	3	3
	3		C206.4	draw and explain various modelling concepts of building construction and building drawing by using AutoCAD 3D.	3	2	3	1	3	3	2	3	2	3	1	3	3	3
	3		C206.5	draw using different types of materials	3	2	3	1	3	3	2	3	2	3	1	3	3	3
	3		C206.6	Render 3D models and scale printing of 3D models	3	2	3	1	3	3	2	3	2	3	1	3	3	3
22	**3**	**Data Analytics Using Python**	**C207**		**3**	**2.5**	**2.5**	**2.5**	**3**	**0**	**0**	**0**	**3**	**0**	**0**	**3**	**2**	**0**
	3		C207.1	Write program of functional and object-oriented Python	3				3				3			3	2	
	3		C207.2	Visualize Data	3	3	3	3	3				3			3	2	
	3		C207.3	Design, analyse & validate linear and multiple linear regression model on given data	3	3	3	3	3				3			3	2	
	3		C207.4	Design and test hypothesis using ANOVA for given data.	3	3	3	3	3				3			3	2	
	3		C207.5	Design, analyse & validate non-linear regression model	3	3	3	3	3				3			3	2	
	3		C207.6	Analyse time series data	3	3	3	3	3				3			3	2	
23	**4**	**Vector Calculus and Differential equations**	**C208**		**3**	**3**	**3**	**3**	**2**	**0**	**0**	**0**	**1**	**2**	**1**	**3**	**2**	**3**

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	2	3	4	5	6	7	8	9	10	11	12	1	2
	4		C208.1	Form mathematical modelling of systems using differential equations and solve the differential equations	3	3	3	3	2				1	2	1	3	2	3
	4		C208.2	Apply mathematical modeling to physical systems using ordinary differential and evaluate particular solution	3	3	3	3	2				1	2	1	3	2	3
	4		C208.3	Apply mathematical modeling of systems using partial differential equations and solve the partial differential equations	3	3	3	3	2				1	2	1	3	2	3
	4		C208.4	Apply Vector differentiation and integration that finds applications in solid mechanics, fluid flow, heat problems and potential theory etc.	3	3	3	3	2				1	2	1	3	2	3
	4		C208.5	Apply vector integral calculus to solve various problems in Civil Engineering.	3	3	3	3	2				1	2	1	3	2	3
	4		C208.6	Analyze the numerical data by applying statistical methods	3	3	3	3	2				1	2	1	3	2	3
24	**4**	**Open Channel flow and Hydraulic Machinery**	**C209**		**3**	**3**	**3**	**3**	**3**	**1.17**	**1**	**0**	**1**	**1**	**1.17**	**1**	**1**	**1**
	4		C209.1	Design most efficient channel section, find critical depth of a flow.	3	3	3	3	3	2	1		1	1	2	1	1	1
	4		C209.2	Understand and apply knowledge of various flow profile and their characteristics	3	3	3	3	3	1	1		1	1	1	1	1	1
	4		C209.3	Find energy dissipated in a hydraulic jump.	3	3	3	3	3	1	1		1	1	1	1	1	1
	4		C209.4	Calculate forces on vanes for different conditions.	3	3	3	3	3	1	1		1	1	1	1	1	1
	4		C209.5	Understand and apply knowledge of turbines	3	3	3	3	3	1	1		1	1	1	1	1	1

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	2	3	4	5	6	7	8	9	10	11	12	1	2
	4		C209.6	Understand and apply knowledge of pumps	3	3	3	3	3	1	1		1	1	1	1	1	1
25	**4**	**Geomechanics**	**C210**		**3**	**2.67**	**2.34**	**2.34**	**1.5**	**1.17**	**0**	**0**	**2**	**1.5**	**1.84**	**1.5**	**1.5**	**1**
	4		C210.1	identify and classify the soil according to formation of soil and its properties.	3	2	2	2	1	1			2	1	2	2	2	2
	4		C210.2	determine index properties of soil	3	2	2	2	1	2			2	2	2	2	2	2
	4		C210.3	calculate coefficient of permeability and effective stresses of soil.	3	3	2	2	2	1			2	2	2	1	1	
	4		C210.4	calculate the geostatic stresses and OMC of soil by various methods.	3	3	3	3	2	1			2	1	2	1	1	
	4		C210.5	analysis of shear parameters of soil by various method	3	3	3	3	2	1			2	2	2	2	2	2
	4		C210.6	compute lateral earth pressure on retaining wall.	3	3	2	2	1	1			2	1	1	1	1	
26	**4**	**Analysis of Determinate Structures**	**C211**		**3**	**3**	**3**	**3**	**2**	**2**	**0**	**0**	**2**	**1**	**0**	**2**	**1**	**1**
	4		C211.1	Determine degree of indeterminacy of structures	3	3	3	3	2	2			2	1		2	1	1
	4		C211.2	Deflection of joints of determinate truss	3	3	3	3	2	2			2	1		2	1	1
	4		C211.3	Construct Influence line diagram for forces in beams	3	3	3	3	2	2			2	1		2	1	1
	4		C211.4	Calculate maximum forces in beams using Influence line diagram.	3	3	3	3	2	2			2	1		2	1	1
	4		C211.5	Calculate maximum forces in truss member using Influence line diagram	3	3	3	3	2	2			2	1		2	1	1
	4		C211.6	Calculate forces in three hinged arch.	3	3	3	3	2	2			2	1		2	1	1
27	**4**	**Planning and Management of Construction Projects**	**C212**		**2**	**1.67**	**2**	**1.5**	**1.34**	**1.84**	**1.84**	**2**	**2**	**1.84**	**2**	**2.17**	**2**	**1**

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	2	3	4	5	6	7	8	9	10	11	12	1	2
	4		C212.1	prepare organization chart.	2				1	2	1	2	3	2	2	2	2	1
	4		C212.2	Explain bar charts and elements of network	2	2	3	3	2	2	2	2	2	3	3	3	2	1
	4		C212.3	prepare a network and analyze by CPM and PERT methods.	2	2	3	2	2	2	2	2	2	2	2	2	2	1
	4		C212.4	update network and carryout resource allocation	2	2	2	1	1	2	2	2	2	2	2	2	2	1
	4		C212.5	carry out material management	2	2	2	2	1	1	2	2	1	1	1	2	2	1
	4		C212.6	check quality parameters in construction process.	2	2	2	1	1	2	2	2	2	1	2	2	2	1
28	**4**	**Vocational Course-II :Plumbing Engineering**	**C213**		**3**	**3**	**2**	**1.5**	**0**	**3**	**3**	**3**	**3**	**2**	**1**	**3**	**2.5**	**2.5**
	4		C213.1	Identify and select proper tools and use them for the given plumbing work	3	3				3	3	3	3	2		3	2	2
	4		C213.2	Select appropriate pipes and carry out pipe fitting after carrying out operations like cutting, bending, threading, joining, aligning and other necessary operations	3	3				3	3	3	3	2		3	2	2
	4		C213.3	Erect simple water supply system. Trace leakage and repair water supply system	3	3	3			3	3	3	3	2		3	2	2
	4		C213.4	Plan, prepare and inspect domestic drainage system	3	3	3	3		3	3	3	3	2	2	3	3	3
	4		C213.5	Select and install sanitary appliances	3	3	3	3		3	3	3	3	2	2	3	3	3
	4		C213.6	Install heating appliances like geyser, etc.	3	3	3	3		3	3	3	3	2	2	3	3	3
29	**4**	**Construction Practices in Civil Engineering**	**C214**		**3**	**3**	**2.2**	**2.6**	**0**	**2**	**0**	**1.8**	**3**	**0.6**	**1.2**	**3**	**3**	**2.2**
	4		C214.1	setout of foundation for buildings.	3	3	2	2		2			3			3	3	3
	4		C214.2	carry out testing of construction materials	3	3	2	2		2		3	3			3	3	2

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	2	3	4	5	6	7	8	9	10	11	12	1	2
	4		C214.3	manage inventory on site	3	3	2	3		2		3	3			3	3	2
	4		C214.4	maintain quality control on site.	3	3	2	3		2		3	3		3	3	3	2
	4		C214.5	work as a site engineer	3	3	3	3		2			3	3	3	3	3	2
30	**5**	**Analysis of Indeterminate Structures**	**C301**		**3**	**3**	**3**	**3**	**2**	**2**	**0**	**0**	**2**	**1**	**0**	**2**	**1**	**1**
	5		C301.1	calculate plastic moment capacity of section.	3	3	3	3	2	2			2	1		2	1	1
	5		C301.2	analyse Indeterminate truss using strain energy method.	3	3	3	3	2	2			2	1		2	1	1
	5		C301.3	calculate fixed end moments	3	3	3	3	2	2			2	1		2	1	1
	5		C301.4	analyse plane structure using slope deflection method.	3	3	3	3	2	2			2	1		2	1	1
	5		C301.5	analyse plane structure using moment distribution method	3	3	3	3	2	2			2	1		2	1	1
	5		C301.6	analyse frame using approximate method	3	3	3	3	2	2			2	1		2	1	1
31	**5**	**Infrastructure and Transportation Systems**	**C302**		**3**	**2.84**	**2.5**	**2.34**	**1.84**	**3**	**2.34**	**2.5**	**2.5**	**2**	**2.17**	**3**	**1.84**	**2.84**
	5		C302.1	describe the scope of road transportation & significance of highway engineering.	3	2	1	1	1	3	2	2	2	2	2	3	1	2
	5		C302.2	evaluate in detail the planning of transport system.	3	3	2	3	2	3	2	3	2	2	2	3	2	3
	5		C302.3	design the roads by considering its geometry.	3	3	3	3	2	3	2	3	2	2	2	3	2	3
	5		C302.4	analyze various materials used in highway construction & design the pavements.	3	3	3	3	2	3	3	3	3	2	2	3	2	3
	5		C302.5	describe the process of highway construction, highway drainage and its	3	3	3	2	2	3	3	2	3	2	2	3	2	3

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	2	3	4	5	6	7	8	9	10	11	12	1	2
				maintenance														
	5		C302.6	apply urban transport technology & its financing	3	3	3	2	2	3	2	2	3	2	3	3	2	3
32	**5**	**Arbitration and Laws Related to Construction Industry**	**C303**		**3**	**3**	**2**	**1**	**1**	**1**	**0**	**1**	**1**	**2**	**2**	**1**	**1**	**0**
	5		C303.1	describe importance of Arbitration in Civil Engineering Industry	3	3	2	1	1	1		1	1	2	2	1	1	
	5		C303.2	classify methods of dispute resolution in construction industry	3	3	2	1	1	1		1	1	2	2	1	1	
	5		C303.3	explain Conciliation and its provisions in dispute resolution	3	3	2	1	1	1		1	1	2	2	1	1	
	5		C303.4	describe Importance and Provisions of Indian Contracts Act	3	3	2	1	1	1		1	1	2	2	1	1	
	5		C303.5	explain different labour Laws	3	3	2	1	1	1		1	1	2	2	1	1	
	5		C303.6	explain various Environmental laws in India.	3	3	2	1	1	1		1	1	2	2	1	1	
33	**5**	**Advanced Surveying with Geomatics***	**C304**		**2.67**	**1.67**	**2.34**	**2.34**	**2.5**	**2.5**	**1.17**	**1.67**	**3**	**2.67**	**1**	**2.5**	**2.67**	**2.5**
	5		C304.1	describe Triangulation Survey and carryout triangulation adjustment	2	1	2	1	1	1	1	2	3	2	1	1	2	1
	5		C304.2	describe Triangulation Survey and carryout triangulation adjustment	3	2	3	3	3	3	1	2	3	2	1	3	3	3
	5		C304.3	describe principles of remote sensing techniques and its applications	3	2	3	3	3	3	1	2	3	3	1	3	3	3
	5		C304.4	describe principles of remote sensing techniques and its applications	3	2	3	3	3	3	2	2	3	3	1	3	3	3
	5		C304.5	describe principles of SBPS and its applications	3	2	2	2	3	3	1	1	3	3	1	3	3	3
	5		C304.6	describe process of Photogrammetry	2	1	1	2	2	2	1	1	3	3	1	2	2	2

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	2	3	4	5	6	7	8	9	10	11	12	1	2
				and its applications.														
34	**5**	**Limit State Design of Steel Structures**	**C305**		**3**	**3**	**3**	**3**	**3**	**2**	**2**	**1**	**2**	**2**	**1**	**2**	**2.84**	**3**
	5		C305.1	estimate design load	3	3	3	3	3	2	2	1	2	2	1	2	3	3
	5		C305.2	design connection for axial load.	3	3	3	3	3	2	2	1	2	2	1	2	3	3
	5		C305.3	design members for axial tension.	3	3	3	3	3	2	2	1	2	2	1	2	3	3
	5		C305.4	design members for axial compression	3	3	3	3	3	2	2	1	2	2	1	2	3	3
	5		C305.5	design built up column	3	3	3	3	3	2	2	1	2	2	1	2	2	3
	5		C305.6	design beam	3	3	3	3	3	2	2	1	2	2	1	2	3	3
35	**5**	**Vocational Course-III: Structural Assessment and Retrofitting**	**C306**		**2**	**2**	**2**	**2**	**2**	**2**	**1**	**2**	**2**	**2**	**2**	**2**	**3**	**3**
	5		C306.1	diagnose the distress in the structure.	2	2	2	2	2	2	1	2	2	2	2	2	3	3
	5		C306.2	decide suitable assessment technique.	2	2	2	2	2	2	1	2	2	2	2	2	3	3
	5		C306.3	suggest appropriate retrofitting and rehabilitation technique	2	2	2	2	2	2	1	2	2	2	2	2	3	3
36	**5**	**Civil Engineering Software – II (Staad Pro)**	**C307**		**3**	**3**	**2**	**2**	**3**	**2.34**	**0.34**	**0.67**	**1.34**	**1**	**0.34**	**2.34**	**2.67**	**2.34**
	5		C307.1	model the structure using FEM software	3	3	1	1	3	2			1	1		2	2	2
	5		C307.2	apply loads, analyse the structure and interpret the analysis output	3	3	2	2	3	2			1	1		2	3	2
	5		C307.3	design the structure using FEM software	3	3	3	3	3	3	1	2	2	1	1	3	3	3
37	**6**	**Water Supply Engineering**	**C308**		**1.84**	**1.84**	**1.5**	**1.67**	**1.34**	**2**	**1.17**	**1.17**	**1**	**0.34**	**1**	**2**	**1.17**	**1.17**

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
	6		C308.1	explain the water quality criteria and drinking water quality standards	2	2	1	2		2	2	2	1	1	1	3	1	1
	6		C308.2	analyse and design the process Aeration and Sedimentation.	2	3	2	2	1	2	1	1	1		1	1	2	1
	6		C308.3	analyse and design the process filtration, Disinfection	2	3	1	1	1	2	1	1	1	1	1	2	1	1
	6		C308.4	demonstrate the various advanced treatment system and knowledge about the recent advances in water treatment process.	1	1	2	2	2	2	1	1	1		1	2	1	2
	6		C308.5	design and evaluate water distribution system plumbing of buildings.	3	1	1	2	2	2	1	1	1		1	2	1	1
	6		C308.6	demonstrate process of water audit and various conservation methods related to Domestic Sector, Industrial Sector, Irrigation Sector	1	1	2	1	2	2	1	1	1		1	2	1	1
38	**6**	**Hydrology and Irrigation Engineering**	**C309**		**2.17**	**2.17**	**1.84**	**2**	**1.5**	**0**	**1.34**	**0**	**1.84**	**0**	**0**	**1.84**	**2**	**1**
	6		C309.1	explain measurement of precipitation and analysis of precipitation data.	2	1	2	2	1		1		2			1	1	
	6		C309.2	identify and estimate losses from precipitation	3	2	2	2	1		2		2			2	2	2
	6		C309.3	identify the runoff and estimate runoff.	2	3	2	2	2		1		2			2	2	2
	6		C309.4	describe ground water flow and estimate yield of aquifers.	3	3	2	2	2		1		2			2	3	1
	6		C309.5	evaluate water requirements of crops and storage capacity of reservoirs	2	2	2	2	2		1		2			2	3	1
	6		C309.6	explain causes and effects of water logging and explain reclamation measures	1	2	1	2	1		2		1			2	1	

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	2	3	4	5	6	7	8	9	10	11	12	1	2
39	**6**	**Design and Detailing of Reinforced Concrete Structures**	**C310**		**3**	**3**	**3**	**3**	**3**	**2**	**2**	**1**	**2**	**2**	**1.17**	**2**	**3**	**3**
	6		C310.1	differentiate between various design philosophies and apply Limit State design philosophy	3	3	3	3	3	2	2	1	2	2	1	2	3	3
	6		C310.2	calculate moment of resistance of beam section.	3	3	3	3	3	2	2	1	2	2	1	2	3	3
	6		C310.3	design and detail of different types of slabs and staircases	3	3	3	3	3	2	2	1	2	2	1	2	3	3
	6		C310.4	design and detail of beams for flexure, shear, bond for various supporting conditions	3	3	3	3	3	2	2	1	2	2	1	2	3	3
	6		C310.5	design and detail of short columns for axial load, uniaxial and biaxial bending.	3	3	3	3	3	2	2	1	2	2	2	2	3	3
	6		C310.6	design and detail of isolated column footings	3	3	3	3	3	2	2	1	2	2	1	2	3	3
40	**6**	**Quantitative Techniques, Communication and Values**	**C311**		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	6		C311.1	solve the aptitude test in the recruitment and competitive exam by applying short techniques and solve the question in less amount of time														
	6		C311.2	apply the short mnemonics and techniques to solve the questions of logical reasoning in the placement and competitive exam in lesser time.														
	6		C311.3	develop the verbal ability to communicate effectively using suitable vocabulary and proper sentence pattern.														

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	2	3	4	5	6	7	8	9	10	11	12	1	2
	6		C311.4	explain the concept of soft skills and its implication at workplace														
	6		C311.5	build up the ability to study employment business correspondences and its proper implications														
	6		C311.6	recognize business ethics, etiquettes and values and apply them in the professional ventures.														
41	**6**	**Project Estimation and Valuation**	**C312**		**2**	**2**	**1.67**	**1.5**	**2.17**	**1.84**	**1.84**	**1.67**	**2**	**1.84**	**2**	**2.17**	**2**	**0**
	6		C312.1	execute approximate estimate of structures	2				1	2	1	2	3	2	2	2	2	
	6		C312.2	execute approximate estimate of structures	2	3	2	3	3	2	2	2	2	3	3	3	2	
	6		C312.3	explain specification with reference to different types of materials	2	3	2	2	3	2	2	2	2	2	2	2	2	
	6		C312.4	explain specification with reference to different types of materials	2	2	2	1	2	2	2	2	2	2	2	2	2	
	6		C312.5	execute abstract and build of different items of work for constructions	2	2	2	2	2	1	2		1	1	1	2	2	
	6		C312.6	calculate value of building and land	2	2	2	1	2	2	2	2	2	1	2	2	2	
42	**6**	**Vocational Course-IV: Contracts and e-Tendering**	**C313**		**2**	**1.84**	**0**	**1.67**	**1.67**	**1.5**	**0**	**1.17**	**2**	**2**	**1.5**	**0**	**1.5**	**1**
	6		C313.1	explain definition and essentials of a valid contract.	2	2		1	1	1		1	1	1	2		2	2
	6		C313.2	explain contract formation and conditions of contracts.	2	1		1	2	1		1	2	2	2		2	1
	6		C313.3	describe Indian Contract Act 1872 and provisions made in the act.	2	2		2	1	2		1	2	3	1		2	1

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	2	3	4	5	6	7	8	9	10	11	12	1	2
	6		C313.4	execute E-Tendering and Manual Tendering.	2	3		2	2	2		1	2	2	2		1	1
	6		C313.5	execute procedure for Civil contractor license for various departments.	2	2		3	2	1		1	2	2	1			
	6		C313.6	explain tender notice and file E-Tender.	2	1		1	2	2		2	3	2	1		2	1
43	**7**	**Foundation Engineering**	**C401**		**2.5**	**2.34**	**2.5**	**1.67**	**0.67**	**0**	**0**	**2**	**1.5**	**0**	**2**	**1.5**	**2.17**	**0**
	7		C401.1	summarize the principles and methods of subsurface exploration.	3	2	3	2	2			2	3		2	2	2	
	7		C401.2	evaluate the bearing capacity of shallow foundation.	3	2	2	1				2			2	1	3	
	7		C401.3	identify the concept of settlement and consolidation in soils.	3	3	2	1				2	3		2	2	1	
	7		C401.4	compute the capacity of pile and pile group.	3	3	3	2				2	2		2	2	2	
	7		C401.5	analyse problems related to black cotton soil and use design principle and construction techniques in black cotton soil to solve them	2	2	2	2				2			2		2	
	7		C401.6	choose the appropriate soil stabilization technique based on site conditions.	1	2	3	2	2			2	1		2	2	3	
44	**7**	**Elective-I**	**C402**	**Average/ Sum of Elective-I**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	7		C402.1															
	7		C402.2															
	7		C402.3															
	7		C402.4															
	7		C402.5															
	7		C402.6															
45	**7**	**Waste Water Treatment and**	**C403**		**1.34**	**1**	**1.17**	**1.34**	**0**	**1**	**1.67**	**0.84**	**0**	**0**	**0.17**	**0.84**	**0.5**	**0.67**

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	2	3	4	5	6	7	8	9	10	11	12	1	2
		Management*																
	7		C403.1	Use the concept related to sewage, sewer, storm water, etc in its hydraulic design	2	1	1	2		1								
	7		C403.2	Study of Primary Treatment and Secondary Treatment	2	1	1	2		1	2	1				1	1	1
	7		C403.3	Take-up functional planning, layout and design of sewage treatment plant components.	1	1	2	1		1	2	1				1		1
	7		C403.4	Study of Advanced Waste water treatment.	1	1	1	1		1	2	1				1	1	
	7		C403.5	Analyze the industrial waste water for understanding its characterization.	1	1	1	1		1	2	1				1		1
	7		C403.6	Plan for Waste Water reclamation and reuse	1	1	1	1		1	2	1			1	1	1	1
46	**7**	**Advanced Design of Structures**	**C404**		**1.5**	**1.5**	**2.5**	**3**	**1.84**	**1.34**	**0.34**	**0**	**1.84**	**1.84**	**0.34**	**0.5**	**1.84**	**1.84**
	7		C404.1	calculate stresses in prestressed girder in flexure.	1	1	2	3	2				1	1			1	1
	7		C404.2	design a prestressed girder.	1	1	2	3	2	1			2	2		1	2	2
	7		C404.3	design the flat slab using I.S. code method.	1	1	2	3	2				2	2		1	2	2
	7		C404.4	design T and L shaped cantilever retaining wall.	2	2	3	3	2	3	1		2	2	1		2	2
	7		C404.5	design rectangular combined footing.	2	2	3	3	1	1			2	2			2	2
	7		C404.6	design circular and rectangular water tank resting on ground using I.S. code method.	2	2	3	3	2	3	1		2	2	1	1	2	2
47	**7**	**Project Stage-I**	**C405**		**2**	**2.5**	**3**	**2.84**	**2**	**2.17**	**2.84**	**1.34**	**3**	**3**	**2.84**	**1.84**	**3**	**3**
	7		C405.1	identify the grey areas of present condition by literature review	3	3	3	3	2	2	3	1	3	3	2	2	3	3

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
	7		C405.2	define the objective of the project and scope of the project	2	3	3	2	2	3	3	2	3	3	3	2	3	3
	7		C405.3	decide the methodology to achieve objective of the project	2	3	3	3	2	2	3	2	3	3	3	2	3	3
	7		C405.4	estimate resources and cost of project	1	2	3	3	2	2	3	1	3	3	3	1	3	3
	7		C405.5	do planning and coordination of project work	1	2	3	3	2	2	2	1	3	3	3	3	3	3
	7		C405.6	arrangement for collection of data / resource required.	3	2	3	3	2	2	3	1	3	3	3	1	3	3
48	**7**	**Civil Engineering Software – III (Auto Scan and Auto Steel)**	**C406**		**3**	**2**	**3**	**2**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
	7		C406.1	use the Auto Cad drawings for estimating the quantities	3	2	3	2	3	3	2	3	3	3	3	3	3	3
	7		C406.2	estimate the quantities with better accuracy and speed	3	2	3	2	3	3	2	3	3	3	3	3	3	3
	7		C406.3	present both measurement sheets and Abstracts / summary reports in a systematic way	3	2	3	2	3	3	2	3	3	3	3	3	3	3
	7		C406.4															
	7		C406.5															
	7		C406.6															
49	**7**	**Internship #**	**C407**		**2.5**	**2.17**	**2.17**	**1.5**	**2.67**	**2**	**1.5**	**2.17**	**2.5**	**2.34**	**3**	**2.34**	**3**	**3**
	7		C407.1	learn work process, behave responsibly, and follow rules of organization	3	2	2	1	3	1	1	3	3	3	3	2	3	3
	7		C407.2	co-relate and apply knowledge of courses learnt on real life project	3	3	3	1	3	3	2	1	1	2	3	3	3	3
	7		C407.3	work individually and in team.	1	2	2	1	2	1	1	3	3	3	3	1	3	3
	7		C407.4	plan, estimate, communicate and	3	2	2	1	2	2	1	1	3	3	3	3	3	3

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
				coordinate to complete the work in scheduled time														
	7		C407.5	learn solution to the problems in context of social, environmental, and legal context.	2	2	2	2	3	3	2	3	3	1	3	2	3	3
	7		C407.6	use and adopt to modern tools and techniques	3	2	2	3	3	2	2	2	2	2	3	3	3	3
50	**8**	**Seismic Design of Structures**	**C408**		**2.5**	**2.5**	**2.5**	**2.84**	**1.5**	**2.5**	**1.5**	**1**	**1**	**1**	**1.17**	**1**	**1.84**	**1.67**
	8		C408.1	apply seismic zones factorsfor earthquake resistant design.	3	3	3	3	2	3	2	2		1	2	2	2	2
	8		C408.2	predict nature of vibration of structure.	2	2	2	3	1	1				1		1		
	8		C408.3	estimate seismic forces on structure using equivalent static method	3	3	3	3	2	3	2	2	2	1	2	1	3	2
	8		C408.4	estimate seismic forces on structure using dynamic method	2	2	2	3	2	2	1		2	1	1			2
	8		C408.5	design shear wall for seismic forces	2	2	2	2	1	3	2	1	2	1		1	3	2
	8		C408.6	detailing of reinforcement for ductile performance of structure.	3	3	3	3	1	3	2	1		1	2	1	3	2
51	**8**	**Hydraulic Structures**	**C409**		**3**	**2**	**3**	**2**	**1**	**2**	**2**	**2**	**2**	**2**	**2**	**1**	**3**	**3**
	8		C409.1	Calculate forces on gravity dam and perform stability analysis.	3	2	3	2	1	2	2	2	2	2	2	1	3	3
	8		C409.2	Describe method of construction and perform stability of slopes of Earth dam.	3	2	3	2	1	2	2	2	2	2	2	1	3	3
	8		C409.3	Hydraulic design of Ogee spillway and Energy dissipater.	3	2	3	2	1	2	2	2	2	2	2	1	3	3
	8		C409.4	Design of weirs on permeable foundations,	3	2	3	2	1	2	2	2	2	2	2	1	3	3
	8		C409.5	Design stable channels and Cross drainage works	3	2	3	2	1	2	2	2	2	2	2	1	3	3
	8		C409.6	Design river training works and describe components of Hydropower plants	3	2	3	2	1	2	2	2	2	2	2	1	3	3

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	2	3	4	5	6	7	8	9	10	11	12	1	2
52	**8**	**Elective-II**	**C410**	**Average/ Sum of Elective-II**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	8		C410.1															
	8		C410.2															
	8		C410.3															
	8		C410.4															
	8		C410.5															
	8		C410.6															
53	**8**	**Construction Quality Control and Safety**	**C411**		**2.34**	**2.17**	**1.17**	**1.84**	**1**	**2.17**	**1.67**	**2**	**2.5**	**2.17**	**2.17**	**2.67**	**2.84**	**1**
	8		C411.1	interpret various quality management systems.	1	2	1	1		1		1	2		2	2	2	
	8		C411.2	identify various system requirements and documentation for TQM.	3	2		2	2	2		3	2	3	3	3	3	2
	8		C411.3	apply quality standards/codes in design and construction.	3	3	3	3	1	2	1	2	2	2	2	2	3	2
	8		C411.4	comprehend the factors related to construction safety management.	2	2		2		2	3	2	3	2	2	3	3	
	8		C411.5	knowledge about safety awareness programs.	2	1	1	1	1	3	3	2	3	3	2	3	3	1
	8		C411.6	implement safety guidelines on construction sites.	3	3	2	2	2	3	3	2	3	3	2	3	3	1
54	**8**	**Project Stage-II**	**C412**		**2.17**	**2.67**	**2.67**	**2.84**	**2.67**	**2.34**	**2**	**1.67**	**2.67**	**2.5**	**2.67**	**2.5**	**3**	**2.5**
	8		C412.1	plan, communicate, coordinate, and exhibit responsibility to complete work in time.	1	2	2	3	2	3	2	2	3	3	3	3	3	2
	8		C412.2	execute the process / experiment based on methodology	3	3	3	3	3	2	2	1	3	3	3	1	3	3
	8		C412.3	observe and analyse the output / results and validate it.	3	3	3	3	3	2	2	1	3	2	3	3	3	3

SN	Sem	Course Name	CO	CO Statement	POs												PSOs	
					1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
	8		C412.4	interpret the results and derive the conclusions	3	3	3	3	3	2	2	1	2	2	2	3	3	3
	8		C412.5	evaluate and optimise the solution in social, environmental context.	2	3	3	3	3	3	3	2	2	2	3	3	3	3
	8		C412.6	prepare report and present the work	1	2	2	2	2	2	1	3	3	3	2	2	3	1
55	**8**	**Civil Engineering Software – IV (E TABS)**	**C413**		**3**	**3**	**3**	**3**	**3**	**0.67**	**1.34**	**0**	**2**	**2**	**1.34**	**1**	**2**	**2**
	8		C413.1	generate structural model using ETABS	3	3	3	3	3				2	2	1	1	2	2
	8		C413.2	apply Loads and analyze the structure for different Load combinations using ETABS	3	3	3	3	3		2		2	2	1	1	2	2
	8		C413.3	design the structure using ETABS and interpret the results	3	3	3	3	3	2	2		2	2	2	1	2	2

HoD-Civil
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Mapping of COs with POs and PSOs
Programme Articulation Matrix (2021 Course)

SN	Sem	Course Code	Course Name	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
1	1	C101	Differential Calculus	3	3	3	3	2	0	0	0	1	2	1	3	2	3
2	1	C102	Applied Chemistry	1.67	1.5	1.67	1.67	1.17	2	1.84	0.34	0.34	0	0.67	1.34	1	0.67
3	1	C103	Construction and Materials	3	0	0	0	0	2	0	0	1	0	0	3	3	0
4	1	C104	Civil Engineering Structures and Geology	1.67	0.5	0.17	0	0.34	0.67	0.5	0	0	0	0.17	0	0.5	0.17
5	1	C105	Introduction and Opportunities in Civil Engineering	2.5	1.5	1.67	0.84	1.17	0	0	0.34	1.67	1.84	1.67	1.5	1	0.5
6	1	C106	Graphics for Civil Engineering	3	2.34	0.67	0.67	2	0	0	0	0.67	2	0.5	1.17	0.84	0
7	1	C107	Workshop Technology	1	1	2.67	0.67	2	0	0.34	0	0	0	2	0.67	2	0.67
8	1	C108	Fundamentals of Problem Solving Logic(Using C)	3	2.5	2.5	2.5	3	0	0	0	3	0	0	3	2	0
9	2	C109	Integral Calculus	3	3	3	3	2	0	0	0	1	2	1	3	2	3
10	2	C110	Acoustics and Modern Physics	2.5	1	1.17	0.84	0.67	0.67	0.34	0	0.17	0	0.17	0.34	0.5	0.34
11	2	C111	Statics and Dynamics	3	2.67	1.34	1.84	1.34	2.34	1.5	1.5	2.5	2	1.34	2.17	1.84	1.84
12	2	C112	Basic Land Surveying	2.84	1.67	0.5	0.17	2	1	0.5	1.84	2	2.17	0.67	1.67	2.17	1
13	2	C113	Construction Design & Drawing	3	2.17	2.5	1.84	0	3	2.5	3	2	1.67	0.5	2.84	1.5	2.17
14	2	C114	Civil Engineering Software – I (AutoCAD)	3	3	3	2	3	3	2	2.5	2	2	1.75	3	1.75	2.75
15	2	C115	Object-Oriented Programming (Using C++)	3	3	2	2	3	0	0	0	2	0	0	3	0	0
16	3	C201	Mechanics of Solids	3	3	3	3	2	2	1	2	2	1	1	2	1	1
17	3	C202	Construction Equipment and Methods	1.5	2	1.17	1.84	2.67	1.34	1.67	1.17	1.34	1.67	2	2.34	2	1
18	3	C203	Fluid Mechanics	3	3	3	3	3	1	1	0	1	0	0	2	3	1
19	3	C204	Economics and Finance	3	2	2	1	0	1	0	0	1	2	2	1	1	0
20	3	C205	Concrete Technology*	2.34	2.17	1.34	1.67	1.34	1.17	1	1	2.34	1	1	3	1.5	1.17
21	3	C206	Vocational Course-I : AutoCAD 3D	3	2	3	1	3	3	2	3	2	3	1	3	3	3
22	3	C207	Data Analytics Using Python	3	2.5	2.5	2.5	3	0	0	0	3	0	0	3	2	0
23	4	C208	Vector Calculus and Differential	3	3	3	3	2	0	0	0	1	2	1	3	2	3

SN	Sem	Course Code	Course Name	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
			equations														
24	4	C209	Open Channel flow and Hydraulic Machinery	3	3	3	3	3	1.17	1	0	1	1	1.17	1	1	1
25	4	C210	Geomechanics	3	2.67	2.34	2.34	1.5	1.17	0	0	2	1.5	1.84	1.5	1.5	1
26	4	C211	Analysis of Determinate Structures	3	3	3	3	2	2	0	0	2	1	0	2	1	1
27	4	C212	Planning and Management of Construction Projects	2	1.67	2	1.5	1.34	1.84	1.84	2	2	1.84	2	2.17	2	1
28	4	C213	Vocational Course-II :Plumbing Engineering	3	3	2	1.5	0	3	3	3	3	2	1	3	2.5	2.5
29	4	C214	Construction Practices in Civil Engineering	3	3	2.2	2.6	0	2	0	1.8	3	0.6	1.2	3	3	2.2
30	5	C301	Analysis of Indeterminate Structures	3	3	3	3	2	2	0	0	2	1	0	2	1	1
31	5	C302	Infrastructure and Transportation Systems	3	2.84	2.5	2.34	1.84	3	2.34	2.5	2.5	2	2.17	3	1.84	2.84
32	5	C303	Arbitration and Laws Related to Construction Industry	3	3	2	1	1	1	0	1	1	2	2	1	1	0
33	5	C304	Advanced Surveying with Geomatics*	2.67	1.67	2.34	2.34	2.5	2.5	1.17	1.67	3	2.67	1	2.5	2.67	2.5
34	5	C305	Limit State Design of Steel Structures	3	3	3	3	3	2	2	1	2	2	1	2	2.84	3
35	5	C306	Vocational Course-III: Structural Assessment and Retrofitting	2	2	2	2	2	2	1	2	2	2	2	2	3	3
36	5	C307	Civil Engineering Software – II (Staad Pro)	3	3	2	2	3	2.34	0.34	0.67	1.34	1	0.34	2.34	2.67	2.34
37	6	C308	Water Supply Engineering	1.84	1.84	1.5	1.67	1.34	2	1.17	1.17	1	0.34	1	2	1.17	1.17
38	6	C309	Hydrology and Irrigation Engineering	2.17	2.17	1.84	2	1.5	0	1.34	0	1.84	0	0	1.84	2	1
39	6	C310	Design and Detailing of Reinforced Concrete Structures	3	3	3	3	3	2	2	1	2	2	1.17	2	3	3
40	6	C311	Quantitative Techniques, Communication and Values	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	6	C312	Project Estimation and Valuation	2	2	1.67	1.5	2.17	1.84	1.84	1.67	2	1.84	2	2.17	2	0
42	6	C313	Vocational Course-IV: Contracts and e-Tendering	2	1.84	0	1.67	1.67	1.5	0	1.17	2	2	1.5	0	1.5	1
43	7	C401	Foundation Engineering	2.5	2.34	2.5	1.67	0.67	0	0	2	1.5	0	2	1.5	2.17	0
44	7	C402	Elective-I	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COLLEGE OF ENGINEERING, PUNE- 43.
DEPARTMENT OF CIVIL ENGINEERING

SN	Sem	Course Code	Course Name	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
45	7	C403	Waste Water Treatment and Management*	1.34	1	1.17	1.34	0	1	1.67	0.84	0	0	0.17	0.84	0.5	0.67
46	7	C404	Advanced Design of Structures	1.5	1.5	2.5	3	1.84	1.34	0.34	0	1.84	1.84	0.34	0.5	1.84	1.84
47	7	C405	Project Stage-I	2	2.5	3	2.84	2	2.17	2.84	1.34	3	3	2.84	1.84	3	3
48	7	C406	Civil Engineering Software – III (Auto Scan and Auto Steel)	3	2	3	2	3	3	2	3	3	3	3	3	3	3
49	7	C407	Internship #	2.5	2.17	2.17	1.5	2.67	2	1.5	2.17	2.5	2.34	3	2.34	3	3
50	8	C408	Seismic Design of Structures	2.5	2.5	2.5	2.84	1.5	2.5	1.5	1	1	1	1.17	1	1.84	1.67
51	8	C409	Hydraulic Structures	3	2	3	2	1	2	2	2	2	2	2	1	3	3
52	8	C410	Elective-II	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53	8	C411	Construction Quality Control and Safety	2.34	2.17	1.17	1.84	1	2.17	1.67	2	2.5	2.17	2.17	2.67	2.84	1
54	8	C412	Project Stage-II	2.17	2.67	2.67	2.84	2.67	2.34	2	1.67	2.67	2.5	2.67	2.5	3	2.5
55	8	C413	Civil Engineering Software – IV (E TABS)	3	3	3	3	3	0.67	1.34	0	2	2	1.34	1	2	2
			Total Courses Mapped	**52**	**51**	**50**	**50**	**46**	**41**	**35**	**32**	**49**	**40**	**44**	**50**	**51**	**43**
			Courses Mapped upto														
			Total up to Sem- I	8	7	7	6	7	3	3	2	6	3	6	7	8	5
			Total up to Sem- II	15	14	14	13	13	8	8	6	13	8	12	14	14	11
			Total up to Sem- III	22	21	21	20	19	14	13	10	20	13	17	21	21	16
			Total up to Sem- IV	29	28	28	27	24	20	16	13	27	20	23	28	28	23
			Total up to Sem- V	36	35	35	34	31	27	21	19	34	27	29	35	35	29
			Total up to Sem- VI	41	40	39	39	36	31	25	23	39	31	33	39	40	33
			Total up to Sem- VII	47	46	45	45	41	36	30	28	44	35	39	45	46	38
			Total up to Sem- VIII	52	51	50	50	46	41	35	32	49	40	44	50	51	43

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