



# SRI BHARATHI

ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Kaikkurichi, Pudukkottai -622 303

[www.sbec.edu.in](http://www.sbec.edu.in)

## NAAC DOCUMENTS



Quality Indicator Frame Work

Criterion – 2

Teaching-Learning and Evaluation

Submitted by

**IQAC**

**Internal Quality Assurance Cell**

**Sri Bharathi Engineering College for Women**



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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

<b>Criteria 2</b>	<b>Teaching-Learning and Evaluation</b>	<b>350</b>
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## **Key Indicator-2.6 Student Performances and Learning Outcome(90)**

*2.6.1 Programme Outcomes (POs) and Course Outcomes (COs) for all programmes offered by the institution are stated and displayed on website*

### COURSE OUTCOMES AND PROGRAMME OUTCOMES

DEPARTMENT OF CIVIL ENGINEERING  
R2021



**SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN**

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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

**DEPARTMENT OF CIVIL ENGINEERING**

**REGULATION 2021 – CO PO MAPPING**

**I SEMESTER**

**Dr. S. THILAGAVATHI M.E. Ph.D.,**  
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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### HS3152- PROFESSIONAL ENGLISH I

Course Code	Course Name	Course Outcome (CO) Students will be able to
HS3152	Professional English I	C101.1: Use appropriate words in a professional context.
		C101.2: Explain the basic grammatical structures and use them in right context.
		C101.3: Describe the denotative and connotative meanings of technical texts.
		C101.4: Summarize about the definitions, descriptions, narrations and essays on various topics.
		C101.5: Apply language effectively in professional contexts.
		C101.6: Discuss the importance of read and write complex texts, summaries, articles, blogs, definitions, essays and user manuals.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3	
HS3152																
C101.1	2	2	2	2	2	2	2	2	2	2	-	2	-	-	-	
C101.2	2	2	2	2	2	2	2	2	2	2	-	2	-	-	-	
C101.3	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	
C101.4	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	
C101.5	2	2	2	2	-	2	2	2	2	2	-	2	-	-	-	
C101.6	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	
C101	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	

\*3-High correlation; 2- Medium correlation; 1-Low correlation; '-' No correlation

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### MA3151- MATRICES AND CALCULUS

Course Code	Course Name	Course Outcome (CO) Students will be able to
MA3151	Matrices and Calculus	<b>C102.1:</b> Use the matrix algebra methods for solving practical problems.
		<b>C102.2:</b> Apply differential calculus tools in solving various application problems.
		<b>C102.3:</b> Describe the partial differential equations with initial and Lagrange's method by using certain techniques with engineering applications.
		<b>C102.4:</b> Illustrate the differentiation to solve maxima and minima problems.
		<b>C102.5:</b> Explain the different methods of integration in solving practical problems.
		<b>C102.6:</b> Determine the multiple integral ideas in solving areas, volumes and other practical problems.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3	
MA3151																
C102.1	3	3	2	2	-	-	-	-	-	1	-	1	-	2	-	
C102.2	3	3	2	2	-	-	-	-	-	1	-	1	-	2	-	
C102.3	3	3	2	2	-	-	-	-	-	1	-	1	-	2	-	
C102.4	3	3	2	2	-	-	-	-	-	1	-	1	-	2	-	
C102.5	3	3	2	2	-	-	-	-	-	1	-	1	-	2	-	
C102.6	3	3	2	2	-	-	-	-	-	1	-	1	-	2	-	
C102	3	3	2	2	-	-	-	-	-	1	-	1	-	2	-	

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### REGULATION 2021 – CO PO MAPPING

#### PH3151- ENGINEERING PHYSICS

Course Code	Course Name	Course Outcome (CO) Students will be able to
PH3151	Engineering Physics	C103.1: Acknowledge the importance of mechanics of particles.
		C103.2: Explain their importance of electromagnetic waves.
		C103.3: Demonstrate a strong foundational knowledge in oscillations.
		C103.4: Demonstrate a strong foundational knowledge in fibre, optics and laser.
		C103.5: Describe the importance of quantum physics.
		C103.6: Illustrate the quantum mechanical principles towards the formation of energy bands.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
C103.1	3	3	2	1	-	1	1	-	-	1	-	1	-	-	-
C103.2	3	3	2	1	-	1	1	-	-	1	-	-	-	-	-
C103.3	3	3	-	-	-	-	-	-	-	1	-	-	-	-	-
C103.4	3	3	2	-	-	1	1	-	-	1	-	-	-	-	-
C103.5	3	3	2	-	-	1	1	-	-	1	-	-	-	-	-
C103.6	3	3	2	1	-	1	1	-	-	1	-	1	-	-	-
C103	3	3	2	1	-	1	1	-	-	1	-	1	-	-	-

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CY3151- ENGINEERING CHEMISTRY

Course Code	Course Name	Course Outcome (CO) Students will be able to
CY3151	Engineering Chemistry	C104.1: Describe the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.
		C104.2: Apply the basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
		C104.3: Describe the phase rule and composites for material selection requirements.
		C104.4: Explain the recommend suitable fuels for engineering processes and applications.
		C104.5: Discuss the different forms of energy resources and apply them for suitable applications in energy sectors.
		C104.6: Determine the importance of engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CY3151															
C104.1	3	2	2	1	-	1	1	-	-	-	-	1	-	-	-
C104.2	3	2	2	1	-	1	1	-	-	-	-	-	-	-	-
C104.3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
C104.4	3	2	2	-	-	1	1	-	-	-	-	-	-	-	-
C104.5	3	2	2	-	-	1	1	-	-	-	-	-	-	-	-
C104.6	3	2	2	1	-	1	1	-	-	-	-	1	-	-	-
C104	3	2	2	1	-	1	1	-	-	-	-	1	-	-	-

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### REGULATION 2021 – CO PO MAPPING

#### GE3151- PROBLEM SOLVING AND PYTHON PROGRAMMING

Course Code	Course Name	Course Outcome (CO) Students will be able to
GE3151	Problem Solving and Python Programming	<b>C105.1:</b> Develop algorithmic solutions to simple computational problems.
		<b>C105.2:</b> Design and execute the simple Python programs.
		<b>C105.3:</b> Write simple Python programs using conditionals and loops for solving problems.
		<b>C105.4:</b> Describe the Python program into functions.
		<b>C105.5:</b> Discuss compound data using Python lists, tuples, dictionaries etc.
		<b>C105.6:</b> Explain the importance of Read and write data from/to files in Python programs.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
GE3151															
C105.1	3	3	2	2	2	-	-	-	2	2	2	-	3	-	1
C105.2	3	3	2	2	2	-	-	-	2	2	2	-	3	-	1
C105.3	3	3	2	2	2	-	-	-	2	2	2	-	3	-	1
C105.4	3	3	2	2	2	-	-	-	2	2	2	-	3	-	1
C105.5	3	3	2	2	2	-	-	-	2	2	2	-	3	-	1
C105.6	3	3	2	2	2	-	-	-	2	2	2	-	3	-	1
C105	3	3	2	2	2	-	-	-	2	2	2	-	3	-	1

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### REGULATION 2021 – CO PO MAPPING

#### GE3152- HERITAGE OF TAMILS

Course Code	Course Name	Course Outcome (CO) Students will be able to
GE3152	Heritage of Tamils	C106.1: Discuss the Tamil language and literature.
		C106.2: Explain about the modern-art sculpture.
		C106.3: Illustrate the folk and martial arts.
		C106.4: Describe the Thinaï concepts of Tamil.
		C106.5: Summarize the contribution of Tamil in Indian culture.
		C106.6: Define the role of siddha medicine.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
GE3152															
C106.1	-	-	-	-	-	3	3	2	-	2	-	2	-	-	-
C106.2	-	-	-	-	-	3	3	2	-	2	-	2	-	-	-
C106.3	-	-	-	-	-	3	3	2	-	2	-	2	-	-	-
C106.4	-	-	-	-	-	3	3	2	-	2	-	2	-	-	-
C106.5	-	-	-	-	-	3	3	2	-	2	-	2	-	-	-
C106.6	-	-	-	-	-	3	3	2	-	2	-	2	-	-	-
C106	-	-	-	-	-	3	3	2	-	2	-	2	-	-	-

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### GE3171 - PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY

Course Code	Course Name	Course Outcome (CO) Students will be able to
GE3171	Problem Solving and Python Programming Laboratory	C107.1: Develop algorithmic solutions to simple computational problems.
		C107.2: Design and execute the simple Python programs.
		C107.3: Describe the programs in Python using conditionals and loops for solving problems.
		C107.4: Describe about the functions to decompose a Python program.
		C107.5: Explain about the compound data using Python data structures.
		C107.6: Utilize Python packages in developing software applications.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
GE3171															
C107.1	3	3	2	2	2	-	-	-	2	2	2	2	3	-	2
C107.2	3	3	2	2	2	-	-	-	2	2	2	2	3	-	2
C107.3	3	3	2	2	2	-	-	-	2	2	2	2	3	-	2
C107.4	3	3	2	2	2	-	-	-	2	2	2	2	3	-	2
C107.5	3	3	2	2	2	-	-	-	2	2	2	2	3	-	2
C107.6	3	3	2	2	2	-	-	-	2	2	2	2	3	-	2
C107	3	3	2	2	2	-	-	-	2	2	2	2	3	-	2

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### REGULATION 2021 – CO PO MAPPING

#### BS3171-PHYSICS AND CHEMISTRY LABORATORY

Course Code	Course Name	Course Outcome (CO) Students will be able to
BS3171	Physics and Chemistry Laboratory	C108.1: Explain the functioning of various physics laboratory equipment
		C108.2: Use graphical models to analyze laboratory data.
		C108.3: Apply mathematical models as a medium for quantitative reasoning and describing physical reality.
		C108.4: Describe products and processes and explain their uses and purposes clearly and accurately C Access, process and analyze scientific information.
		C108.5: Solve problems individually and collaboratively.
		C108.6: Determine the amount of metal ions through volumetric and spectroscopic techniques.

### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3	
BS3171																
C108.1	3	3	3	2	2	-	-	-	2	2	-	-	2	-	-	
C108.2	3	3	3	2	2	-	-	-	2	2	-	-	2	-	-	
C108.3	3	3	3	2	2	-	-	-	2	2	-	-	2	-	-	
C108.4	3	3	3	2	2	-	-	-	2	2	-	-	2	-	-	
C108.5	3	3	3	2	2	-	-	-	2	2	-	-	2	-	-	
C108.6	3	3	3	2	2	-	-	-	2	2	-	-	2	-	-	
C108	3	3	3	2	2	-	-	-	2	2	-	-	2	-	-	

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### GE3172-ENGLISH LABORATORY

Course Code	Course Name	Course Outcome (CO) Students will be able to
GE3172	English Laboratory	C109.1: Describe and comprehend general as well as complex academic information.
		C109.2: Explain about the different points of view in a discussion.
		C109.3: Explain the formal and informal communicative contexts.
		C109.4: Describe the products and processes and explain their uses and purposes clearly and accurately.
		C109.5: Express their opinions effectively in both formal and informal discussions.
		C109.6: Use language efficiently in expressing their opinions via various media.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
GE3172															
C109.1	3	3	3	3	2	2	2	2	2	2	2	2	-	-	-
C109.2	3	3	3	3	2	2	2	2	2	2	2	2	-	-	-
C109.3	3	3	3	3	2	2	2	2	2	2	2	2	-	-	-
C109.4	3	3	3	3	2	2	2	2	2	2	2	2	-	-	-
C109.5	3	3	3	3	2	2	2	2	2	2	2	2	-	-	-
C109.6	3	3	3	3	2	2	2	2	2	2	2	2	-	-	-
C109	3	3	3	3	2	2	2	2	2	2	2	2	-	-	-

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**DEPARTMENT OF CIVIL ENGINEERING**

**REGULATION 2021 – CO PO MAPPING**

# **II SEMESTER**

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### HS3252-PROFESSIONAL ENGLISH - II

Course Code	Course Name	Course Outcome (CO) Students will be able to
HS3252	Professional English - II	C110.1: compare and contrast products and ideas in technical texts.
		C110.2: Identify and report cause and effects in events, industrial processes through technical texts.
		C110.3: Analyse the problems in order to arrive at feasible solutions and communicate them in the written format.
		C110.4: Explain the importance of present their ideas and opinions in a planned and logical manner.
		C110.5: Design the effective resumes in the context of job search.
		C110.6: Demonstrate an understanding of job applications and interviews for internship and placements.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
HS3252															
C110.1	3	3	3	3	2	2	2	2	2	2	2	2	-	-	-
C110.2	3	3	3	3	2	2	2	2	2	2	2	2	-	-	-
C110.3	3	3	3	3	2	2	2	2	2	2	2	2	-	-	-
C110.4	3	3	3	3	2	2	2	2	2	2	2	2	-	-	-
C110.5	3	3	3	3	2	2	2	2	2	2	2	2	-	-	-
C110.6	3	3	3	3	2	2	2	2	2	2	2	2	-	-	-
C110	3	3	3	3	2	2	2	2	2	2	2	2	-	-	-

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### MA3251- STATISTICS AND NUMERICAL METHODS

Course Code	Course Name	Course Outcome (CO) Students will be able to
MA3251	Statistics and Numerical Methods	C111.1: Apply the concept of testing of hypothesis for small and large samples in real life problems.
		C111.2: Apply the basic concepts of classifications of design of experiments in the field of agriculture.
		C111.3: Describe the numerical techniques of interpolation in various intervals.
		C111.4: Apply the numerical techniques of differentiation and integration for engineering problems.
		C111.5: Explain the various techniques and methods for solving first and second order ordinary differential equations.
		C111.6: Describe the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3	
MA3251																
C111.1	3	3	3	2	-	-	-	-	-	1	-	1	-	2	-	
C111.2	3	3	3	2	-	-	-	-	-	1	-	1	-	2	-	
C111.3	3	3	3	2	-	-	-	-	-	1	-	1	-	2	-	
C111.4	3	3	3	2	-	-	-	-	-	1	-	1	-	2	-	
C111.5	3	3	3	2	-	-	-	-	-	1	-	1	-	2	-	
C111.6	3	3	3	2	-	-	-	-	-	1	-	1	-	2	-	
C111	3	3	3	2	-	-	-	-	-	1	-	1	-	2	-	

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### PH3201- PHYSICS FOR CIVIL ENGINEERING

Course Code	Course Name	Course Outcome (CO) Students will be able to
PH3201	Physics for Civil Engineering	C112.1: Describe the heat transfer through different materials, thermal performance of building and thermal insulation.
		C112.2: Explain the ventilation and air conditioning of buildings
		C112.3: Illustrate the concepts of sound absorption, noise insulation and lighting designs
		C112.4: Explain the processing and applications of composites, metallic glasses, shape memory alloys and ceramics
		C112.5: Describe the awareness on natural disasters such as earth quake and cyclone.
		C112.6: Describe the awareness on natural disasters such as fire and safety measures.

### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
PH3201															
C112.1	3	2	1	-	-	1	-	-	-	1	-	1	2	2	-
C112.2	3	2	1	-	-	1	-	-	-	1	-	1	2	2	-
C112.3	3	2	1	-	-	1	-	-	-	-	-	1	2	2	-
C112.4	3	2	1	-	-	1	-	-	-	-	-	1	2	2	-
C112.5	3	2	1	-	-	1	-	-	-	1	-	1	2	2	-
C112.6	3	2	1	-	-	1	-	-	-	-	-	1	2	2	-
C112	3	2	1	-	-	1	-	-	-	1	-	1	2	2	-

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### BE3252- BASIC ELECTRICAL AND ELECTRONICS INSTRUMENTATION ENGINEERING

Course Code	Course Name	Course Outcome (CO) Students will be able to
BE3252	Basic Electrical and Electronics Instrumentation Engineering	C113.1: Describe the electric circuit parameters for simple problems.
		C113.2: Explain the working principle and applications of electrical machines.
		C113.3: Illustrate the characteristics of analog electronic devices.
		C113.4: Explain the basic concepts of digital electronics.
		C113.5: Explain the operating principles of measuring instruments.
		C113.6: Describe the functional elements and working of measuring instruments.

#### CO-PO MAPPING

BE3251	PROGRAM OUTCOMES												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
C113.1	2	2	1	1	-	-	1	1	1	1	-	1	-	-	-
C113.2	2	2	1	1	-	-	1	1	1	1	-	1	-	-	-
C113.3	2	2	1	1	-	-	1	1	1	1	-	1	-	-	-
C113.4	2	2	1	1	-	-	1	1	1	1	-	1	-	-	-
C113.5	2	2	1	1	-	-	1	1	1	1	-	1	-	-	-
C113.6	2	2	1	1	-	-	1	1	1	1	-	1	-	-	-
C113	2	2	1	1	-	-	1	1	1	1	-	1	-	-	-

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### GE3251- ENGINEERING GRAPHICS

Course Code	Course Name	Course Outcome (CO) Students will be able to
GE3251	Engineering Graphics	C114.1: Explain the basis concept of BIS conventions and specifications for engineering drawing.
		C114.2: Describe about the conic curves, involutes and cycloid.
		C114.3: Solve practical problems involving projection of lines.
		C114.4: Draw the orthographic, isometric and perspective projections of simple solids.
		C114.5: Explain about the development of simple solids.
		C114.6: Analyse the three dimensional modeling of simple objects.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
GE3251															
C114.1	3	2	2	1	-	-	-	2	-	2	-	1	2	2	1
C114.2	3	2	2	1	-	-	-	2	-	2	-	1	2	2	1
C114.3	3	2	2	1	-	-	-	2	-	2	-	1	2	2	1
C114.4	3	2	2	1	-	-	-	2	-	2	-	1	2	2	1
C114.5	3	2	2	1	-	-	-	2	-	2	-	1	2	2	1
C114.6	3	2	2	1	-	-	-	2	-	2	-	1	2	2	1
C114	3	2	2	1	-	-	-	2	-	2	-	1	2	2	1

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 - CO PO MAPPING

#### GE3252 - TAMILS AND TECHNOLOGIES

Course Code	Course Name	Course Outcome (CO) Students will be able to
GE3252	Tamil and Technologies	C116.1: Explain about the weaving and pottery technology in Tamilnadu.
		C116.2: Describe about the design and construction technology in Tamilnadu.
		C116.3: Discuss about the manufacturing technology in Tamilnadu.
		C116.4: Illustrate the agriculture and irrigation technology in Tamilnadu.
		C116.5: Define the growth of science in Tamil.
		C116.6: Learn the contribution of the Tamil to Indian culture.

### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
GE3252															
C116.1	-	-	-	-	-	3	3	2	-	2	-	2	-	-	-
C116.2	-	-	-	-	-	3	3	2	-	2	-	2	-	-	-
C116.3	-	-	-	-	-	3	3	2	-	2	-	2	-	-	-
C116.4	-	-	-	-	-	3	3	2	-	2	-	2	-	-	-
C116.5	-	-	-	-	-	3	3	2	-	2	-	2	-	-	-
C116.6	-	-	-	-	-	3	3	2	-	2	-	2	-	-	-
C116	-	-	-	-	-	3	3	2	-	2	-	2	-	-	-

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### GE3271-ENGINEERING PRACTICES LABORATORY

Course Code	Course Name	Course Outcome (CO) Students will be able to
GE3271	Engineering Practices Laboratory	C117.1: Draw the pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.
		C117.2: Explain the wire various electrical joints in common household electrical wire work.
		C117.3: Describe about a weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, and tapping in parts.
		C117.4: Describe about a solder and test simple electronic circuits; assemble and test simple electronic components on PCB.
		C117.5: Illustrate the simple mechanical assembly of common household equipments.
		C117.6: Design a tray out of metal sheet using sheet metal work.

### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
GE3271															
C117.1	3	2	2	2	-	2	2	-	2	2	-	1	2	1	1
C117.2	3	2	2	2	-	2	2	-	2	2	-	1	2	1	1
C117.3	3	2	2	2	-	2	2	-	2	2	-	1	2	1	1
C117.4	3	2	2	2	-	2	2	-	2	2	-	1	2	1	1
C117.5	3	2	2	2	-	2	2	-	2	2	-	1	2	1	1
C117.6	3	2	2	2	-	2	2	-	2	2	-	1	2	1	1
C117	3	2	2	2	-	2	2	-	2	2	-	1	2	1	1

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### BE3272- BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING LABORATORY

Course Code	Course Name	Course Outcome (CO) Students will be able to
BE3272	Basic Electrical, Electronics and Instrumentation Engineering Laboratory	C118.1: Explain the Ohm's law and Kirchhoff's Law and to measure three phase power.
		C118.2: Describe the load characteristics of electrical machines.
		C118.3: Illustrate the characteristics of basic electronic devices.
		C118.4: Explain the Characteristics of BJT, SCR and MOSFET.
		C118.5: Design and analysis of Half wave and Full Wave rectifiers.
		C118.6: Describe the LVDT to measure displacement.

### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
BE3272															
C118.1	2	2	1	1	-	-	1	1	1	1	-	1	-	-	-
C118.2	2	2	1	1	-	-	1	1	1	1	-	1	-	-	-
C118.3	2	2	1	1	-	-	-	1	1	1	-	1	-	-	-
C118.4	2	2	1	1	-	-	1	1	1	1	-	1	-	-	-
C118.5	2	2	1	1	-	-	-	1	1	1	-	1	-	-	-
C118.6	2	2	1	1	-	-	-	1	1	1	-	1	-	-	-
C118	2	2	1	1	-	-	1	1	1	1	-	1	-	-	-

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### GE3272- COMMUNICATION LABORATORY

Course Code	Course Name	Course Outcome (CO) Students will be able to
GE3272	Communication Laboratory	C119.1: Speak effectively in group discussions held in formal/semi formal contexts.
		C119.2: Discuss the present concepts and problems from various perspectives to arrive at suitable solutions.
		C119.3: Write the emails, letters and effective job applications.
		C119.4: Describe the critical reports to convey data and information with clarity and precision.
		C119.5: Explain the appropriate instructions and recommendations for safe execution of tasks.
		C119.6: Discuss the safety issues about electrical devices.

### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
GE3272															
C119.1	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
C119.2	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
C119.3	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
C119.4	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
C119.5	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
C119.6	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
C119	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-

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**DEPARTMENT OF CIVIL ENGINEERING**

**REGULATION 2021 – CO PO MAPPING**

# **III SEMESTER**

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### MA3351- TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

Course Code	Course Name	Course Outcome (CO) Students will be able to
MA3351	Transforms and Partial Differential Equations	C201.1: Explain the given standard partial differential equations.
		C201.2: Explain the differential equations using Fourier series analysis which plays a vital role in engineering applications.
		C201.3: Describe the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
		C201.4: Explain the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve the physical problems of engineering.
		C201.5: Illustrate the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
		C201.6: Describe about an effective mathematical tools for the solutions of partial differential equations by using Inverse-Z transform techniques for discrete time systems.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO			
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3	
MA3351																
C201.1	3	2	1	1	-	-	-	-	-	1	-	1	2	-	-	
C201.2	3	2	1	1	-	-	-	-	-	1	-	1	2	-	-	
C201.3	3	2	1	1	-	-	-	-	-	1	-	1	2	-	-	
C201.4	3	2	1	1	-	-	-	-	-	1	-	1	2	-	-	
C201.5	3	2	1	1	-	-	-	-	-	1	-	1	2	-	-	
C201.6	3	2	1	1	-	-	-	-	-	1	-	1	2	-	-	
C201	3	2	1	1	-	-	-	-	-	1	-	1	2	-	-	

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### ME3351-ENGINEERING MECHANICS

Course Code	Course Name	Course Outcome (CO) Students will be able to
ME3351	Engineering Mechanics	<b>C202.1:</b> Illustrate the vector and scalar analytical techniques for analyzing forces in statically determinate structures.
		<b>C202.2:</b> Analyse the equilibrium in two and three dimensions of rigid bodies.
		<b>C202.3:</b> Determine the moment of inertia of a three dimensional body by integration and distributed forces on beams.
		<b>C202.4:</b> Determine the concept of frictional forces at the contact surfaces of various engineering system.
		<b>C202.5:</b> Describe about the basic dynamic concepts of forces, momentum, work and energy.
		<b>C202.6:</b> Describe about the kinetic energy of a particle and impact of bodies.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
ME3351															
C202.1	3	2	2	2	-	1	1	-	-	1	-	1	2	2	1
C202.2	3	2	2	2	-	1	1	-	-	1	-	1	2	2	-
C202.3	3	2	2	2	-	1	1	-	-	1	-	1	2	2	1
C202.4	3	2	2	2	-	1	1	-	-	1	-	1	2	2	1
C202.5	3	2	2	2	-	1	1	-	-	1	-	1	2	2	-
C202.6	3	2	2	2	-	1	1	-	-	1	-	1	2	2	1
C202	3	2	2	2	-	1	1	-	-	1	-	1	2	2	1

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3301-FLUID MECHANICS

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3301	Fluid Mechanics	<b>C203.1:</b> Demonstrate the difference between solid and fluid, its properties and behaviour in static conditions.
		<b>C203.2:</b> Describe the conservation laws applicable to fluids and its application through fluid kinematics and dynamics.
		<b>C203.3:</b> Illustrate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies.
		<b>C203.4:</b> Describe the losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel.
		<b>C203.5:</b> Explain the concept of laminar and turbulent boundary layers and its application.
		<b>C203.6:</b> Explain the drag force exerted by the fluid on the flat solid surface.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE3301															
C203.1	3	2	2	2	-	1	-	-	1	1	-	1	3	2	1
C203.2	3	2	2	2	-	1	-	1	1	1	1	1	3	2	1
C203.3	3	2	2	2	-	1	-	-	1	1	-	1	3	2	1
C203.4	3	2	2	2	-	1	-	1	-	1	-	1	3	2	1
C203.5	3	2	2	2	-	1	-	-	1	1	1	1	3	2	1
C203.6	3	2	2	2	-	1	-	-	1	1	-	1	3	2	1
C203	3	2	2	2	-	1	-	1	1	1	1	1	3	2	1

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### REGULATION 2021 – CO PO MAPPING

#### CE3351-SURVEYING AND LEVELLING

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3351	Surveying and Levelling	C204.1: Explain about the various methods of surveying and its principles.
		C204.2: Describe the methods of levelling and contouring in ground features.
		C204.3: Explain the theodolite surveying for complex surveying operations.
		C204.4: Explain the procedure for establishing horizontal and vertical control surveying and its adjustment methods.
		C204.5: Illustrate the modern surveying instruments and its applications.
		C204.6: Explain the field procedure and application of GPS.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE3351															
C204.1	3	3	2	2	-	-	-	1	-	1	1	-	3	3	2
C204.2	3	3	2	2	-	-	-	-	-	-	1	-	3	3	2
C204.3	3	3	2	2	-	-	-	-	1	1	1	-	3	3	2
C204.4	3	3	2	2	-	-	-	1	-	-	1	1	3	3	-
C204.5	3	3	2	2	1	-	-	-	1	1	1	1	3	3	2
C204.6	3	3	2	2	1	-	-	-	1	-	1	1	3	3	-
C204	3	3	2	2	1	-	-	1	1	1	1	1	3	3	2

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3302 -CONSTRUCTION MATERIALS AND TECHNOLOGY

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3302	Construction Materials And Technology	C205.1: Identify the good quality brick, stone and blocks for construction.
		C205.2: Recognize the market forms of timber, steel, aluminum and applications of various composite materials.
		C205.3: Identify the best construction and service practices such as thermal insulations and air conditioning of the building.
		C205.4: Explain the various equipments for construction works conditioning of building.
		C205.5: Explain the construction planning and scheduling techniques.
		C205.6: Explain the network modeling and time analysis in construction planning.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE3302															
C205.1	2	2	1	1	-	1	-	-	1	1	-	1	2	1	-
C205.2	2	2	1	1	-	1	-	-	1	1	-	-	2	1	1
C205.3	2	2	1	1	-	1	-	-	1	1	2	-	2	1	-
C205.4	2	2	1	1	-	-	-	-	1	1	2	-	2	1	1
C205.5	2	2	1	1	-	-	-	-	1	1	2	1	2	1	1
C205.6	2	2	1	1	-	-	-	-	1	1	-	1	2	1	-
C205	2	2	1	1	-	1	-	-	1	1	2	1	2	1	1

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3303- WATER SUPPLY AND WASTEWATER ENGINEERING

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3303	Water Supply and Wastewater Engineering	C206.1: Illustrate the various components of water supply scheme and design of intake structure and conveyance system for water transmission
		C206.2: Explain the characteristics and composition of sewage, ability to estimate sewage generation and design sewer system including sewage pumping stations
		C206.3: Explain the process of conventional treatment and design of water and wastewater treatment system and selection of treatment process and biological treatment process
		C206.4: Design and evaluate water distribution system and water supply in buildings and explain the self-purification of streams.
		C206.5: Explain and design the advanced waste water treatment systems.
		C206.6: Describe the recent advances in sludge treatment and its disposal methods.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE3303															
C206.1	3	3	2	2	1	1	-	-	1	1	-	1	3	2	2
C206.2	3	3	2	2	-	1	-	-	1	1	1	-	3	2	2
C206.3	3	3	2	2	1	1	1	-	1	1	-	-	3	2	2
C206.4	3	3	2	2	-	1	-	-	1	1	1	-	3	2	2
C206.5	3	3	2	2	-	1	1	-	1	1	1	1	3	2	2
C206.6	3	3	2	2	-	1	1	-	1	1	1	1	3	2	2
C206	3	3	2	2	1	1	1	-	1	1	1	1	3	2	2

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3361- SURVEYING AND LEVELLING LABORATORY

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3361	Surveying and Levelling Laboratory	C207.1: Describe the usage of basic surveying instruments like chain/tape and compass.
		C207.2: Explain the levelling instrument used for surveying operations.
		C207.3: Explain about the theodolite for various surveying operations.
		C207.4: Describe the measurements of height and distances by stadia and tangential tacheometry.
		C207.5: Describe the measurements of angles and area of traverse by Total station.
		C207.6: Illustrate the distance and difference in elevation between two inaccessible points using Total station.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE3361															
C207.1	3	2	1	1	-	-	-	1	1	1	2	2	2	1	1
C207.2	3	2	1	1	-	-	-	1	-	1	-	2	2	1	1
C207.3	3	2	1	1	-	-	-	1	1	1	2	2	2	1	1
C207.4	3	2	1	1	-	-	-	-	1	1	2	2	2	1	1
C207.5	3	2	1	1	1	-	-	1	-	1	-	2	2	1	1
C207.6	3	2	1	1	1	-	-	1	1	1	2	2	2	1	1
C207	3	2	1	1	1	-	-	1	1	1	2	2	2	1	1

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3311 - WATER AND WASTEWATER ANALYSIS LABORATORY

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3311	Water and Wastewater Analysis Laboratory	C208.1: Explain the basis concept of pollutant concentration in water and wastewater.
		C208.2: Illustrate the proper water and waste water samples for analysis.
		C208.3: Describe about the sample preservation methods.
		C208.4: Describe the field oriented testing of water and wastewater samples.
		C208.5: Explain the performance of coliform analysis in water samples.
		C208.6: Explain the performance of pathogenic and non-pathogenic analysis in water samples.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE3311															
C208.1	3	3	2	1	-	1	-	-	-	1	-	1	2	2	2
C208.2	3	3	2	1	-	1	-	1	1	1	-	1	2	2	2
C208.3	3	3	2	1	-	-	-	-	1	1	-	-	2	2	2
C208.4	3	3	2	1	-	1	-	1	1	1	-	-	2	2	2
C208.5	3	3	2	1	1	-	-	-	1	1	-	1	2	2	2
C208.6	3	3	2	1	1	-	-	1	-	1	-	1	2	2	2
C208	3	3	2	1	1	1	-	1	1	1	-	1	2	2	2

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**DEPARTMENT OF CIVIL ENGINEERING**

**REGULATION 2021 – CO PO MAPPING**

# **IV SEMESTER**

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### REGULATION 2021 – CO PO MAPPING

#### GE3361 - PROFESSIONAL DEVELOPMENT

Course Code	Course Name	Course Outcome (CO) Students will be able to
GE3361	Professional Development	<b>C209.1:</b> Explain about the MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements.
		<b>C209.2:</b> Explain the MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of explaining.
		<b>C209.3:</b> Describe the MS EXCEL to retrieve data as per requirements.
		<b>C209.4:</b> Illustrate the MS EXCEL to visualize data for ease of explaining.
		<b>C209.5:</b> Explain about MS PowerPoint to create high quality academic presentations by including common tables, charts, and graphs.
		<b>C209.6:</b> Describe the MS PowerPoint to interlinking other elements, and using media objects.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
GE3361															
C209.1	3	2	2	1	-	-	2	-	2	2	-	1	2	2	1
C209.2	3	2	2	1	-	-	2	-	2	2	1	1	2	2	1
C209.3	3	2	2	1	-	-	2	-	2	2	-	1	2	2	1
C209.4	3	2	2	1	-	-	2	-	2	2	1	1	2	2	1
C209.5	3	2	2	1	-	-	2	-	2	2	-	1	2	2	1
C209.6	3	2	2	1	-	-	2	-	2	2	1	1	2	2	1
<b>C209</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3401- APPLIED HYDRAULIC ENGINEERING

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3401	Applied Hydraulic Engineering	<b>C210.1:</b> Describe the basics of open channel flow, its classification and analysis of uniform flow in steady state conditions with specific energy concept and its application.
		<b>C210.2:</b> Explain the steady gradually varied flow, water surface profiles and its length calculation using direct and standard step methods.
		<b>C210.3:</b> Describe the relationship among the sequent depths of steady rapidly varied flow and estimating energy loss in hydraulic jump with exposure to positive and negative surges.
		<b>C210.4:</b> Design and explain the working principles of hydraulic machineries.
		<b>C210.5:</b> Illustrate about the pumps and explain their working principle with characteristic curves.
		<b>C210.6:</b> Describe the operating characteristics of multistage pumps and saving in work done.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE3401															
C210.1	3	2	1	1	-	1	-	1	1	1	-	1	2	2	1
C210.2	3	2	1	1	-	-	-	-	1	1	-	-	2	2	1
C210.3	3	2	1	1	-	-	-	-	1	1	-	-	2	2	1
C210.4	3	2	1	1	-	1	-	1	1	1	1	1	2	2	1
C210.5	3	2	1	1	-	1	-	-	1	1	1	1	2	2	1
C210.6	3	2	1	1	-	-	-	-	1	1	-	1	2	2	1
C210	3	2	1	1	-	1	-	1	1	1	1	1	2	2	1

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3402- STRENGTH OF MATERIALS

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3402	Strength of Materials	<b>C211.1:</b> Explain the concepts of stress and strain, principal stresses and principal planes.
		<b>C211.2:</b> Describe the Shear force and bending moment in beams and explain concept of theory of simple bending.
		<b>C211.3:</b> Explain the deflection of beams by different methods and selection of method for determining slope or deflection.
		<b>C211.4:</b> Analyze the propped cantilever, fixed beams and continuous beams for external loadings and support settlements.
		<b>C211.5:</b> Describe the stresses due to unsymmetrical bending of beams & locate the shear center,
		<b>C211.6:</b> Illustrate the various theories of failure in unsymmetrical bending of beams.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO			
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3	
CE3402																
C211.1	3	2	2	2	-	1	-	-	1	1	1	1	3	3	2	
C211.2	3	2	2	2	-	-	-	1	1	1	-	1	3	3	2	
C211.3	3	2	2	2	-	1	-	-	1	1	1	-	3	3	2	
C211.4	3	2	2	2	-	-	-	-	1	1	-	1	3	3	2	
C211.5	3	2	2	2	-	-	-	1	1	1	1	-	3	3	2	
C211.6	3	2	2	2	-	-	-	-	1	1	-	-	3	3	2	
C211	3	2	2	2	-	1	-	1	1	1	1	1	3	3	2	

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3403- CONCRETE TECHNOLOGY

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3403	Concrete Technology	<b>C212.1:</b> Explain the requirements of cement, aggregates and water for concrete.
		<b>C212.2:</b> Describe about the suitable admixtures for enhancing the properties of concrete.
		<b>C212.3:</b> Design concrete mixes as per IS method of mix design.
		<b>C212.4:</b> Determine the properties of concrete at fresh and hardened state.
		<b>C212.5:</b> Describe the importance of special concretes for specific requirements.
		<b>C212.6:</b> Describe the importance and usage of high performance concrete.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE3403															
C212.1	3	2	1	1	-	1	-	-	2	1	1	1	2	1	1
C212.2	3	2	1	1	-	1	-	-	2	1	1	1	2	1	1
C212.3	3	2	1	1	-	1	-	-	2	1	-	-	2	1	1
C212.4	3	2	1	1	-	1	-	-	2	1	1	1	2	1	1
C212.5	3	2	1	1	-	1	-	-	2	1	-	1	2	1	1
C212.6	3	2	1	1	-	1	-	-	2	1	-	1	2	1	1
C212	3	2	1	1	-	1	-	-	2	1	1	1	2	1	1

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3404 - SOIL MECHANICS

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3404	Soil Mechanics	<b>C213.1:</b> Explain the formation of soil and its unified classification system, formulate and solve engineering Problems.
		<b>C213.2:</b> Describe the two dimensional flow through soil medium and its impact of engineering solution.
		<b>C213.3:</b> Explain the basic concept of stress distribution in loaded soil medium and soil settlement due to consolidation.
		<b>C213.4:</b> Illustrate the shear strength of cohesive and cohesion less soils and also will be aware of contemporary issues on shear strength of soils.
		<b>C213.5:</b> Describe the stability analysis of finite slopes, component and process as per needs and specifications.
		<b>C213.6:</b> Describe the stability analysis of infinite slopes and its failures protection measures.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE3404															
C213.1	3	2	2	1	-	1	-	-	1	1	1	1	2	2	1
C213.2	3	2	2	1	-	1	-	-	1	1	1	1	2	2	1
C213.3	3	2	2	1	-	-	-	-	1	1	1	-	2	2	1
C213.4	3	2	2	1	-	-	-	-	1	1	1	-	2	2	1
C213.5	3	2	2	1	-	-	-	-	1	1	1	1	2	2	1
C213.6	3	2	2	1	-	-	-	-	1	1	1	1	2	2	1
C213	3	2	2	1	-	1	-	-	1	1	1	1	2	2	1

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3405- HIGHWAY AND RAILWAY ENGINEERING

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3405	Highway and Railway Engineering	C214.1: Describe the highway according to the principles and standards adopted in various institutions in India.
		C214.2: Describe the geometric features of road network and components of pavement.
		C214.3: Explain the highway materials and construction practice methods and know its properties and able to perform pavement evaluation and management.
		C214.4: Illustrate the methods of route alignment and design elements in railway planning and constructions.
		C214.5: Explain the construction techniques and maintenance of track laying and railway stations.
		C214.6: Explain about the layouts of railway stations and its development.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
HS8381															
C214.1	3	2	2	2	-	-	-	-	1	1	1	2	2	1	-
C214.2	3	2	2	2	-	1	-	-	1	1	1	2	2	1	-
C214.3	3	2	2	2	-	1	-	-	-	1	1	2	2	1	-
C214.4	3	2	2	2	-	-	-	-	-	1	-	2	2	1	-
C214.5	3	2	2	2	-	1	-	-	1	1	1	2	2	1	-
C214.6	3	2	2	2	-	-	-	-	-	1	-	2	2	1	-
C214	3	2	2	2	-	1	-	-	1	1	1	2	2	1	-

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### GE3451 - ENVIRONMENTAL SCIENCES AND SUSTAINABILITY

Course Code	Course Name	Course Outcome (CO) Students will be able to
GE3451	Environmental Sciences and Sustainability	<b>C215.1:</b> Explain the functions of environment, ecosystems and biodiversity and their conservation.
		<b>C215.2:</b> Explain about the effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
		<b>C215.3:</b> Explain about the renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
		<b>C215.4:</b> Describe the different goals of sustainable development and apply them for suitable technological advancement and societal development.
		<b>C215.5:</b> Demonstrate the knowledge of sustainability practices and identify the green materials, energy cycles and the role of sustainable urbanization.
		<b>C215.6:</b> Describe the sustainability standard of ISO 14000 series and life cycle assessment.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
GE3451															
C215.1	2	1	1	-	-	1	1	-	-	1	-	1	2	-	-
C215.2	2	1	1	-	-	1	1	-	-	1	-	1	2	-	-
C215.3	2	1	1	-	-	1	1	-	-	1	-	1	2	-	-
C215.4	2	1	1	1	-	1	1	-	-	-	-	-	2	-	-
C215.5	2	1	1	-	-	1	1	-	-	1	-	1	2	-	-
C215.6	2	1	1	-	-	1	1	-	-	-	-	-	2	-	-
C215	2	1	1	1	-	1	1	-	-	1	-	1	2	-	-

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3411-HYDRAULIC ENGINEERING LABORATORY

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3411	Hydraulic Engineering Laboratory	C217.1: Explain the Bernoulli equation for calibration of flow measuring devices.
		C217.2: Illustrate the friction factor in pipes and compare with Moody diagram.
		C217.3: Determine the performance characteristics of rotodynamic pumps.
		C217.4: Determine the performance characteristics of positive displacement pumps.
		C217.5: Explain about the performance characteristics of turbines.
		C217.6: Determine the metacentric height of floating bodies.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE8461															
C217.1	3	3	2	2	-	-	-	-	2	1	-	2	3	2	2
C217.2	3	3	2	2	-	-	1	-	-	1	-	2	3	2	2
C217.3	3	3	2	2	-	-	1	-	2	1	2	2	3	2	2
C217.4	3	3	2	2	-	-	-	-	2	1	2	2	3	2	2
C217.5	3	3	2	2	-	-	1	-	2	1	-	2	3	2	2
C217.6	3	3	2	2	-	-	-	-	-	1	2	-	3	2	2
C217	3	3	2	2	-	-	1	-	2	1	2	2	3	2	2

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3412- MATERIALS TESTING LABORATORY

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3412	Materials Testing Laboratory	C218.1: Explain about the mechanical tests on metals.
		C218.2: Describe the physical properties tests on cement.
		C218.3: Explain about the physical properties tests on fine and coarse aggregates.
		C218.4: Demonstrate the compressive strength of concrete and flowability of self compacting concrete.
		C218.5: Determine the compressive strength, water absorption and efflorescence of brick.
		C218.6: Determine the compressive strength test on wood.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE3412															
C218.1	3	3	2	2	-	-	-	-	-	1	1	2	3	2	-
C218.2	3	3	2	2	-	1	-	-	-	1	1	2	3	2	-
C218.3	3	3	2	2	-	-	1	-	-	1	1	2	3	2	-
C218.4	3	3	2	2	-	-	-	-	-	1	1	2	3	2	-
C218.5	3	3	2	2	-	1	1	-	-	1	1	2	3	2	-
C218.6	3	3	2	2	-	-	-	-	-	1	1	2	3	2	-
C218	3	3	2	2	-	1	1	-	-	1	1	2	3	2	-

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3413 - SOIL MECHANICS LABORATORY

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3413	Soil Mechanics Laboratory	C219.1: Determine the index properties and Atterberg limits of soil.
		C219.2: Determine the insitu density and compaction characteristics of soil.
		C219.3: Illustrate the engineering properties and consolidation characteristics of soil.
		C219.4: Determine the permeability test on cohesion and cohesion less soil.
		C219.5: Explain the shear strength test, triaxial tests of cohesion less soil and unconfined compressive strength test of cohesive soil.
		C219.6: Determine the tensile strength and interfacial friction angles of geosynthetics.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE3413															
C219.1	3	3	2	2	-	-	-	-	2	1	-	1	3	2	2
C219.2	3	3	2	2	-	-	2	-	-	1	-	1	3	2	2
C219.3	3	3	2	2	-	-	-	-	2	1	1	1	3	2	2
C219.4	3	3	2	2	-	-	2	-	2	1	-	1	3	2	2
C219.5	3	3	2	2	-	-	2	-	2	1	1	1	3	2	2
C219.6	3	3	2	2	-	-	-	-	-	1	1	-	3	2	2
C219	3	3	2	2	-	-	2	-	2	1	1	1	3	2	2

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**V SEMESTER**

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### REGULATION 2021 – CO PO MAPPING

#### CE3501- DESIGN OF REINFORCED CONCRETE STRUCTURAL ELEMENTS

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3501	Design of Reinforced Concrete Structural Elements	C301.1: Describe the basics design concepts of RC rectangular beams by working stress and limit state methods.
		C301.2: Explain the design of RC flanged beams and design for shear and torsion of RC members.
		C301.3: Illustrate the design of RC slabs and staircase and draw its reinforcement detailing.
		C301.4: Describe the short columns for axial, uni-axial and bi-axial eccentric loadings.
		C301.5: Explain about the types of column and design of short rectangular and circular column.
		C301.6: Design of axially and eccentrically loaded rectangular pad and sloped footings.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE3501															
C301.1	3	3	2	2	-	1	-	1	-	1	1	1	3	3	2
C301.2	3	3	2	2	-	1	-	1	-	1	1	1	3	3	2
C301.3	3	3	2	2	-	1	-	1	-	1	1	1	3	3	2
C301.4	3	3	2	2	-	1	-	1	-	1	1	1	3	3	2
C301.5	3	3	2	2	-	1	-	1	-	1	1	1	3	3	2
C301.6	3	3	2	2	-	1	-	1	-	1	1	1	3	3	2
C301	3	3	2	2	-	1	-	1	-	1	1	1	3	3	2

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3502 - STRUCTURAL ANALYSIS I

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3502	Structural Analysis I	<b>C302.1:</b> Analyse the determinate and indeterminate trusses and application of space trusses.
		<b>C302.2:</b> Analyse the continuous beams and rigid frames by slope deflection method.
		<b>C302.3:</b> Explain the concept of moment distribution on frames and symmetric frames with symmetric and skew symmetric loadings.
		<b>C302.4:</b> Describe the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.
		<b>C302.5:</b> Explain the concept of matrix stiffness method and analysis of continuous beams.
		<b>C302.6:</b> Analyse the pin jointed plane frames and rigid frames by direct stiffness method.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE8502															
C302.1	3	3	2	2	-	1	-	1	1	-	1	2	3	2	-
C302.2	3	3	2	2	-	1	-	1	1	-	1	2	3	2	-
C302.3	3	3	2	2	-	1	-	-	1	-	1	2	3	2	-
C302.4	3	3	2	2	-	1	-	1	1	-	1	2	3	2	-
C302.5	3	3	2	2	-	1	-	-	1	-	1	2	3	2	-
C302.6	3	3	2	2	-	1	-	-	1	-	1	2	3	2	-
C302	3	3	2	2	-	1	-	1	1	-	1	2	3	2	-

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING


#### CE3503 - FOUNDATION ENGINEERING

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3503	Foundation Engineering	<b>C303.1:</b> Explain the detailed site investigation and selection of foundation based on soil condition.
		<b>C303.2:</b> Illustrate the bearing capacity of shallow foundations on homogeneous deposits and settlement of foundations on granular and clay deposits.
		<b>C303.3:</b> Describe the types of footings and contact pressure and settlement distribution variations of cohesive and cohesion less soil.
		<b>C303.4:</b> Determine the negative skin friction, uplift capacity and group pile carrying capacity by different methods.
		<b>C303.5:</b> Describe about the active and passive earth pressure on retaining wall based on Rankine's theory.
		<b>C303.6:</b> Analyse the stability analysis of retaining wall by culmann graphical method.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE3503															
C303.1	3	2	1	1	-	-	-	-	1	-	1	1	3	2	2
C303.2	3	2	1	1	-	1	1	-	1	-	1	1	3	2	2
C303.3	3	2	1	1	-	1	-	-	1	1	1	1	3	2	2
C303.4	3	2	1	1	-	1	-	-	1	-	1	1	3	2	2
C303.5	3	2	1	1	-	1	1	-	1	-	1	1	3	2	2
C303.6	3	2	1	1	-	1	1	-	1	1	1	1	3	2	2
C303	3	2	1	1	-	1	1	-	1	1	1	1	3	2	2

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3025 - AIRPORTS AND HARBOURS

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3025	Airports and Harbours	<b>C304.1:</b> Explain about the planning and site selection of Airport Planning and design.
		<b>C304.2:</b> Illustrate about the various Airport components and geometric design of runway and taxiways.
		<b>C304.3:</b> Describe the various types of elements used for orientation of runways and passenger facility systems.
		<b>C304.4:</b> Explain the various features in Harbours and Ports, their construction, coastal protection works.
		<b>C304.5:</b> Describe the wave action on coastal structures and shore protection measures.
		<b>C304.6:</b> Explain the coastal regulation zone and methods of impact analysis.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE3025															
C304.1	3	2	1	1	-	1	-	-	-	-	1	1	2	1	-
C304.2	3	2	1	1	-	1	-	-	-	1	1	1	2	1	-
C304.3	3	2	1	1	-	1	-	1	-	-	1	1	2	1	-
C304.4	3	2	1	1	-	1	-	-	-	-	1	-	2	1	-
C304.5	3	2	1	1	-	1	-	1	-	1	1	1	2	1	-
C304.6	3	2	1	1	-	1	-	-	-	-	1	1	2	1	-
C304	3	2	1	1	-	1	-	1	-	1	1	1	2	1	-

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CCE331 - AIR AND NOISE POLLUTION CONTROL ENGINEERING

Course Code	Course Name	Course Outcome (CO) Students will be able to
CCE331	Air and Noise Pollution Control Engineering	<b>C305.1:</b> Explain about various types and sources of air pollution and its effects.
		<b>C305.2:</b> Illustrate the dispersion of air pollutants and their modeling.
		<b>C305.3:</b> Explain about the principles and design of control of particulate pollutants.
		<b>C305.4:</b> Explain the principles and design of control of gaseous pollutant.
		<b>C305.5:</b> Describe the sources, effects of vehicular, indoor air and noise pollution.
		<b>C305.6:</b> Describe the control of noise at source and control of other types of noise sound absorbent.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CCE331															
C305.1	2	2	1	1	-	-	-	-	1	-	-	1	2	2	-
C305.2	2	2	1	1	-	-	2	-	1	-	-	1	2	2	-
C305.3	2	2	1	1	-	-	2	-	1	-	2	-	2	2	-
C305.4	2	2	1	1	-	-	-	-	-	-	2	1	2	2	-
C305.5	2	2	1	1	-	-	2	-	1	-	2	1	2	2	-
C305.6	2	2	1	1	-	-	-	-	-	-	-	-	2	2	-
C305	2	2	1	1	-	-	2	-	1	-	2	1	2	2	-

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3003 - PREFABRICATED STRUCTURES

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3003	Prefabricated Structures	<b>C306.1:</b> Explain the concepts about principles of prefabrication, production, transportation and erection.
		<b>C306.2:</b> Describe about the panel systems, slabs, beams, shear walls and columns in precast construction.
		<b>C306.3:</b> Illustrate the design of cross section based on efficiency of material used and joint flexibility.
		<b>C306.4:</b> Explain about the joints and connections in precast construction.
		<b>C306.5:</b> Describe about the structural stability for abnormal loads of prefabricated structures.
		<b>C306.6:</b> Describe an importance of avoidance of progressive collapse and its codal provisions.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE3003															
C306.1	3	2	2	1	-	-	-	1	-	-	1	1	3	2	2
C306.2	3	2	2	1	-	2	-	1	-	1	1	-	3	2	-
C306.3	3	2	2	1	-	2	-	1	-	-	1	1	3	2	2
C306.4	3	2	2	1	-	-	-	1	-	1	-	1	3	-	-
C306.5	3	2	2	1	-	-	-	1	-	1	1	-	3	2	-
C306.6	3	2	2	1	-	2	-	-	-	-	1	1	3	2	2
C306	3	2	2	1	-	2	-	1	-	1	1	1	3	2	2

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3511- HIGHWAY ENGINEERING LABORATORY

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3511	Highway Engineering Laboratory	<b>C308.1:</b> Explain about the characteristics of pavement aggregate through relevant test.
		<b>C308.2:</b> Determine the specific gravity and ductility of bitumen or asphalt sample.
		<b>C308.3:</b> Determine the optimum binder content by Marshall method.
		<b>C308.4:</b> Evaluate the consistency and softening point of bitumen or asphalt sample.
		<b>C308.5:</b> Demonstrate the bitumen content in the bituminous mixes by cold solvent extraction method.
		<b>C308.6:</b> Demonstrate the stripping value in the bituminous mixes.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
C308.1	3	2	2	1	-	-	-	1	2	1	-	-	3	1	1
C308.2	3	2	2	1	-	-	-	1	2	1	1	1	3	1	1
C308.3	3	2	2	1	-	-	-	1	2	-	1	1	3	1	1
C308.4	3	2	2	1	-	-	-	1	2	1	1	1	3	1	1
C308.5	3	2	2	1	-	-	-	1	2	-	-	-	3	1	1
C308.6	3	2	2	1	-	-	-	1	2	1	-	-	3	1	1
C308	3	2	2	1	-	-	-	1	2	1	1	1	3	1	1

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## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### CE3512 - SURVEY CAMP

Course Code	Course Name	Course Outcome (CO) Students will be able to
CE3512	Survey Camp	<b>C309.1:</b> Explain the modern surveying instruments like Total station and GPS.
		<b>C309.2:</b> Explain about the modern surveying techniques in field to establish horizontal control.
		<b>C309.3:</b> Explain the basic surveying techniques in field to establish vertical control.
		<b>C309.4:</b> Describe the different survey of adjustment techniques.
		<b>C309.5:</b> Describe about different setting out works in the field.
		<b>C309.6:</b> Illustrate the curve setting by deflection angle.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
CE3512															
C309.1	2	2	1	1	-	-	-	1	-	1	-	1	2	-	-
C309.2	2	2	1	1	-	-	-	1	-	1	-	1	2	-	-
C309.3	2	2	1	1	-	-	-	1	-	1	-	1	2	-	-
C309.4	2	2	1	1	-	-	-	1	-	1	-	1	2	-	-
C309.5	2	2	1	1	-	-	-	1	-	1	-	1	2	-	-
C309.6	2	2	1	1	-	-	-	1	-	1	-	1	2	-	-
C309	2	2	1	1	-	-	-	1	-	1	-	1	2	-	-

\*3-High correlation; 2- Medium correlation; 1-Low correlation; '-' No correlation

  
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# SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)

Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

## DEPARTMENT OF CIVIL ENGINEERING

### REGULATION 2021 – CO PO MAPPING

#### MX3081 - INTRODUCTION TO WOMEN AND GENDER STUDIES

Course Code	Course Name	Course Outcome (CO) Students will be able to
MX3081	Introduction to Women and Gender Studies	C307.1: Exhibit the fundamental concepts of gender studies.
		C307.2: Illustrate about the types of feminist theory.
		C307.3: Analyze the history of women's movements.
		C307.4: Distinguish between the gender based on linguistic forms.
		C307.5: Explain the role of media in gender equality.
		C307.6: Discuss the representation of women in media.

#### CO-PO MAPPING

COs	PROGRAM OUTCOMES												PSO		
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
MX3081															
C307.1	-	-	-	-	-	1	1	1	3	2	-	2	-	-	-
C307.2	-	-	-	-	-	1	1	1	3	2	-	2	-	-	-
C307.3	-	-	-	-	-	1	1	1	3	2	-	2	-	-	-
C307.4	-	-	-	-	-	1	1	1	3	2	-	2	-	-	-
C307.5	-	-	-	-	-	1	1	1	3	2	-	2	-	-	-
C307.6	-	-	-	-	-	1	1	1	3	2	-	2	-	-	-
C307	-	-	-	-	-	1	1	1	3	2	-	2	-	-	-

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