Engineering Mechanics
Code: ARCH 103
Prerequisites: Physics, Mathematics

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

CO1. Determine nature of forces and its final effects

CO2. Understand basic principles of structural mechanics

CO3. Calculate simple design of minor structural elements

CO4. Understand structural behaviour of building elements.

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2							1		1	
CO 2	3	2							1		1	
CO 3	3	3							1		1	
CO 4	3	2	1						2		2	1

1: Slightly 2: Moderately 3: Substantially

Structure I
Code: ARCH 302

Prerequisites: Engineering Mechanics, Physics, Mathematics

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

CO1. Determine the principal stresses and strains in structural members

CO2. Calculate deflection of beam element using moment area and conjugate beam method

CO3. Understand column buckling theory.

CO4. Design of columns, short columns andpiers with eccentric loading.

Mapping of Course outcomes with Program outcomes

Program outcomes → / **Course outcome↓**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	**3**	**2**							**1**		**1**	
CO 2	**3**	**2**							**1**		**1**	
CO 3	**3**	**2**							**1**		**1**	
CO 4	**3**	**2**	**2**						**2**		**2**	**1**

1: Slightly 2: Moderately 3: Substantially

Structure I
Code: ARCH 402
Prerequisites: Engineering Mechanics, Strength of Materials, Physics, Mathematics

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

CO1. Calculation deflection of a member by Strain Energy Method and Castigiliano's theorem

CO2. Analysis of structure by Moment Distribution Method.

CO3. Understand Wind effect on a structure.

CO4. Understand Seismic effect on a structure.

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	2					1				
CO 2	3	3	3	2		1		1	2	1	2	3
CO 3	3	2	2			2	2	1		1	2	1
CO 4	3	2	2			2	2	1		1	2	1

1: Slightly 2: Moderately 3: Substantially

Structure III
Code: ARCH 502
Prerequisites: Structure I, Structure II

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

CO1. Design the Reinforced Concrete beams using limit state method

CO2. Design of simple retaining wall with pressure distribution of different parts.

CO3. Design Reinforced Concrete slabs and staircases

CO4. Design of columns and shallow foundation

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3						2		2	1
CO 2	3	3	3	1					2		2	1
CO 3	3	3	3	1					2		2	1
CO 4	3	3	3	1					2		2	1

1: Slightly 2: Moderately 3: Substantially

.

Structure IV
Code: ARCH 601
Prerequisites: Structure I, Structure II

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

CO1. Design riveted, bolt and welded connections including beam end connections

CO2. Design truss members

CO3. Design builds up beams and columns

CO4. Design of base-plate, gusset plate and concrete footings for steel columns, grillage foundation.

CO5. Design of M.S. Plate girders and compound columns.

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	**3**	**3**	**3**	**1**	**2**	**1**	**1**		**2**		**2**	**1**
CO 2	**3**	**3**	**3**	**1**	**2**	**1**	**1**		**2**		**2**	**1**
CO 3	**3**	**3**	**3**	**1**	**2**	**1**	**1**		**2**		**2**	**1**
CO 4	**3**	**3**	**3**	**1**	**2**	**1**	**1**		**2**		**2**	**1**
CO 5	**3**	**3**	**3**	**1**	**2**	**1**	**1**		**2**		**2**	**1**

1: Slightly 2: Moderately 3: Substantially

CE 401: Fluid mechanics

Course Outcomes:

After completion of the course, the students will be able to

- Understand fundamental concept of fluid mechanics.
- Build strong foundation on fluid statics, buoyancy, centre of pressure, metacentric height etc. stability of floating bodies.
- Apply the fundamental laws to solve problems in fluid mechanics on applications dealing with the flow of incompressible fluids in engineering systems.

- Analyse fluid flow problems with application of mass, momentum and energy conservation equations (pipe flow problems, flow through notches weirs etc.).
- Understand the theory of open channel flow, development of mathematical modelling of an open channel flow along with several assumptions and approximations.
- Classifications of different fluid flow in an open channel and importance of several non-dimensional numbers used to classify several flows.
- Understand the importance of specific energy curve for an open channel, and how to draw the same. The importance of Froude number for an open channel.
- Analyse the phenomena of hydraulic jump with the help of specific energy curve.
- Perform the dimensional analysis for fluid flow problems.
- Classify different types of fluid machines.
- Understand the basic working principle of turbo machines (Pump and turbines only)
- Identify different losses in fluid machines.
- Select an appropriate class of turbomachine for a particular application.
- Analyse different performance characteristics of various fluid machines.

SEMINAR

Code: CE681

Contact: 3P

Credits: 2

Prerequisites: NIL.

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

CO1: present the technical presentation confidentially

CO2: able to prepare the presentation contents for tender or contracts

CO3: communicate with the clients fluently

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1										3	2	
CO 2						2				3	2	
CO 3										3	2	

1: Slightly 2: Moderately 3: Substantially

Sub: Advanced Highway and Transportation Engineering

Code: CE703C

Contact: 3L (Total: 36L)

Credits: 3

Pre-requisites: Highway & Transportation Engineering

Course Outcomes (COs):

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

CO 1. Estimate basic characteristics of traffic stream and analyze traffic data from traffic studies

CO 2. Design traffic signal systems and determine the capacity of highways considering control system and safety issues

CO 3. Understand transportation planning studies & investigation and recognize the use of modern software.

CO 4. Design &analyze the railway track system after identifying the factors governing design of railway infrastructures

CO 5. Understand the importance of functional areas of airports, Design of important parts of Airport.

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3			1							
CO 2	3	3	2			1					1	
CO 3	3	2	1		2	1	1					
CO 4	2	3			1							
CO 5	2	3	2									

1: Slightly 2: Moderately 3: Substantially

SURVEYING &GEOMATICS
Code: CE(PC)405
Contact: 1L +1T
Credits: 2

Prerequisites: None

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

CO1 Calculate angles, distances and levels

CO2 Identify data collection methods and prepare field notes

CO3 Understand the working principles of survey instruments

CO4 Estimate measurement errors and apply corrections

CO5 Interpret survey data and compute areas and volumes

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1		3		1								
CO 2		3			1							
CO 3		3			1							
CO 4		3			1							
CO 5							3	1				

1: Slightly 2: Moderately 3: Substantially

SURVEYING &GEOMATICS PRACTICE

Code: CE(PC) 494

Contact: 2P

Credits: 1

Prerequisites: None

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

CO1:Conduct surveying using various survey instruments in the field works.

CO2: Set out curves and marking of buildings on the site

CO3:Prepare LS , CS for the road works and contour map for the given area

CO4:take angular and linear measurements using total station

CO5 :prepare contour maps for the given area

CO6:conduct astronomical survey.

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	2									
CO 2	2	3	2									
CO 3	2	3	2									
CO 4		3	2		3							
CO 5		3			3							

CO 6		**3**			**3**							

1: Slightly 2: Moderately 3: Substantially

SOLID MECHANICS
Code: CE301
Prerequisites: Physics, Mathematics II and Engineering Mechanics.

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

CO1 -Analyse the statically determinate and indeterminate problems

CO2- Determine the stresses and strains in the members subjected to axial, bending and torsional loads

CO3- Evaluate the slope and deflection of beams subjected to loads

CO4-To determine the bending, shear stresses and deflection produced in a beam subjected to system of loads

CO5- Determine the principal stresses and strains in structural members

CO6- To analyze about the force in member Truss with different methods

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes → / **Course outcome ↓**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	**3**			**2**				**3**				
CO 2	**3**			**2**				**3**				
CO 3	**3**			**2**				**3**				
CO 4	**3**		**2**	**2**					**2**			
CO 5	**3**			**2**				**3**				

CO 6	**3**		**2**	**2**					**2**			

1: Slightly 2: Moderately 3: Substantially

BUILDING MATERIALS AND CONSTRUCTION
Code: CE303
Contact: 3L + 1T (Total: 36L + 12T)
Credits: 4

Prerequisites: Basic Civil Engineering.
Course Outcomes: At the end of the course, the student will be able to:

CO1 - Identify and characterize building materials
CO2 - Understand the manufacturing process of bricks and cement
CO3 - Identify the methods for preservation of timber and metals
CO4 - Understand the use of non-conventional Civil Engineering materials

Mapping of Course outcomes with Program outcomes

Program outcomes → / **Course outcome ↓**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	**2**	**1**		**2**								
CO 2	**2**	**2**		**3**								
CO 3	**3**	**1**		**2**								

CO 4	2	2		3								

1: Slightly 2: Moderately 3: Substantially

STRUCTURAL ANALYSIS
Code: CE402
Contact: 3L + 1 T(Total: 42Hrs)
Credits: 4
Prerequisites: Mechanics of Materials,EngineeringMechanics,Strength of Materials

Course Outcomes: At the end of the course, the student will be able to:
CO1 Formulate Equilibrium and compatibility equations for structural members
CO2 Analyze one dimensional and two dimensional problems using classical methods
CO3 Analyze indeterminate structures
CO4 Analyse structures for gravity loads, moving loads and lateral loads
CO5: Analyze the pin jointed plane frames using energy and consistent deformation method
CO6: Find the maximum moment, shear and stresses produced in arches due to external loads temperature effects and support settlements.
CO7: To find the influence line diagram for determinate structures

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3			3				1				
CO 2	3			3				1				
CO 3	3			3				1				
CO 4	3			3				1				
CO 5	2		2	3								
CO 6	2		2	3								
CO 7	2		2	3								

1: Slightly 2: Moderately 3: Substantially

Sub: Soil Mechanics
Code: CE403
Contact: 3L+1T (Total: 42)
Credits: 4

Pre-requisites: None

Course Outcomes (COs)

On completion of this course a student will
CO 1. Learn the common terminology used in the field of Soil Mechanics
CO 2. Understand the basic soil structure, the behaviour and properties of different types of soil and familiarize with the relevant laboratory tests
CO 3. Get the idea of soil classification and identification procedure and will also understand the permeability of soil and analysis procedure of seepage through earthen structures
CO 4. Understand the behaviour of stresses in soil under various conditions and will have the ability to analyze the stress distribution for a given loading
CO 5. Become familiar with compaction and consolidation of soils and settlement characteristics of soils and will also understand the experimental methods to attain certain level of compressibility,
CO 6. Learn fundamental concept of shear strength of soil and laboratory determination procedure of soil shear parameter.

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2											
CO 2	3	2	1		1							
CO 3	3	3			1							
CO 4	3	3	1									
CO 5	3	3	2		2							
CO 6	3	3		1	2							

1: Slightly 2: Moderately 3: Substantially

Sub: Soil MechanicsLab -I
Code: CE493
Contact: 3L+1T (Total: 42)
Credits: 4

Pre-requisites: Soil Mechanics

Course Outcomes (COs)

On completion of this course a student will be

CO 1. Able to identify the different types of soil as per Indian Standard

CO 2. Determine the natural moisture content and specific gravity of the soil

CO 3. Able to determine the grain-size distribution for both cohesion less soil and cohesive soil

CO 4. Determine the Insitu density of the soil using different methods

CO 5. Determine the atterberg limit characteristics of the soil

CO 6. Determine the permeability of the soil by different methods

CO 7. Determine the compaction characteristics of soil

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2								1	1		
CO 2	3	3			1				1	1		
CO 3	3	3			1				1	1		
CO 4	3	3			1				1	1		
CO 5	3	3			1				1	1		
CO 6	3	3			1				1	1		
CO 7	3	3			1				1	1		

1: Slightly 2: Moderately 3: Substantially

FOUNDATION ENGINEERING
Code: CE501
Contact: 3L + 1T(Total: 36L + 12T)
Credits: 4

Prerequisites : Soil Mechanics

COURSE OUTCOME:

CO1: Able to carry out sub-surface Investigation & select the type of foundation required based on the sub-surface investigation report.

CO2: Determine the bearing capacity and prediction of settlement of the different foundation on different types of soil

CO3: Find the dimensions of the foundation for isolated footing, combined footing and floating foundation.

CO4: Analyze the group of piles for their load capacity

CO5: Carry out stability analysis of retaining walls.

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3	3	2	-	1	-	-	-	-	-
CO 2	3	3	3	3	-	-	-	-	-	-	-	-
CO 3	1	-	3	3	-	-	-	-	-	-	-	-
CO 4	2	2	3	3	-	-	-	-	-	-	-	-
CO 5	3	3	3	3	-	-	-	-	-	-	-	-

1: Slightly 2: Moderately 3: Substantially

DESIGN OF RC STRUCTURES
Code: CE502
Contact: 3L + 1T
Credits: 4
Prerequisites: Concrete Technology and Mechanics of Materials.
Course Outcomes: At the end of the course, the student will be able to:
CO1 Design the Reinforced Concrete beams using limit state and working stress methods
CO2 Design Reinforced Concrete slabs
CO3 Design the Reinforced Concrete Columns and footings
CO4 Design structures for serviceability
CO5 Design stair cases, canopy, retaining wall and water tanks
CO1- Understand the complete analysis and design of residential and industrial buildings using relevant IS codes.
CO2- Understand the complete analysis and design of different types of retaining walls.
CO3- Understand the complete analysis and design of different types of water tanks using relevant IS codes by working stress method.
CO4- Be well versed with concepts of civil engineering techniques and ability to use it in practice.

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	1		3				1				
CO 2	3	1		3				1				
CO 3	3	1		3				1				
CO 4	3	1		3				1				
CO 5	3	1		3				1				

1: Slightly 2: Moderately 3: Substantially

CONCRETE TECHNOLOGY
Code: CE503
Contact: 3L (Total: 36L) +1T(Proposed)
Credits: 3

Prerequisites :Building Materials

COURSE OUTCOMES:

CO1. Identify the materials used to make concrete; including their sources, production and properties

CO2. Describe and carry out tests relevant to the use of fresh and hardened concrete

CO3. To design concrete mix with and without admixtures

CO4. Classify the different types of concrete based on their applications

CO5. To identify the various concreting methods to place the concrete on site

CO6- Perform various NDT on concrete structures and to study crack repair and rehabilitation of concrete structures.

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1					2	2	1					
CO 2	2	2	1	2	2							
CO 3	2	2	2	1			2					2
CO 4			2			2						2
CO 5	2		2		2				2		2	
CO 6	3	3			3	2	2					

1: Slightly 2: Moderately 3: Substantially

ENGINEERING GEOLOGY
Code: CE504
Contact: 3L (Total: 36L) +1T(Proposed)
Credits: 3

Prerequisites: Basic Sciences (Physics, Chemistry, Mathematics), Physical Geography and fundamentals of Civil Engineering, Building Technology andMaterials, Geotechnical Engineering.

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

CO1- Apply the core concepts of Geology with special focus in various Civil Engineering Projects.

CO2- Identify various minerals along with their physical properties and distinguish different types of rocks, their structures, texturesalong with their applications as construction materials in Civil Engineering Projects.

CO3- Understand the formation of various landforms existing on the Earth's Surface and the various forces/factors acting on them and apply the knowledge in construction sites.

CO4- Gain the knowledge of structural geology and Tectonics to understand the occurrence of various deformations on the surface of the earth such as faults, folds, joints, etc, and their consequences.

CO5- Gain the basic knowledge of Seismology, Vulcanology and Natural Disaster Managementand their applications to find out the cause, effects and precautions in various natural disasters such as Earthquakes, Volcanism and landslides

CO6- Gather knowledge regarding the different conditions, precautions and significanceof construction of dams, tunnels and reservoirs.

CO7- Apply the knowledge of Geology to Surface and subsurface geological and geophysical investigations in major underground and Civil Engineering Projects.

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes →	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

Course outcome ↓												
CO 1	**3**	**3**	**3**	**3**			**2**		**1**			**1**
CO 2	**3**	**2**	**2**	**2**					**3**	**1**		**2**
CO 3	**3**	**2**	**2**	**2**					**1**			**1**
CO 4	**3**	**3**	**3**	**3**					**3**	**1**		**2**
CO 5	**3**	**3**	**3**	**3**		**2**	**2**		**2**	**2**		**3**
CO 6	**3**	**3**	**3**	**3**	**2**	**2**	**3**	**2**	**3**	**3**	**3**	**3**
CO 7	**3**	**3**	**3**	**3**	**2**	**1**	**2**	**2**	**3**	**2**	**2**	**2**

1: Slightly 2: Moderately 3: Substantially

Sub: Soil Mechanics Lab -II
Code: CE591
Contact: 3L+1T (Total: 42)
Credits: 4

Pre-requisites: Soil Mechanics

Course Outcomes (COs)

On completion of this course a student will be
CO 1. Able to determine the compressibility characteristics of soil
CO 2. Determine the shear strength parameter of soil by different methods suitable for different types of soil.
CO 3. Determine the penetration resistance of soil

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2			1				1	1		
CO 2	3	2			1				1	1		
CO 3	3	2			1				1	1		

1: Slightly 2: Moderately 3: Substantially

CONCRETE TECHNOLOGY LAB
CODE: CE-592
CRDIT-2
Prerequisites: Knowledge in Building Materials and Concrete Technology subject

COURSE OUTCOMES:-

At the end of the course, the student is expected to be aware of
CO01: Various tests regarding the quality and engineering property checking of Cement as construction material
CO02: Various tests regarding the quality and engineering property checking of Aggregates as construction material
CO03: Various tests regarding the quality and engineering property checking of Green & hardened Concrete as construction material
CO04: Mix design procedure for different grades of concrete

Mapping of Course outcomes with Program outcomes

Program outcomes → / **Course outcome ↓**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	**3**	**1**	**2**	**1**		**1**	**1**		**2**		**3**	**2**
CO 2	**3**	**1**	**2**	**1**		**1**	**1**		**2**		**3**	**2**
CO 3	**3**	**1**	**2**	**1**		**1**	**1**		**2**		**3**	**2**
CO 4	**3**	**3**	**3**	**2**		**1**	**2**		**2**		**3**	**2**

1: Slightly 2: Moderately 3: Substantially

QUANTITY SURVEYING & VALUATION
Code: CE593
Contact: 3L (Total: 36L) +1T(Proposed)
Credits: 2

Prerequisites : Building Materials,Mathematics.

COURSE OUTCOMES:

CO1- To read, understand and interpret plans, sections, detailed drawings and specifications for a construction project. To study the various methods of detailed and approximate estimates.

CO2- To emphasize the importance of relevant IS: 1200- 1964 codes and relevant Indian Standard specifications, taking out quantities from the given requirements of the work, and drafting specifications.

CO3- To conduct a material and labour survey to understand the current market rates for the various materials required for construction and the different categories of labour required. To prepare specifications of various types, prepare specifications for various items as a part of tender documents. Understanding the importance and use of specification.

CO4- To perform the rate analysis for various items: standard and non-standard and the use of DSR in this process.

CO5- To study the process of tendering and its various stages, various types of contracts, its suitability and validity as per the Indian Contract Act of 1872 and draft various clauses and conditions of a contract. Will be able to understand the arbitration process.

CO6- To study assessment of the value of a property with or without structure. Study the Valuation table and formulas for assessing different types of properties.

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

CO 1	**3**		**1**	**3**	**3**	**2**	**1**	**3**	**3**	**2**	**1**	**1**
CO 2	**3**		**2**	**3**	**3**	**2**	**1**	**3**	**3**	**2**	**1**	
CO 3	**3**	**2**	**1**	**3**	**3**	**1**		**3**	**3**		**1**	**1**
CO 4	**2**	**2**	**1**	**3**	**3**			**3**	**3**		**1**	**1**
CO 5	**1**	**1**	**2**	**3**	**3**		**1**	**3**	**3**		**1**	**1**
CO 6	**3**	**3**	**1**	**1**	**1**		**3**	**3**			**3**	**2**

1: Slightly 2: Moderately 3: Substantially

ENGINEERING GEOLOGY LABORATORY
Code: CE504
Contact: 3P+3L (Total: 36L)
Credits: 2

Prerequisites: Basic Sciences (Physics, Chemistry, Mathematics), Physical Geography and fundamentals of Civil Engineering, Building Technology andMaterials, Geotechnical Engineering.

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

CO1-Identify minerals and rocks

CO2-Measure strike and dip of the bedding planes

CO3-Interpret geological maps

<u>Mapping of course outcomes with program outcomes:</u>

Program outcomes → / **Course outcome ↓**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1		**2**	**1**	**2**	**2**	**1**	**1**	**1**	**2**			**2**

CO 2	**2**	**3**	**2**	**2**	**2**	**1**	**2**	**1**	**3**	**1**		**2**
CO 3	**1**	**2**	**2**	**2**	**2**	**1**	**2**	**2**	**3**	**2**		**3**

1: Slightly 2: Moderately 3: Substantially

Sub: Highway & Transportation Engineering

Code: CE601

Contact: 3L+1T (Additional) (Total: 36L+12T)

Credits: 3

Pre-requisites: None

Course Outcomes (COs):

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

CO 1. Plan and prioritize highway networks with consideration of finance and socio-economic condition.

CO 2. Design highway geometrics and understand use of modern software.

CO 3. Design traffic Intersections with traffic control devices.

CO 4. Design flexible and rigid pavements.

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

CO 1	3	3	2			2					3	
CO 2	3	3	2		2							
CO 3	3	3	3		1	1						
CO 4	3	3	2	2	2							

1: Slightly 2: Moderately 3: Substantially

Design of Steel structure
Code: CE602
Contact: 3L
Credits: 3
Prerequisites: Strength of Materials, Structural Analysis, Mathematical Methods and Engineering Mechanics.
Course Outcomes: At the end of the course, the student will be able to:
CO1. Students will be able to use appropriate methods of structural design for the design of steel structures by applying the fundaments of mechanics.
CO2 Design bolt and weld connections
CO3 Design tension and compression members
CO4 Design beams and beam columns
CO5 Design built up members and column base
CO6: Design of plate girders, web and flange design, curtailment of flange plates.
CO7: Design of simple and built up columns subject to combined bending and axial loads
CO8: To study shape factor, plastic hinge,plastic moment , plastic analysis of beams, Design Truss

Mapping of Course outcomes with Program outcomes

Program outcomes → / **Course outcome ↓**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	**2**	**3**	**3**		**3**	**2**	**2**	**2**	**3**		**2**	**3**
CO 2	**3**	**1**		**3**				**1**				
CO 3	**3**	**1**		**3**				**1**				
CO 4	**3**	**1**		**3**				**1**				
CO 5	**3**	**1**		**3**				**1**				
CO 6	**2**		**3**	**2**								

CO 7	**2**		**3**	**2**								
CO 8	**2**		**3**	**2**								

1: Slightly 2: Moderately 3: Substantially

CONSTRUCTION PLANNING AND MANAGEMENT
Code: CE603
Contact: 3L + 1T (PROPOSED) (Total: 36L + 12T)
Credits: 4

Prerequisites :

Course outcome:

1. The understanding & to determine the quantity of buildings require the knowledge of drawings. This knowledge will be useful to the student to prepare the construction schedule. They should also able to present the knowledge in a way that it is understandable by others.

2. The Construction check lists is closely associated with the knowledge of Construction materials and engineering laboratory tests for different types of works etc. The student will able to analyzes critical path, and resource allocation, towards the end of the course. They should also able to present the knowledge in a way that it is understandable by others.

3. The students should have the knowledge to quality control monitoring in the project, project safety management and construction project information. They should also able to present the knowledge in a way that it is understandable by others.

CO1- Understand the different types of standard/special equipment used in the construction industry and learn the different sources of equipment, economic life and depreciation cost of equipment.

CO2- Determine owning and operating costs, evaluate maintenance and repair costs.

CO3- Understand the various equipment related to earth moving, drilling and blasting, pile driving, pumping, stone crushing, air compressors, equipment for moving materials etc.

CO4- Understand the complex processes involved in the construction of tunnels.

CO5- Understand various soil stabilization techniques such as sand drains and stone columns, use of geotextiles and chemicals, diaphragm wall, rock anchors, foundation grouting, etc.

CO6- Understand the concept of mass concreting, vacuum concreting and modern slip forms and to understand different types of cladding and their arrangements.

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3		2	1		2	2	3	1		2	
CO 2			2	1		2	2	3	1		2	2
CO 3		2	2	1		2	2	3	1		2	2
CO 4												
CO 5												
CO 6												

1: Slightly 2: Moderately 3: Substantially

BRIDGE ENGINEERING
Code: CE604A
Contact: 3L(Total: 36L)
Credits: 3

Prereqisites :Structures,RCC& Steel Design

COURSE OUTCOMES:

CO1.Understand the design theories for super structure and substructure of bridges

CO2.Design Culvert, R.C.C T beam bridge.

CO3.Understand the behaviour of continuous bridges, box girder bridges.

CO4.Possess the basic knowledge to design prestressed concrete.

CO5.Design Railway bridges, Plate girder bridges, different types of bearings , abutments, piers and various types of foundations for Bridges.

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3	2								2
CO 2	3	3	3								2	
CO 3	3	3	3	2								3
CO 4	3	3	3									2
CO 5	3	3	3									
CO 6												

1: Slightly 2: Moderately 3: Substantially

Prestressed Concrete
Code: CE604B

Prerequisites : Design of Concrete Structures
Course Outcomes: At the end of the course, the student will be able to:

CO1 -Understand the concepts of pre-stressing in concrete structures including analysis of Pre-stressed Concrete section, complete in all respect.

CO2 – Analysis of losses and deflection of Pre-stressed Concrete member.

CO3-Design of Pre-stressed Concrete Section including Anchor Zone

CO4 –Design Composite structure and analysis of statically indeterminate structure

CO5:-Design pre-stressed concrete tanks, poles and sleepers and understand concept of partial Pre-stressing

CO1- Understand the concept of reinforced concrete & working stress method (WSM).

CO2- Analyse & design various types of beams& columns by WSM.

CO3- Design slab, footing & shear bonds in structure by WSM.

CO4- Understand basic principles, methods, losses & analysis of prestressed concrete.

CO5- Learn the general design principles of a prestressed concrete member.

Mapping of Course outcomes with Program outcomes

Program outcomes → / **Course outcome ↓**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	**3**	**1**	**1**	**1**			**1**		**2**			**2**
CO 2	**3**	**2**	**1**	**1**			**1**		**2**			**2**
CO 3	**3**	**3**	**3**	**1**	**1**	**1**	**3**		**2**		**2**	**3**
CO 4	**3**	**3**	**3**	**1**	**1**	**1**	**3**		**2**		**2**	**3**

CO 5	**3**	**3**	**3**	**1**	**1**	**1**	**3**		**2**		**2**	**3**

1: Slightly 2: Moderately 3: Substantially

Highway & Transportation Engg. Lab
Code: CE 691
Prerequisites: Highway & Transportation Engg and Engineering Materials

Course Outcomes: At the end of the course, the student will be aware of:

CO1. Different engineering property test on Highway aggregate materials like, Impact value, Abrasion value, Flakiness and Elongation Index etc

CO2. Different engineering property test on bituminous materials like, penetration value, softening point, flash & fire pointetc

CO3. Stripping value test of bituminous mix

CO4. Design of different bituminous mixes and Marshal Stability test

CO5. Concept of pavement design with CBR value test

CO6. Benkelman Beam test

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes → / **Course outcome ↓**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1			**3**			**1**	**2**		**2**		**1**	

CO 2			**3**			**1**	**2**		**2**		**1**	
CO 3			**3**			**1**	**2**		**2**		**1**	
CO 4	**2**	**1**	**3**			**1**	**2**		**2**		**2**	
CO 5	**2**	**1**	**3**	**1**		**1**	**2**		**2**		**2**	
CO 6			**3**			**1**	**2**		**2**		**1**	

1: Slightly 2: Moderately 3: Substantially

CAD Laboratory
Code: CE693
Contact: 3L(Total: 36L)
Credits: 3

Prerequisites: knowledge in Geometrical Drawing, Computer Operation, Basic Engineering Drawing and analysis and design of structure

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

CO1. Operate standard design and analysis software

CO2. Model, analyse and design different structure

CO3. Prepare detail drawing of different structural elements including ductile detailing

CO4. Design foundation of structure.

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes →	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**

Course outcome↓												
CO 1					3				1		2	
CO 2	2	2	3	1	3				2		2	
CO 3	1	1	3		3				1		2	
CO 4	2	2	3		3				2		2	

1: Slightly 2: Moderately 3: Substantially

Environmental Engineering
Code – CE 701
Contact – 3L
Credits- 3
Prerequisites: Chemistry and Engineering Hydrology.
Course Outcomes: At the end of the course, the student will be able to:
CO1-Plan water supply system for developing area
CO2-Analyze characteristics of water and wastewater
CO3- Estimate the quantity of drinking water and domestic wastewater generated
CO4- Design components of water supply systems
CO5- Design the various treatment plant in water supply system
CO6- Treat the drinking water using advanced techniques
CO7- Principles of design of water supply and drainage in buildings
CO8- Design sewerage system
CO9-Design the water distribution systems
CO1- Understand the importance of sanitation. They will also learn to estimate water demand using population forecasting methods.
CO2- Give layout of distribution system which is suitable for particular location.
CO3- Get the idea about whole water treatment process and will be able to design sedimentation tank and rapid sand filter.
CO4- Get the idea about different coagulants, disinfectant, iron removal, defluoridation, Reverse osmosis and hardness removing methods.
CO5- Get the idea about how to manage the solid waste in the society.
CO6- Give plumbing layout and improve the sanitation by providing modern plumbing systems with water efficient fixture.

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes →	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

Course outcome ↓												
CO 1			2	3								
CO 2	3	3	3				2					
CO 3	2	2				3	2					
CO 4	3	2		3	2		2	1				
CO 5	2		2	3				2				
CO 6			3	2							1	
CO 7	1		3	2								
CO8	3	2		3	2		2	1				
CO 9	1		3	2								

1: Slightly 2: Moderately 3: Substantially

WATER RESOURCE ENGINEERING
Code: CE702
Contact: 3L + 1T (PROPOSED) (Total: 36L + 12T)
Credits: 4

Prerequisites :

COURSE OUTCOME:

CO1: Demonstrated understanding of physical processes in the context of flood hydrology, including the hydrological cycle in general, and rainfall, loss and groundwater transport mechanisms in particular.

CO2: Demonstrated understanding of the methods that can be used to measure rainfall and flow, as well as their relative advantages and disadvantages.

CO3: Demonstrated ability to obtain design rainfall intensities and hyetographs.

CO4: Demonstrated ability to select appropriate methods of determining design flows and

hydrographs in urban and rural areas.

CO5: Demonstrated ability to solve engineering design problems in the context of flood hydrology and hydrogeology.

CO1- Collect data and calculate the demand of water for agricultural land.

CO2- Derive hydrographs and predict yield of catchment.

CO3- Apply their knowledge on ground water, well hydraulics toestimate safe yield.

CO4- Investigate and control level of sedimentation in reservoir.

CO5- Perform stability analysis and design various hydraulic structures.

CO6- Analyse and carry out design of water resource distribution system

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1					2	1	1				1	
CO 2						1	1				1	
CO 3					2	1	1				1	
CO 4					2	1	1				1	
CO 5						1	1				1	
CO 6					1	1	1				1	

1: Slightly 2: Moderately 3: Substantially

Sub: Advanced Foundation Engineering (CE 703A)
Code:
Contact: 3L
Credits: 3

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

CO1 Planning of soil exploration programme & preparation of soil investigation report

CO2 Design and analyze shallow and deep foundations

CO3 Able to design foundation for vibration control

CO4 Design and analyze retaining wall and sheet pile structures

CO5 Able to understand the problems of foundation on expansive soil.

CO1- Understand concept of stability of slope and study various method of evaluating stability of slope.

CO2- Understand lateral earth pressure theories and method to calculate active and passive earth pressure also able to check stability of retaining structure.

CO3- Calculate bearing capacity to design various footing such as square, rectangle etc.

CO4- Understand necessity of pile foundation and also able to design and calculate load on pile

CO5- Understand concept of underground conduit and estimation of strut load in braced cut.

CO6- Understand application of reinforced soil.

Mapping of Course outcomes with Program outcomes

Program	PO1 →	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

outcomes Course outcome	↓											
CO 1	3	1	-	3	2	-	-	-	-	-	-	-
CO 2	3	3	2	2	3	-	-	-	-	-	-	
CO 3	3	3	3	3	3	2	-	-	-	-	-	-
CO 4	3	3	3	3	-	-	-	-	-	-	-	-
CO 5	2	3	2	3	-	-	-	-	-	-	-	-

1: Slightly 2: Moderately 3: Substantially

Advanced Structural Analysis
Code: CE704A
Prerequisites: Physics, Mathematics I & II and Engineering Mechanics, Structural Analysis.

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

CO1 –Analyse the statically indeterminate structures

CO2-Do matrix analysis of structure with axial elements

CO3-Do matrix analysis of beams and grids

CO4-Do matrix analysis of planes and space frames

CO5- Familiar with the theory of elasticity

CO1- Understand stiffness matrix method.

CO2- Analyse various types of structures by conventional form ofstiffness method, Modified Moment Method, Kani's Method.

CO3- Understand Flexibility Method in Matrix form.

CO4- Analyse the indeterminate structure by conventional form of flexibility method.

CO5- Analyse the indeterminate structure by Approximate Methods.

CO6- Understand Influence line diagram for indeterminate structure & Plastic Analysis of Steel Structure.

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	**3**	**3**	**3**	**3**	**2**	**1**			**1**		**1**	**1**
CO 2	**3**	**3**	**3**	**3**	**3**	**1**			**1**		**1**	**1**
CO 3	**3**	**3**	**3**	**3**	**3**	**1**			**1**		**1**	**1**
CO 4	**3**	**3**	**3**	**3**	**3**	**1**			**1**		**1**	**1**
CO 5	**3**	**3**	**3**	**3**	**2**	**1**			**1**		**1**	**1**

1: Slightly 2: Moderately 3: Substantially

HYDRAULIC STRUCTURES
Code: CE704B
Contact: 3L + 1T (PROPOSED) (Total: 36L + 12T)
Credits: 4

Prerequisites : Fluid Mechanics, RCC Design of Structures

COURSE OUTCOMES:

At the end of the course, students would be able to

CO1 :Plan and design diversion head works.

CO2 :Design irrigation canal structures

CO3 :Analyze gravity and earth dams.

CO4: Design spillways and energy dissipations works.

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2		3	1			1				
CO 2	2	2		3	1			1		2		3
CO 3	3	1	1	3				1				
CO 4	2	2		3								
CO 5												
CO 6												

1: Slightly 2: Moderately 3: Substantially

Engineering Materials
Code: CE 705A
Prerequisites: Physics, Mathematics

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

CO1. Understand the different between metal and non-metal.

CO2. Understand the relationship between the phase diagrams and properties of alloys.

CO3. Know about the crystal structures of material.

CO4. Understand the iron-carbon diagram.

CO5. Understand the defects of materials.

CO6. Understand the methods for measurement of grain size.

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1	-	-	-	-	-	-	-	-	-	-
CO 2	2	1	-	-	1	1	-	-	-	-	-	-
CO 3	3	2	1	-	-	2	-	-	-	-	-	-
CO 4	3	3	1	1	-	1	-	-	-	-	-	-
CO 5	3	3	1	2	1	-	-	-	-	-	-	-
CO 6	3	3	2	2	1	1	-	-	-	-	-	-

1: Slightly 2: Moderately 3: Substantially

Prerequisites :Designing and detailing of R.C.C Structures & Steel Structures , Foundation Engineering

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

CO1: Understand basic concept of structure both R.C.C and Steel Structures and various parts thereof.
CO2: Analysis of different members including foundation
CO3: Design all members of the structure
CO4: Submit detailing of structures

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3	2					3			
CO 2	3	3	3	2	3	3		3	3		2	3
CO 3	3	3	3	2	3	3	2	3	3		2	3
CO 4	3	3	3	2	1	3	3	3	3	1	3	3

1: Slightly 2: Moderately 3: Substantially

ENVIRONMENTAL ENGINEERING LAB
CODE: CE-791
CRDIT-2
Prerequisites: Environmental Engineering

COURSE OUTCOMES:-
At the end of the course, the student is expected to be aware of
CO01: The procedure for quantifying quality parameters for water and waste water
CO02: Have a fundamental knowledge to conduct various quality tests on water and wastewater
CO03: Have a well-founded knowledge to assess the suitability of water for drinking and irrigation purpose.
CO04: Acquire skills in assessing the suitability of water for concreting works

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1						3	3					
CO 2	1	3	2		1	3	3					
CO 3		3	2			3	3				1	
CO 4		3	2			2	3				1	

1: Slightly 2: Moderately 3: Substantially

CIVIL ENGINEERING PRACTICE SESSIONAL
CODE: CE-792
CRDIT-2
Prerequisites: Knowledge in Geo Technical Engineering, Water Resource Engineering, Environmental Engineering and Transportation Engineering

COURSE OUTCOMES:-
At the end of the course, the student is expected to be able to
CO01: Understand and prepare Geotechnical reports, design and detailing of various types foundations.
CO02: Understand basics of soil hydrology,
CO03: Understand and prepare Population forecasting, Analysis and design of water distribution network, Hydraulic design of sewer
CO04: Understand basic knowledge of geometric design of highway and Design flexible and rigid pavement, Traffic Signal.

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3	2	1	3	3		2		3	2
CO 2	3	3	3	2	1	3	3		2		3	2
CO 3	3	3	3	2	1	3	3		2		3	2
CO 4	3	3	3	2	1	3	3		2		3	2

1: Slightly 2: Moderately 3: Substantially

FINITE ELEMENT ANALYSIS

Code: CE802A
Pre-requisites: Mathematical Methods.

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

CO1 -Understand the fundamental concepts of the Finite Element Method (FEM).

CO2-Develop global stiffness matrices and global load vectors,Develop shape functions for spring and bar elements.

CO3-Apply Natural and Arial coordinate systems to Constant Strain Triangle and Linear Strain Triangle elements

CO4 -Analyze planar structural systems using finite element modellingand solve typical Civil Engg. Problems using FEM

CO5-Apply the basic properties, behaviour and usage of different types of finite elements and understand the application of FEM in Software

Mapping of Course outcomes with Program outcomes

Program outcomes → / **Course outcome ↓**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	**3**	**1**			**1**	**1**			**1**			**1**
CO 2	**3**	**3**			**2**	**1**			**1**			**2**
CO 3	**3**	**3**			**2**	**1**			**2**			**3**
CO 4	**3**	**3**	**2**	**3**	**3**	**1**			**2**		**2**	**3**
CO 5	**3**	**3**	**2**	**3**	**3**	**1**			**2**		**2**	**3**

1: Slightly 2: Moderately 3: Substantially

PAVEMENT DESIGN
Code: CE802D
Contact: 3L + 1T (PROPOSED) (Total: 36L + 12T)
Credits: 4

Prerequisites : Highway Engineering

COURSE OUTCOMES:

CO 1: Introduce students to the basic types and behavior of highway materials.

CO 2. Expose students to the general aspects of pavement structural design, flexible or rigid.

CO 3. Expose students to the analysis concepts and procedures for stresses, strains and deflection in pavements.

CO 4. Introduce students to commercially available software in the area of pavement structural design.

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2								1			
CO 2											2	
CO 3											2	
CO 4									2			
CO 5												
CO 6												

1: Slightly 2: Moderately 3: Substantially

Project Part II
CODE: CE-881
Prerequisites :Designing and detailing of R.C.C Structures & Steel Structures , Foundation Engineering

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

CO1: Understand basic concept of structure both R.C.C and Steel Structures and various parts thereof.
CO2: Analysis of different members including foundation
CO3: Design all members of the structure
CO4: Submit detailing of structures

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3	2					3			
CO 2	3	3	3	2	3	3		3	3		2	3
CO 3	3	3	3	2	3	3	2	3	3		2	3
CO 4	3	3	3	2	1	3	3	3	3	1	3	3

1: Slightly 2: Moderately 3: Substantially

Structural Engineering Design Practice
Code: CE891
Contact: 6P
Credits: 4

Prerequisites: Design of RC structure, Design of steel structure

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

CO1. Design of water tank

CO2. Design of pipes, silos and chimneys

CO3. Design of Aqueducts and Box Culverts, Concrete Bridges

CO4. Design of Plate girder and steel bridge

CO5. Design of roof truss

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3	2			1		2		2	
CO 2	3	3	3	2			1		2		2	
CO 3	3	3	3	2			1		2		2	
CO 4	3	3	3	2			1		2		2	
CO 5	3	3	3	2	2		1		2		2	

1: Slightly 2: Moderately 3: Substantially

Engineering Mechanics
Code: CE (ES) 301
Prerequisites: Physics, Mathematics

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

CO1. Determine the nature of forces and its final effects and also understand the effect of friction force

CO2. Understand the basic principles of structural analysis

CO3. Understand the basic concept of centre of gravity

CO4. Understand the principle of virtual work and energy method

CO5. Understand the basic concept of particle dynamics and kinetics of rigid body

CO6. Solve simple problems of mechanical vibration

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	1							1			
CO 2	3	1	1	1					2			
CO 3	3	1							1			
CO 4	3	1	1						1			
CO 5	3	1	1	1					1			
CO 6	3	1	1	1	1				2			

1: Slightly 2: Moderately 3: Substantially

Introduction to Civil Engineering
Code: CE(HS)302
Prerequisites: Basic Science knowledge

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

CO1. Understand basic disciplines of civil engineering, History of civil engineering and ancient monuments and the concept of national planning for construction and infrastructure development.

CO2. Understand the fundamentals of architecture & town planning, fundamentals of building materials and construction management.

CO3. Understand the fundamentals of environmental engineering and sustainability.

CO4. Understand the basic concepts of Geotechnical, hydraulics, water resource and ocean engineering.

CO5. Understand the fundamentals of Power plant structure, structural engineering, surveying and traffic & transportation engineering.

CO6. Understand the fundamentals of repairs and rehabilitation of structures.

CO7. Understand the basic principles of computational method, IT, IOT in civil engineering.

CO8. Understand the application of civil engineering knowledge in industry, basics of professionalism

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes → **Course outcome ↓**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**

CO 1	**1**											
CO 2	**2**						**1**				**2**	
CO 3	**2**	**1**					**2**					
CO 4	**2**	**1**					**1**					
CO 5	**2**	**1**	**1**									
CO 6	**2**											
CO 7	**2**	**1**			**1**							
CO 8	**1**							**3**			**2**	

1: Slightly 2: Moderately 3: Substantially

STRUCTURAL DYNAMICS &Erthquake engineering
Code: CE604C
Contact: 3L (Total: 36L) +1T(Proposed)
Credits: 3

Prerequisites: Physics, Mathematical Methods and Engineering Mechanics, Structural Analysis

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

CO1 Analyse single degree of freedom systems without damping and with damping

CO2 Analyse multi degree freedom system and continuous systems using iterative techniques.

CO3 Evaluate dynamic response using numerical methods

CO4 Draw mode shapes and determine coefficients

CO5 Apply seismic coefficient and response spectrum methods for analysis of multi storied buildings CO6 Apply concepts of ductility in the design of multi-storeyed structures

CO7 Understand the concepts of base isolation

Mapping of Course outcomes with Program outcomes

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2		2			1	1				
CO 2	2	2		2			1	1				
CO 3	1	2	1	2				1				
CO 4		2	1				1	1				
CO 5	2	2		2			1	1				
CO6	2	2		2			1	1				
CO7		2	1				1	1				

1: Slightly 2: Moderately 3: Substantially

ENVIRONMENT AIRPOLLUTION AND CONTROL
Code: CE801A
Contact: 3L (Total: 36L) +1T(Proposed)
Credits: 3

Prerequisites: Environmental Science

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

CO1: To learn about the air pollutants, sources and its effects.

CO2: To have a clear understanding on the air quality standards and its techniques.

CO3: To determine the fluid resistance for organic materials.

CO4: To find the Properties of air pollution and its control measures.

CO5: To learn about the effects and the sources of noise pollution constructions

CO1- Determine quantity of waste water and also design the sewer line for a population of particular city

CO2- Analyse waste water sample and suggest a suitable solution to remove the impurities from water.

CO3- Get the idea about working and design of secondary treatment units and sludge disposal standards.

CO4- Get the idea about advanced water treatment used for removal of nutrients from waste water and how to calculate oxygen deficit.

CO5- Give plumbing layout and improve the sanitation by providing modern plumbing systems with water efficient fixtures.

CO6- Students shall be able to carry out analysis of air quality and understand how it affects human health. They will also learn about pollution controlling measures .

<u>Mapping of Course outcomes with Program outcomes</u>

Program outcomes → / Course outcome ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	1				2	3					
CO 2			3						1			2

CO 3		**2**		**3**			**3**		**3**			
CO 4	**3**							**2**	**2**			
CO 5				**3**					**3**			

1: Slightly 2: Moderately 3: Substantially