

**Department of civil Engineering**

<b>Program Outcomes (PO)</b>	<b>STATEMENT</b>
PO1	Apply the knowledge of mathematics, science, engineering fundamentals, and Civil Engineering
PO2	Identify, formulate, research literature, and analyze complex Civil Engineering problems reaching substantiated conclusions.
PO3	Design solutions of Civil Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural and environmental considerations.
PO4	Research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions related to Civil Engineering problems.
PO5	Create, select, and apply appropriate techniques, resources, and modern engineering tools such as E-Tab, STAAD Pro, CAD, FEM and GIS including prediction and modeling to Civil Engineering activities with an understanding of the limitations.
PO6	Understand the impact of the professional Civil Engineering solutions in social and environmental contexts, and demonstrate the knowledge and need for sustainable development.
PO7	Ethical principles, Professional ethics and responsibilities and norms of the Civil Engineering practice.
PO8	Effectively function as an individual, and as a member or leader in diverse teams.
PO9	Communicate effectively on Civil Engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO10	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage Civil Engineering projects and in multidisciplinary environments.
PO11	Have need to preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**Building Technology and Materials**

**Course Objectives:**

- 1) To enumerate different types of structure and their requirement as building components.
- 2) To describe all basic activities of construction from foundation to finishing.
- 3) To study different types of materials used in construction for civil engineering projects.

**Course Outcomes:**

On completion of the course, learner will be able to:

- 1) Identify types of building and basic requirements of building components.
- 2) Explain types of masonry, formwork, casting procedure and necessity of underpinning and scaffolding.
- 3) Elucidate different types of flooring and roofing materials.
- 4) Describe types of doors, windows, arches and lintel.
- 5) Illuminate means of vertical circulation and protective coatings.
- 6) Explain different materials especially eco-friendly materials and safety measures to be adopted at any construction site.

C0	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1											
CO2							√	√			
CO3											
CO4											
CO5					√						
CO6			√			√					





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### **Strength of Materials**

#### **Course Objectives:**

- 1) To study the different types of stresses due to load, temperature, etc.
- 2) To learn concept of Shear Force and Bending Moment Diagram for determinate beams.

#### **Course Outcomes:**

On completion of the course, learner will be able to

- 1) Compute different type of stresses in determinate, indeterminate, homogeneous and composite structures.
- 2) Develop bending and shear stress diagram.
- 3) Determine the torsional stresses and stresses due to strain energy for different loading conditions.
- 4) Explain the concept of principal stresses due to combined loading and able to compare the values of analytical and graphical (Mohr's circle) method.
- 5) Plot loading diagram, Shear Force Diagram (SFD) and Bending Moment Diagram (BMD).
- 6) Analyze axially and eccentrically loaded column.

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	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>
<b>CO1</b>	✓	✓			✓		✓		✓		✓
<b>CO2</b>	✓	✓		✓						✓	
<b>CO3</b>	✓	✓			✓		✓		✓	✓	
<b>CO4</b>	✓	✓			✓		✓		✓	✓	✓
<b>CO5</b>	✓	✓		✓	✓			✓		✓	
<b>CO6</b>	✓	✓		✓			✓	✓		✓	✓



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### **Fluid Mechanics-I**

#### **Course Objectives:**

- 1) To study basics of Fluid Mechanics, Fluid properties and concept of submerged & floating structure in a static fluid.
- 2) To make use of principles of continuity, momentum, and energy as applied to fluid motions.
- 3) To apply fundamental principles of fluid mechanics for the solution of practical civil engineering problems.

#### **Course Outcomes:**

On completion of the course, learners will be able to:

- 1) Use fluid properties, dimensional analysis for solving problems of fluid flow.
- 2) Solve fluid statics problems.
- 3) Measure fluid pressure.
- 4) Calibrate discharge measuring instrument like venturimeter, orifice meter.
- 5) Distinguish between various types of fluid flows and find the fluid velocity using principles of Kinematics and Dynamics.
- 6) Design pipes to carry particular amount of discharge.

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	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>
<b>CO1</b>	✓	✓			✓		✓		✓		
<b>CO2</b>	✓	✓		✓		✓		✓		✓	
<b>CO3</b>	✓	✓			✓		✓		✓	✓	
<b>CO4</b>	✓	✓			✓		✓		✓	✓	✓
<b>CO5</b>	✓	✓		✓		✓		✓		✓	
<b>CO6</b>	✓	✓	✓	✓		✓		✓		✓	

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### **Architectural Planning and Design of Buildings**

#### **Course Objectives:**

- 1) To understand necessity of Town planning, principles of planning, principles of architecture and byelaws.
- 2) To study the planning for building services such as noise and acoustics, ventilation, lighting, plumbing work and safety practices.
- 3) To develop the plan, elevation and section of load bearing and framed structures.

#### **Course Outcomes:**

On completion of the course, learner will be able to:

- 1) Make use of principles of planning and principles of architectural Planning.
- 2) Analyze the available primary or secondary data and plan different types of structures considering futuristic need of an area.
- 3) Improve the status of existing structures by proposing appropriate green measures.
- 4) Plan effectively various types of buildings according to their utility with reference to different codes.
- 5) Understand and resolve contemporary issues at multi-dimensional functional levels.

C0	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1			√		√	√		√	√	√	
CO2		√				√			√	√	
CO3			√				√	√		√	√
CO4			√	√	√			√	√		
CO5		√				√		√	√	√	



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### **Structural Analysis I**

#### **Course Objectives:**

- 1) To understand the basics configuration and classification of structures.
- 2) To analyze the determinate and indeterminate structures.

#### **Course Outcomes:**

On completion of the course, learner will be able to:

- 1) Understand the basic concept of static and kinematic indeterminacy, slope and deflection of determinate and indeterminate beams for analysis of structures.
- 2) Analyze indeterminate beams structures and frames.
- 3) Evaluate determinate and indeterminate trusses and its application in the field.
- 4) Apply influence line diagrams for the analysis of structures under moving load.
- 5) Analyze two and three hinged arches and its application.
- 6) Apply plastic analysis for indeterminate steel structures by limits state method.

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CO1	√	√		√	√						
CO2	√	√		√	√						
CO3	√	√	√	√	√	√					
CO4		√	√	√	√						
CO5	√	√	√		√	√					
	√	√		√	√						√



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### Engineering Geology

#### Course Objectives:

1. To study basic of engineering geology and introductory part of the earth science.
2. To understand the utility and application of geological principles in various phases of civil engineering activities.
3. To describe the sources, and characterization of common Building materials.
4. To learn the basic aspects occur due to structural features like folds and faults.
5. To explain various natural hazards and their implications on structures and effects on society.

#### Course Outcomes:

1. Explain the basic concepts of engineering geology.
2. Differentiate between the different rock types, their inherent characteristics and their application in civil engineering.
3. Understand physical properties, mechanical properties of the minerals and their application in civil engineering. .
4. Identify favourable and unfavourable conditions for the buildings, roads, dam, tunneling etc through the rocks.
5. Explain mass wasting processes, effects of mass wasting process on the civil engineering structures and remedial measures.
6. Interpret geo hydrological characters of the rocks present at the foundations of the dams, percolation tanks, tunnels.
7. Understand Seismic activities and its effect on the civil engineering construction.
8. Identify geological hazards and presence of ground water.

C0	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	√							√	√		
CO2							√				
CO3						√					
CO4				√						√	
CO5			√				√				
CO6			√		√						
CO7	√	√			√	√					
CO8		√				√					

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### Concrete Technology

#### Course Objectives:

- 1) To know properties of various ingredients of concrete and concept of mix design.
- 2) To learn the behavior of concrete at its fresh and hardened state.
- 3) To understand special concrete and their application.
- 4) To explain deterioration of concrete and study methods of repair.

#### Course Outcomes:

On completion of the course, learner will be able to:

- 1) Understand chemistry, properties, and classification of cement, fly ash, aggregates and admixtures, and hydration of cement in concrete.
- 2) Prepare and test the fresh concrete
- 3) Test hardened concrete with destructive and nondestructive testing instruments
- 4) Get acquainted to concrete handling equipments and different special concrete types.
- 5) Design concrete mix of desired grade
- 6) Predict deteriorations in concrete and repair it with appropriate methods and techniques.

C0	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1											
CO2			√						√		√
CO3			√						√		√
CO4			√						√		
CO5	√	√		√	√				√		
CO6			√						√	√	



**Course Names :** Engineering Mathematics III

**Subject Code :** 207001

**Course Outcomes (COs)**

<b>CO-1</b>	Solve higher order linear differential equations and apply to civil engineering problems such as bending of beams and whirling of shafts.
<b>CO-2</b>	Solve system of linear equations using direct and iterative numerical techniques and develop solutions to ordinary differential equations using single step and multistep methods applied to structural systems.
<b>CO-3</b>	Apply statistical methods like correlation, regression analysis in analyzing and interpreting experimental data and probability theory applied to construction management.
<b>CO-4</b>	Perform vector differentiation and integration, analyze the vector fields and apply to fluid flow problems.
<b>CO-5</b>	Solve various partial differential equations such as wave equation, one and two dimensional heat flow equations.

**Mapping of course outcomes (COs) with program outcomes (POs)**

<b>Programme Objectives</b>	<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>
<b>I</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>		<b>X</b>	
<b>II</b>	<b>X</b>		<b>X</b>	<b>X</b>							<b>X</b>
<b>III</b>	<b>X</b>	<b>X</b>									
<b>IV</b>	<b>X</b>			<b>X</b>							
<b>V</b>	<b>X</b>			<b>X</b>	<b>X</b>	<b>X</b>			<b>X</b>		<b>X</b>

S.E. (Civil Engineering) 2015 Course  
207001: Engineering Mathematics III  
Course Outcomes:

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- 2) Solve system of linear equations using direct and iterative numerical techniques and develop solutions to ordinary differential equations using single step and multistep methods applied to structural systems.
- 3) Apply statistical methods like correlation, regression analysis in analyzing and interpreting experimental data and probability theory applied to construction management.
- 4) Perform vector differentiation and integration, analyze the vector fields and apply to fluid flow problems.
- 5) Solve various partial differential equations such as wave equation, one and two dimensional heat flow equations.

**Programme Outcomes**

- a) Graduates will demonstrate basic knowledge in mathematics, science and engineering
- b) Graduates will demonstrate the ability to design and conduct experiments in various branches of Civil Engineering and report results.

- (c) Graduates will demonstrate the ability to analyze and design various Civil Engineering Structures .
- (d) Graduates will demonstrate skills to use modern engineering tools , software's and equipments to analyze problems.
- (e) Graduates will demonstrate the ability to identify, formulate and solve Civil engineering problems.
- (f) Graduates will demonstrate an understanding of their professional and ethical responsibilities.
- (g) Graduates will be able to communicate effectively in both verbal and written forms.
- (h) Graduates will have the confidence to apply engineering solutions in global and societal contexts.
- (i) Graduates should be capable of self-education and clearly understand the value of lifelong learning.
- (j) Graduates will be broadly educated and will have an understanding of the impact of engineering on society and demonstrate awareness of contemporary issues.
- (k) Graduates who can participate and succeed in competitive examinations .