

**J.P. COLLEGE OF ENGINEERING**  
**DEPARTMENT OF CIVIL ENGINEERING**  
**COURSE OUTCOME**

**Regulation : 2021**

S. No	Sem	Course Code	Course Name	Course Outcome	
1	I Sem	HS3152	Professional English - I	To use appropriate words in a professional context	
				To gain understanding of basic grammatical structures and use them in right context.	
				To read and infer the denotative and connotative meanings of technical texts	
				To read and interpret information presented in tables, charts and other graphic forms	
2		MA3151	Matrices and Calculas		To write definitions, descriptions, narrations and essays on various topics
					Use the matrix algebra methods for solving practical problems.
					Apply differential calculus tools in solving various application problems.
					Able to use differential calculus ideas on several variable functions.
3		PH3151	Engineering Physics		Apply different methods of integration in solving practical problems.
					Apply multiple integral ideas in solving areas, volumes and other practical problems.
					Understand the importance of mechanics.
					Express their knowledge in electromagnetic waves.
4		CY3151	Engineering Chemistry		Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
					Understand the importance of quantum physics.
					Comprehend and apply quantum mechanical principles towards the formation of energy bands
					To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.
5	GE3151	Problem Solving and Python Programming		To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	
				To apply the knowledge of phase rule and composites for material selection requirements.	
				To recommend suitable fuels for engineering processes and applications.	
				To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	
				Develop algorithmic solutions to simple computational problems.	
				Develop and execute simple Python programs.	
				Write simple Python programs using conditionals and looping for solving problems.	
				Decompose a Python program into functions.	
				Represent compound data using Python lists, tuples, dictionaries etc.	

			Read and write data from/to files in Python programs.
6		GE3152	Heritage of Tamils NIL
7	II Sem	HS3252	Professional English - II To compare and contrast products and ideas in technical texts. To identify and report cause and effects in events, industrial processes through technical texts To analyse problems in order to arrive at feasible solutions and communicate them in the written format. To present their ideas and opinions in a planned and logical manner To draft effective resumes in the context of job search.
8		MA3251	Statistics and Numerical Methods Apply the concept of testing of hypothesis for small and large samples in real life problems. Apply the basic concepts of classifications of design of experiments in the field of agriculture. Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems. Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations. Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
9		PH3201	Physics for Civil Engineering acquire knowledge about heat transfer through different materials, thermal performance of building and thermal insulation. gain knowledge on the ventilation and air conditioning of buildings understand the concepts of sound absorption, noise insulation and lighting designs now about the processing and applications of composites, metallic glasses, shape memory alloys and ceramics get an awareness on natural disasters such as earth quake, cyclone, fire and safety measures
10		BE3252	Basic Electrical and Electronics and Instrumentation Engineering Compute the electric circuit parameters for simple problems Explain the concepts of domestic wiring and protective devices Explain the working principle and applications of electrical machines Analyze the characteristics of analog electronic devices Explain the types and operating principles of sensors and transducers
11		GE3251	Engineering Graphics Use BIS conventions and specifications for engineering drawing. Construct the conic curves, involutes and cycloid. Solve practical problems involving projection of lines. Draw the orthographic, isometric and perspective projections of simple solids. Draw the development of simple solids.

12		GE3252	Tamils and Technology	NIL
13	III Sem	MA3351	Transforms and Partial Differential Equations	Understand how to solve the given standard partial differential equations.
				Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
				Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
				Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
				Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
14		ME3351	Engineering Mechanics	Illustrate the vectorial and scalar representation of forces and moments
				Analyse the rigid body in equilibrium
	Evaluate the properties of distributed forces			
	Determine the friction and the effects by the laws of friction			
			Calculate dynamic forces exerted in rigid body	
15	CE3301	Fluid Mechanics	Demonstrate the difference between solid and fluid, its properties and behaviour in static conditions.	
			Apply the conservation laws applicable to fluids and its application through fluid kinematics and dynamics.	
			Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies.	
			Estimate the losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel.	
			Explain the concept of boundary layer and its application to find the drag force exerted by the fluid on the flat solid surface.	
16	CE3302	Construction Materials and Technology	Identify the good quality brick, stone and blocks for construction.	
			Recognize the market forms of timber, steel, aluminum and applications of various composite materials.	
			Identify the best construction and service practices such as thermal insulations and air conditioning of the building	
			Select various equipments for construction works conditioning of building	
			Understand the construction planning and scheduling techniques	
			Understand the various components of water supply scheme and design of intake structure and conveyance system for water transmission	

17	CE3303	Water Supply and Wastewater Engineering	Understand on the characteristics and composition of sewage, ability to estimate sewage generation and design sewer system including sewage pumping stations
			Understand the process of conventional treatment and design of water and wastewater treatment system and gain knowledge of selection of treatment process and biological treatment process
			Ability to design and evaluate water distribution system and water supply in buildings and understand the self-purification of streams and sludge and septage disposal methods.
			Able to understand and design the various advanced treatment system and knowledge about the recent advances in water and wastewater treatment process and reuse of sewage
18	CE3351	Surveying and Levelling	Introduce the rudiments of various surveying and its principles.
			Imparts knowledge in computation of levels of terrain and ground features
			Imparts concepts of Theodolite Surveying for complex surveying operations
			Understand the procedure for establishing horizontal and vertical control
			Imparts the knowledge on modern surveying instruments
19	CE3401	Applied Hydraulics Engineering	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
			Analyse steady gradually varied flow, water surface profiles and its length calculation using direct and standard step methods with change in water surface profiles due to change in grades.
			Derive 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.
			Design turbines and explain the working principle
			Differentiate pumps and explain the working principle with characteristic curves and design centrifugal and reciprocating pumps.
20	CE3402	Strength of Materials	Understand the concepts of stress and strain, principal stresses and principal planes.
			Determine Shear force and bending moment in beams and understand concept of theory of simple bending.
			Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.
			Analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements.
			Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and study the various theories of failure
21	CE3403	Concrete Technology	Understand the requirements of cement, aggregates and water for concrete
			Select suitable admixtures for enhancing the properties of concrete
			Design concrete mixes as per IS method of mix design
			Determine the properties of concrete at fresh and hardened state.
			Know the importance of special concretes for specific requirements.

22	IV Sem	CE3404	Soil Mechanics	Demonstrate an ability to identify various types of soils and its properties, formulate and solve engineering Problems
				Show the basic understanding of flow through soil medium and its impact of engineering solution
				Understand the basic concept of stress distribution in loaded soil medium and soil settlement due to consolidation
				Show the understanding of shear strength of soils and its impact of engineering solutions to the loaded soil medium and also will be aware of contemporary issues on shear strength of soils.
				Demonstrate an ability to design both finite and infinite slopes, component and process as per needs and specifications.
23		CE3405	Highway and Railway Engineering	Plan a highway according to the principles and standards adopted in various institutions in India.
				Design the geometric features of road network and components of pavement.
				Test the highway materials and construction practice methods and know its properties and able to perform pavement evaluation and management.
				Understand the methods of route alignment and design elements in railway planning and constructions.
24		GE3451	Environmental Sciences and Sustainability	Understand the construction techniques and maintenance of track laying and railway stations
				To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.
				To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
				To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
				To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
25		CE3501	Design of Reinforced Concrete Structural Elements	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.
				Know the various design concepts and design RC rectangular beams by working stress and limit state methods
				Understand the design of flanged beams, design for shear and torsion, and anchorage and development length.
				Design a RC slabs and staircase and draw the reinforcement detailing.
				Design short columns for axial, uni-axial and bi-axial eccentric loadings
26		CE3502	Structural Analysis I	Design wall footings, isolated footings and combined rectangular footing.
				Analyze the pin-jointed plane and space frames.
				Analyse the continuous beams and rigid frames by slope deflection method.
				Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.

26	V Sem	CE3502	Structural Analysis I	Analyse the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method. Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames
27		CE3503	Foundation Engineering	Graduate will demonstrate an ability to plan and execute a detailed site investigation to select geotechnical design parameters and type of foundation Graduate will demonstrate an ability to design shallow foundations, its component or process as per the needs and specifications. Graduate will demonstrate an ability to design combined footings and raft foundations, its component or process as per the needs and specifications. Graduate will demonstrate an ability to design deep foundations, its component or process as per the needs and specifications. . Graduate will demonstrate an ability to design retaining walls, its component or process as per the needs and specifications
28	VI Sem	CE3601	Design of Steel Structural Elements	Recognize the design philosophy of steel structures and identify the different failure modes of bolted and welded connections, and determine their design strengths Select the most suitable section shape and size for tension and compression members and beams according to specific design criteria Apply the principles, procedures and current code requirements to the analysis and design of steel tension members, columns, column bases and beams Identify and compute the design loads on Industrial structures, and gantry girder Find out ultimate load of steel beams and portal frames using plastic analysis
29		CE3602	Structural Analysis II	Draw influence lines for statically determinate structures and calculate critical stress resultants. Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams. Analyse three hinged, two hinged and fixed arches. Analyse the suspension bridges with stiffening girders Analyse the rigid frames by approximate methods for gravity and horizontal loads.
30		AG3601	Engineering Geology	Knowing the internal structure of earth and its relation to earthquakes. Landforms created by various geological agents and their importance in civil engineering. Getting knowledge on various minerals and rocks that can be used as construction materials and road aggregates. In addition, testing the suitability of rocks for foundation purposes. Studying various geological structures and their impact in engineering constructions. Further, learning the geomechanical properties of rocks and their significance in engineering projects. Gaining knowledge on the role of geological mapping, remote sensing and geophysics for surface and subsurface investigations. In addition, students will also gain knowledge on borehole logging techniques and their applications in civil engineering.

Applying geological knowledge for designing and constructing major civil engineering structures, and also mitigating various geological hazards such as earthquakes, landslides and tsunamis.

### Professional Elective Subjects - Regulation : 2021

S. No	Sem	Course Code	Course Name	Course Outcome
31	V Sem	CE3005	Rehabilitation / Heritage Restoration	Know the importance of inspection and maintenance.
				Study the Impacts of cracks, corrosion and climate on structures.
				Know about various special concretes
				Understand the testing techniques and various protection measures
32	V Sem	CE3013	Advanced Construction Techniques	Know the Repair of structures and Restoration of Heritage structures
				Understand the modern construction techniques used in the sub structure construction.
				Demonstrate knowledge and understanding of the principles and concepts relevant to super structure construction for buildings
				Understand the concepts used in the construction of special structures
33	V Sem	CE3009	Construction Equipment and Machinery	Knowledge on Various strengthening and repair methods for different cases.
				Identify the suitable demolition technique for demolishing a building.
				Develop knowledge on planning of equipment and selection of equipment
				Explain the knowledge on fundamentals of earth work operations, earth moving operations and types of earth work equipment
34	VI Sem	CE3025	Airports and Harbours	Develop the knowledge on special construction equipment
				Apply the knowledge on asphalt and concrete plants
				Apply the knowledge and select the proper materials handling equipment
				Gain an insight on the planning and site selection of Airport Planning and design.
35	VI Sem	CE3011	Digitalized Construction Lab	Knowledge on Design of various Airport components
				Analyze and design the elements for orientation of runways and passenger facility systems.
				Understand the various features in Harbours and Ports, their construction, coastal protection works
				Knowledge on various Environmental Regulations and Acts
				To understand the importance of latest softwares in a construction industry.
				To plan a construction project using Primavera
				To plan a construction project using MS project
				To develop a BIM information model
				To analyse the bid management and its effectiveness using bid management software

### Open Elective Subjects - Regulation : 2021

S. No	Sem	Course Code	Course Name	Course Outcome
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36	VI Sem	OCS353	Data Science Fundamentals	Gain knowledge on data science process.
				Perform data manipulation functions using Numpy and Pandas.
				Understand different types of machine learning approaches.
				Perform data visualization using tools.
				Handle large volumes of data in practical scenarios.

### Mandatory Course Subjects - Regulation : 2021

S. No	Sem	Course Code	Course Name	Course Outcome
37	V Sem	MX3084	Disaster Risk Reduction Management	To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)
				To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction
				To develop disaster response skills by adopting relevant tools and technology
				Enhance awareness of institutional processes for Disaster response in the country and
				Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity
38	VI Sem	MX3089	Industrial Safety	Understand the basic concept of safety.
				Obtain knowledge of Statutory Regulations and standards.
				Know about the safety Activities of the Working Place.
				Analyze on the impact of Occupational Exposures and their Remedies
				Obtain knowledge of Risk Assessment Techniques.