

**DEPARTMENT OF
CIVIL ENGINEERING**

2021 REGULATION

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PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	Gain knowledge and skills in Civil engineering which will enable them to have a career and professional accomplishment in the public or private sector organizations.
PEO 2	Become consultants on complex real life Civil Engineering problems related to Infrastructure development especially housing, construction, water supply, sewerage, transport, spatial planning.
PEO 3	Become entrepreneurs and develop processes and technologies to meet desired infrastructure needs of society and formulate solutions that are technically sound, Economically feasible, and socially acceptable.
PEO 4	Perform investigation for solving Civil Engineering problems by conducting research using modern equipment and software tools.
PEO 5	Function in multi-disciplinary teams and advocate policies, systems, processes and equipment to support civil engineering

PROGRAM OUTCOMES (POs)

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of Mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex 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, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex 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
PO11	Project management and finance: 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 projects and in multidisciplinary environments.
PO12	Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PROGRAM SPECIFIC OUTCOMES (PSOs)

The students will demonstrate the abilities	
PSO1	Knowledge of Civil Engineering discipline Demonstrate in-depth knowledge of Civil Engineering discipline, with an ability to evaluate, analyze and synthesize existing and new knowledge.
PSO2	Critical analysis of Civil Engineering problems and innovation Critically analyze complex Civil Engineering problems, apply independent judgment for synthesizing information and make innovative advances in a theoretical, practical and policy context.
PSO3	Conceptualization and evaluation of engineering solutions to Civil Engineering Issues Conceptualize and solve Civil Engineering problems, evaluate potential solutions and arrive at technically feasible, economically viable and environmentally sound solutions with due consideration of health, safety, and socio cultural factors

LIST OF COURSES

REGULATION 2021

CIVIL ENGINEERING		
SEMESTER I		
S. NO.	COURSE CODE	COURSE TITLE
1	IP3151	Induction Programme
THEORY		
2	HS3152	Professional English - I
3	MA3151	Matrices and Calculus
4	PH3151	Engineering Physics
5	CY3151	Engineering Chemistry
6	GE3151	Problem Solving and Python Programming
7	GE3152	Heritage of Tamils
PRACTICALS		
8	GE3171	Problem Solving and Python Programming Laboratory
9	BS3171	Physics and Chemistry Laboratory
10	GE3172	English Laboratory
SEMESTER II		
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	HS3252	Professional English - II
2	MA3251	Statistics and Numerical Methods
3	PH3201	Physics for Civil Engineering
4	BE3252	Basic Electrical, Electronics and Instrumentation Engineering
5	GE3251	Engineering Graphics
6	GE3252	Tamils and Technology
7	NCC Credit Course Level 1 [#]	
PRACTICALS		
8	GE3271	Engineering Practices Laboratory
9	BE3272	Basic Electrical, Electronics and Instrumentation Engineering Laboratory
10	GE3272	Communication Laboratory / Foreign Language
SEMESTER III		
S. NO.	COURSECODE	COURSE TITLE
THEORY		
1	MA3351	Transforms and Partial Differential Equations
2	ME3351	Engineering Mechanics
3	CE3301	Fluid Mechanics
4	CE3302	Construction Materials and Technology
5	CE3303	Water Supply and Wastewater Engineering

PRACTICALS		
6	CE3361	Surveying and Leveling Laboratory
7	CE3311	Water and Wastewater Analysis Laboratory
8	GE3361	Professional Development
SEMESTER IV		
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	CE3401	Applied Hydraulics Engineering
2	CE3402	Strength of Materials
3	CE3403	Concrete Technology
4	CE3404	Soil Mechanics
5	CE3405	Highway and Railway Engineering
6	GE3451	Environmental Sciences and Sustainability
7		NCC Credit Course Level 2 [#]
PRACTICALS		
8	CE3411	Hydraulic Engineering Laboratory
9	CE3412	Materials Testing Laboratory
10	CE3413	Soil Mechanics Laboratory
SEMESTER V		
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	CE3501	Design of Reinforced Concrete Structural Elements
2	CE3502	Structural Analysis I
3	CE3503	Foundation Engineering
4	CE3003	Prefabricated Structures
5	CE3011	Digitalized Construction Lab
6	CE3016	Ground Improvement Techniques
7	MX3084	Disaster Risk Reduction and Management
PRACTICALS		
8	CE3511	Highway Engineering Laboratory
9	CE3512	Survey Camp (2 weeks)
SEMESTER VI		
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	CE3601	Design of Steel Structural Elements
2	CE3602	Structural Analysis II
3	CE3602	Engineering Geology
4		Professional Elective IV
5		Professional Elective V
6		Professional Elective VI
7		Open Elective – I
8		Mandatory Course-II
9		NCC Credit Course Level 3 [#]

PRACTICALS		
10	CE3611	Building Drawing and Detailing Laboratory
SEMESTER VII		
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	CE3701	Estimation, Costing and Valuation Engineering
2	AI3404	Hydrology and Water Resources Engineering
3	GE3791	Human Values and Ethics
4	GE3752	Foundation of Robotics
5	OHS352	Total Quality Management
6		Open Elective – II
7		Open Elective – III
8		Open Elective – IV
SEMESTER VIII		
S. NO.	COURSE CODE	COURSE TITLE
PRACTICALS		
1	CE3811	Project Work/Internship

COURSE OUTCOME FOR CIVIL ENGINEERING

DEGREE	U.G
PROGRAMME	B.E - CIVIL ENGINEERING
ACADEMIC YEAR	2022-23
REGULATION	2021

SEMESTER 01		
1.Course Code and Name : HS3151 PROFESSIONAL ENGLISH - I		
	CO Statements	Knowledge Level
At the end of the course, learners will be able		
1	To use appropriate words in a professional context	K2
2	To gain understanding of basic grammatical structures and use them in right context.	K2
3	To read and infer the denotative and connotative meanings of technical texts	K2
4	To read and interpret information presented in tables, charts and other graphic forms	K3
5	To write definitions, descriptions, narrations and essays on various topics	K4
2.Course Code and Name : MA3151 MATRICES AND CALCULUS		
	CO Statements	Knowledge Level
At the end of the course the students will be able to		
1	Use the matrix algebra methods for solving practical problems.	K3
2	Apply differential calculus tools in solving various application problems.	K3
3	Able to use differential calculus ideas on several variable functions.	K3
4	Apply different methods of integration in solving practical problems.	K3
5	Apply multiple integral ideas in solving areas, volumes and other practical problems.	K3
3.Course Code and Name : PH3151 ENGINEERING PHYSICS		
	CO Statements	Knowledge Level
After completion of this course, the students should be able to		
1	Understand the importance of mechanics.	K1
2	Express their knowledge in electromagnetic waves.	K2
3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	K3
4	Understand the importance of quantum physics.	K3
5	Comprehend and apply quantum mechanical principles towards the formation of energy bands	K4
4.Course Code and Name : CY3151 ENGINEERING CHEMISTRY		
	CO Statements	Knowledge Level
At the end of the course, the students will be able:		
1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K3

2	To identify and apply basic concepts of nano science and nanotechnology in designing the synthesis of nano materials for engineering and technology applications.	K4
3	To apply the knowledge of phase rule and composites for material selection Requirements.	K2
4	To recommend suitable fuels for engineering processes and applications.	K2
5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K3

5.Course Code and Name : GE3151 PROBLEM SOLVING AND PYTHON PROGRAMMING

	CO Statements	Knowledge Level
Upon completion of the course, students will be able to		
1	Develop algorithmic solutions to simple computational problems.	K3
2	Develop and execute simple Python programs.	K3
3	Write simple Python programs using conditionals and loops for solving problems.	K4
4	Decompose a Python program into functions.	K4
5	Represent compound data using Python lists, tuples, dictionaries etc.	K4
6	Read and write data from/to files in Python programs.	K4

7.Course Code and Name : GE3171 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY

	CO Statements	Knowledge Level
On completion of the course, students will be able to:		
1	Develop algorithmic solutions to simple computational problems	K3
2	Develop and execute simple Python programs.	K4
3	Implement programs in Python using conditionals and loops for solving problems.	K2
4	Deploy functions to decompose a Python program.	K3
5	Process compound data using Python data structures.	K4
6	Utilize Python packages in developing software applications.	K2

8.Course Code and Name : GE3172 ENGLISH LABORATORY

	CO Statements	Knowledge Level
1	To listen to and comprehend general as well as complex academic information	K2
2	To listen to and understand different points of view in a discussion	K2
3	To speak fluently and accurately in formal and informal communicative contexts	K2
4	To describe products and processes and explain their uses and purposes clearly and accurately	K2
5	To express their opinions effectively in both formal and informal discussions	K2

9.Course Code and Name : BS3171 PHYSICS AND CHEMISTRY LABORATORY

	CO Statements	Knowledge Level
Upon completion of the course, the students will be able to		
PHYSICS LABORATORY		
1	Understand the functioning of various physics laboratory equipment.	K3

2	Use graphical models to analyze laboratory data.	K2
3	Use mathematical models as a medium for quantitative reasoning and describing Physical reality.	K1
4	Access, process and analyze scientific information.	K1
5	Solve problems individually and collaboratively.	K1

CHEMISTRY LABORATORY

1	To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K2
2	To determine the amount of metal ions through volumetric and spectroscopic techniques	K1
3	To analyse and determine the composition of alloys.	K1
4	To learn simple method of synthesis of nanoparticles	K2
5	To quantitatively analyse the impurities in solution by electro analytical techniques	K3

SEMESTER 02

1.Course Code and Name : HS3252 PROFESSIONAL ENGLISH - II

	CO Statements	Knowledge Level
At the end of the course learners will be able to		
1	To compare and contrast products and ideas in technical texts.	K2
2	To identify and report cause and effects in events, industrial processes through technical texts	K2
3	To analyse problems in order to arrive at feasible solutions and communicate them in the written format.	K2
4	To present their ideas and opinions in a planned and logical manner	K3
5	To draft effective resumes in the context of job search.	K4

2.Course Code and Name : MA3251 STATISTICS AND NUMERICAL METHODS

	CO Statements	Knowledge Level
Upon successful completion of the course, students will be able to		
1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3
2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	K3
4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K3
5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K3

3.Course Code and Name : PH3201 PHYSICS FOR CIVIL ENGINEERING

	CO Statements	Knowledge Level
At the end of the course, the students should be able to		

1	Acquire knowledge about heat transfer through different materials, thermal performance of building and thermal insulation	K2
2	Gain knowledge on the ventilation and air conditioning of buildings	K2
3	Understand the concepts of sound absorption, noise insulation and lighting designs	K2
4	Now about the processing and applications of composites, metallic glasses, shape memory alloys and ceramics	K3
5	Get an awareness on natural disasters such as earth quake, cyclone, fire and safety measures	K2

4.Course Code and Name : BE3252 BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING

	CO Statements	Knowledge Level
At the end of the course, the students should be able to		
1	Compute the electric circuit parameters for simple problems	K3
2	Explain the concepts of domestics wiring and protective devices	K2
3	Explain the working principle and applications of electrical machines	K4
4	Analyze the characteristics of analog electronic devices	K2
5	Explain the types and operating principles of sensors and transducers	K2

5.Course Code and Name : GE3251 ENGINEERING GRAPHICS

	CO Statements	Knowledge Level
At the end of the course, the students should be able to		
1	Use BIS conventions and specifications for engineering drawing.	K3
2	Construct the conic curves, involutes and cycloid.	K3
3	Solve practical problems involving projection of lines.	K3
4	Draw the orthographic, isometric and perspective projections of simple solids.	K5
5	Draw the development of simple solids.	K5

6.Course Code and Name : GE3271 ENGINEERING PRACTICES LABORATORY

	CO Statements	Knowledge Level
Upon completion of this course, the students will be able to		
1	Draw 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.	K5
2	Wire various electrical joints in common household electrical wire work.	K6
3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	K2
4	Solder and test simple electronic circuits;	K6
5	Assemble and test simple electronic components on PCB.	K6

8.Course Code and Name : BE3272 BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING LABORATORY

	CO Statements	Knowledge Level
1	Use experimental methods to verify the Ohm's law and Kirchhoff's Law and to measure three phase power	K2
2	Analyze experimentally the load characteristics of electrical machines	K5
3	Analyze the characteristics of basic electronic devices	K5
4	Use LVDT to measure displacement.	K5
9.Course Code and Name : GE3272 COMMUNICATION LABORATORY		
	CO Statements	Knowledge Level
1	Speak effectively in group discussions held in a formal/semi-formal contexts.	K5
2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions	K3
3	Write emails, letters and effective job applications.	K3
4	Write critical reports to convey data and information with clarity and precision	K3
5	Give appropriate instructions and recommendations for safe execution of tasks	K5
SEMESTER 03		
1.Course Code and Name : MA3351 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS		
	CO Statements	Knowledge Level
Upon successful completion of the course, students should be able to		
1	Understand how to solve the given standard partial differential equations.	K2
2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.	K3
3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.	K3
4	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.	K2
5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.	K3
2.Course Code and Name : ME3351 ENGINEERING MECHANICS		
	CO Statements	Knowledge Level
At the end of the course the students would be able to		
1	Illustrate the vectorial and scalar representation of forces and moments	K2
2	Analyse the rigid body in equilibrium	K4
3	Evaluate the properties of distributed forces	K5
4	Determine the friction and the effects by the laws of friction	K5
5	Calculate dynamic forces exerted in rigid body	K5
3.Course Code and Name : CE3301 FLUID MECHANICS		
	CO Statements	Knowledge Level
On completion of the course, the student is expected to		
1	Demonstrate the difference between solid and fluid, its properties and behaviour in static	K2

	conditions.	
2	Apply the conservation laws applicable to fluids and its application through fluid kinematics and dynamics.	K3
3	Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies.	K6
4	Estimate the losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel.	K5
5	Explain the concept of boundary layer and its application to find the drag force exerted by the fluid on the flat solid surface.	K5

4.Course Code and Name : CE3302 CONSTRUCTION MATERIALS AND TECHNOLOGY

	CO Statements	Knowledge Level
Students will be able to		
1	Identify the good quality brick, stone and blocks for construction.	K3
2	Recognize the market forms of timber, steel, aluminum and applications of various composite materials.	K3
3	Identify the best construction and service practices such as thermal insulations and air conditioning of the building	K3
4	Select various equipments for construction works conditioning of building	K3
5	Understand the construction planning and scheduling techniques	K2

5.Course Code and Name : CE3303 WATER SUPPLY AND WASTEWATER ENGINEERING

	CO Statements	Knowledge Level
On completion of the course, the student is expected to		
1	Understand the various components of water supply scheme and design of intake structure and conveyance system for water transmission	K2
2	Understand on the characteristics and composition of sewage, ability to estimate sewage generation and design sewer system including sewage pumping stations	K2
3	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	K2
4	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.	K2
5	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	K2

6.Course Code and Name : CE3351 SURVEYING AND LEVELLING

	CO Statements	Knowledge Level
On completion of the course, the student is expected to		
1	Introduce the rudiments of various surveying and its principles.	K5
2	Imparts knowledge in computation of levels of terrain and ground features	K5
3	Imparts concepts of Theodolite Surveying for complex surveying operations	K5
4	Understand the procedure for establishing horizontal and vertical control	K2
5	Imparts the knowledge on modern surveying instruments	K5

7.Course Code and Name : CE3361 SURVEYING AND LEVELLING LABORATORY

	CO Statements	Knowledge Level
On completion of the course, the student is expected to		
1	Impart knowledge on the usage of basic surveying instruments like chain/tape, compass and levelling instruments	K5
2	Able to use levelling instrument for surveying operations	K2
3	Able to use theodolite for various surveying operations	K2
4	Able to carry out necessary surveys for social infrastructures	K2
5	Able to prepare planimetric maps	K2

8.Course Code and Name : CE3311 WATER AND WASTEWATER ANALYSIS LABORATORY

	CO Statements	Knowledge Level
On completion of the course, the student is expected to		
1	Calibrate and standardize the equipment	K3
2	Collect proper sample for analysis	K3
3	To know the sample preservation methods	K3
4	To perform field oriented testing of water, wastewater	K3
5	To perform coliform analysis	K3

9.Course Code and Name :GE3361 PROFESSIONAL DEVELOPMENT

	CO Statements	Knowledge Level
On successful completion the students will be able to		
1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements	K3
2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding	K3
3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.	K3
4	Perform document statistical report using MS Word, Excel and PPT.	K3
5	Present and interpret data document using MS Word, Excel and PPT	K4

SEMESTER 04**1.Course Code and Name : CE3401 APPLIED HYDRAULICS ENGINEERING**

	CO Statements	Knowledge Level
On completion of the course, the student is expected to		
1	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	K5
2	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.	K4
3	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.	K5
4	Design turbines and explain the working principle	K5
5	Differentiate pumps and explain the working principle with characteristic curves and design centrifugal and reciprocating pumps.	K4

2.Course Code and Name : CE3402 STRENGTH OF MATERIALS

	CO Statements	Knowledge Level
Students will be able to		
1	Understand the concepts of stress and strain, principal stresses and principal planes.	K2
2	Determine Shear force and bending moment in beams and understand concept of theory of simple bending.	K4
3	Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.	K4
4	Analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements.	K4
5	Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and study the various theories of failure	K4

3.Course Code and Name : CE3403 CONCRETE TECHNOLOGY

	CO Statements	Knowledge Level
At the end of the course the student will be able to		
1	Understand the requirements of cement, aggregates and water for concrete	K2
2	Select suitable admixtures for enhancing the properties of concrete	K1
3	Design concrete mixes as per IS method of mix design	K6
4	Determine the properties of concrete at fresh and hardened state.	K5
5	Know the importance of special concretes for specific requirements.	K2

4.Course Code and Name : CE3404 SOIL MECHANICS

	CO Statements	Knowledge Level
On completion of the course, the student is expected to be able to		
1	Demonstrate an ability to identify various types of soils and its properties, formulate and solve engineering Problems	K3
2	Show the basic understanding of flow through soil medium and its impact of engineering solution	K1
3	Understand the basic concept of stress distribution in loaded soil medium and soil settlement due to consolidation	K2
4	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.	K1
5	Demonstrate an ability to design both finite and infinite slopes, component and process as per needs and specifications.	K3

5.Course Code and Name : CE3405 HIGHWAY AND RAILWAY ENGINEERING

	CO Statements	Knowledge Level
On completion of the course, the student is expected to		
1	Plan a highway according to the principles and standards adopted in various institutions in India.	K6
2	Design the geometric features of road network and components of pavement.	K6

3	Test the highway materials and construction practice methods and know its properties and able to perform pavement evaluation and management.	K6
4	Understand the methods of route alignment and design elements in railway planning and constructions.	K2
5	Understand the construction techniques and maintenance of track laying and railway stations	K2

6.Course Code and Name : GE3451 ENVIRONMENTAL SCIENCES AND SUSTAINABILITY

	CO Statements	Knowledge Level
At the end of this course, the students will be able to		
1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.	K2
2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	K2
3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K2
4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	K2
5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K2

7.Course Code and Name : CE341 HYDRAULIC ENGINEERING LABORATORY

	CO Statements	Knowledge Level
On completion of the course, the student is expected to		
1	Apply Bernoulli equation for calibration of flow measuring devices.	K3
2	Measure friction factor in pipes and compare with Moody diagram	K5
3	Determine the performance characteristics of rotodynamic pumps.	K5
4	Determine the performance characteristics of positive displacement pumps.	K5
5	Determine the performance characteristics of turbines	K5

8.Course Code and Name : CE3412 MATERIALS TESTING LABORATORY

	CO Statements	Knowledge Level
On completion of the course, the student is expected to		
1	Determine the mechanical properties of steel.	K5
2	Determine the physical properties of cement	K5
3	Determine the physical properties of fine and coarse aggregate	K5
4	Determine the workability and compressive strength of concrete	K5
5	Determine the strength of brick and wood.	K5

9.Course Code and Name : CE3413 SOIL MECHANICS LABORATORY

	CO Statements	Knowledge Level
On completion of the course, the student is expected to		
1	Conduct tests to determine the index properties of soils	K5

2	Determine the density and compaction characteristics.	K5
3	Conduct tests to determine the compressibility, permeability and shear strength of soils.	K5
4	Understand the various tests on Geosynthetics.	K2
SEMESTER 05		
1.Course Code and Name : CE3501 DESIGN OF REINFORCED CONCRETE STRUCTURAL ELEMENTS		
	CO Statements	Knowledge Level
At the end of the course the student will be able to		
1	Know the various design concepts and design RC rectangular beams by working stress and limit state methods	K6
2	Understand the design of flanged beams, design for shear and torsion, and anchorage and development length.	K2
3	Design a RC slabs and staircase and draw the reinforcement detailing.	K6
4	Design short columns for axial, uni-axial and bi-axial eccentric loadings	K6
5	Design wall footings, isolated footings and combined rectangular footing.	K6
2.Course Code and Name : CE3502 STRUCTURAL ANALYSIS I		
	CO Statements	Knowledge Level
Students will be able to		
1	Analyze the pin-jointed plane and space frames.	K4
2	Analyse the continuous beams and rigid frames by slope deflection method.	K4
3	Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.	K2
4	Analyse the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.	K4
5	Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.	K2
3.Course Code and Name : CE3503 FOUNDATION ENGINEERING		
	CO Statements	Knowledge Level
On completion of the course, the student is expected to be able to		
1	Graduate will demonstrate an ability to plan and execute a detailed site investigation to select geotechnical design parameters and type of foundation	K6
2	Graduate will demonstrate an ability to design shallow foundations, its component or process as per the needs and specifications.	K6
3	Graduate will demonstrate an ability to design combined footings and raft foundations, its component or process as per the needs and specifications.	K6
4	Graduate will demonstrate an ability to design deep foundations, its component or process as per the needs and specifications.	K6
5	Graduate will demonstrate an ability to design retaining walls, its component or process as per the needs and specifications	K6
4.Course Code and Name : CE3003 PREFABRICATED STRUCTURES		
	CO Statements	Knowledge Level
Students will be able to		
1	Understand concepts about principles of prefabrication, production, transportation, erection.	K2

2	Acquire knowledge about panel systems, slabs, beams, shear walls and columns used in precast construction.	K2
3	Acquire knowledge about design of cross section, joint flexibility.	K2
4	Acquire knowledge about joints and connection in precast construction.	K2
5	Acquire knowledge about structural stability.	K2

5.Course Code and Name : CE3011 DIGITALIZED CONSTRUCTION LAB

	CO Statements	Knowledge Level
At the end of the course the student will be able to understand the output of digitalization of construction		
1	To understand the importance of latest software's in a construction industry.	K2
2	To plan a construction project using Primavera	K6
3	To plan a construction project using MS project	K6
4	To develop a BIM information model	K6
5	To analyse the bid management and its effectiveness using bid management software	K4

6.Course Code and Name : CE3016 GROUND IMPROVEMENT TECHNIQUES

	CO Statements	Knowledge Level
On completion of the course, the student is expected to be able to		
1	Identify and evaluate the deficiencies in the deposits of the given project area and improve its characteristics by hydraulic modifications	K3
2	Improve the ground characteristics by mechanical modifications using various methods and design the system.	K6
3	Improve the ground characteristics by physical modifications using various method and design the system	K6
4	improve the characteristics of soils by various reinforcement techniques and design	K6
5	Analyse the ground and decide the suitable chemical method for improving its characteristics	K4

7.Course Code and Name : MX3084 DISASTER RISK REDUCTION AND MANAGEMENT

	CO Statements	Knowledge Level
At the end of this course, the students will be able to		
1	To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)	K5
2	To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction	K3
3	To develop disaster response skills by adopting relevant tools and technology	K5
4	Enhance awareness of institutional processes for Disaster response in the country and	K3
5	Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity	K5

8.Course Code and Name : CE3511 HIGHWAY ENGINEERING LABORATORY

	CO Statements	Knowledge Level
At the end of this course, the students will be able to		
1	Characterize Pavement Aggregate through relevant test	K6
2	Ascertain the Quality of Bitumen.	K6
3	Determine the Optimum Binder Content Using Marshall Method.	K5

4	Evaluate the Consistency and Properties of Bitumen.	K5
5	Determine the Bitumen Content in the Bituminous Mixes	K5
9.Course Code and Name : CE3512 SURVEY CAMP		
	CO Statements	KnowledgeLevel
On completion of the course, the student is expected to be able to		
1	Handle the modern surveying instruments like Total station and GPS	K2
2	Apply modern surveying techniques in field to establish horizontal control.	K3
3	Understand the surveying techniques in field to establish vertical control	K2
4	Apply different survey adjustment techniques.	K3
5	Carry out different setting out works in the field	K3

