T.J.S. ENGINEERING COLLEGE

TJS Nagar, Kavaraipettai – 601 206

Department of Civil Engineering

Course Outcomes – ODD Semester 2020-21

Sl. No.	Semester	Theory/Practical	Course Code / Course Name
1	3	Theory	MA8353-Transforms and Partial Differential Equations
2	3	Theory	CE8301-Strength of Materials I
3	3	Theory	CE8302-Fluid Mechanics
4	3	Theory	CE8351-Surveying
5	3	Theory	CE8391-Construction Materials
6	3	Theory	CE8392-Engineering Geology
7	3	Practical	CE8311-Construction Materials Laboratory
8	3	Practical	CE8361-SurveyingLaboratory
9	3	Practical	HS8381-Interpersonal Skills/ Listening and Speaking
10	5	Theory	CE8501-Design of Reinforced Concrete Elements
11	5	Theory	CE8502-Structural Analysis I
12	5	Theory	EN8491-Water Supply Engineering
13	5	Theory	CE8591-Foundation Engineering
14	5	Theory	GE8071-Disaster Management (Professional Elective – I)
15	5	Theory	ORO551-Renewable Energy Sources(Open Elective)
16	5	Practical	CE8511-Soil Mechanics Laboratory
17	5	Practical	CE8512-Water and Waste water Analysis Laboratory
18	5	Practical	CE8513-Survey Camp
19	7	Theory	CE8701-Estimation costing and valuation Engineering
20	7	Theory	CE8702-Railway Airports, Docks and Harbour Engineering
21	7	Theory	CE8703-Structural design and drawing
22	7	Theory	CE6704-Estimation and Quantity Surveying
23	7	Theory	EN8501-Municipal Solid waste Management (Elective)
24	7	Theory	OE551 -Textile Effluent Treatment (Elective)
25	7	Practical	CE8711-Creative and Innovative Project
26	7	Practical	CE8712-Industrial Training

Third Semester B.E.

MA8353-Transforms and Partial Differential Equations

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Understand how to solve the given standard partial differential equations.
CO2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
CO3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
CO4	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.
CO5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

CE8301 - STRENGTH OF MATERIALS I

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Understand the concepts of stress and strain, principal stresses and principal planes.
CO2	Determine Shear force and bending moment in beams and understand concept of theory of simple bending.
CO3	Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.
CO4	Apply basic equation of torsion in design of circular shafts and helical springs,
CO5	Analyze the pin jointed plane and space trusses

CE8302-Fluid Mechanics

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium.
CO2	Understand and solve the problems related to equation of motion.
CO3	Gain knowledge about dimensional and model analysis.
CO4	Learn types of flow and losses of flow in pipes.
CO5	Understand and solve the boundary layer problems.

CE8351-Surveying

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	The use of various surveying instruments and mapping
CO2	Measuring Horizontal angle and vertical angle using different instruments
CO3	Methods of Leveling and setting Levels with different instruments
CO4	Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth
CO5	Concept and principle of modern surveying.

CE8391-Construction Materials

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Compare the properties of most common and advanced building materials.
CO2	understand the typical and potential applications of lime, cement and aggregates
CO3	know the production of concrete and also the method of placing and making of concrete elements.
CO4	understand the applications of timbers and other materials
CO5	Understand the importance of modern material for construction.

CE8392-Engineering Geology

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Will be able to understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.
CO2	Will get basics knowledge on properties of minerals.
CO3	Gain knowledge about types of rocks, their distribution and uses.
CO4	Will understand the methods of study on geological structure.
CO5	Will understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbor

Laboratory

CE8311-Construction Materials Laboratory

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	have the required knowledge in the area of testing of construction materials and components of construction elements experimentally.

CE8361-SurveyingLaboratory

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	have acquired practical knowledge on handling basic survey instruments including Theodolite, Tacheometry, Total Station and GPS
CO2	have adequate knowledge to carryout Triangulation and Astronomical surveying including general field marking for various engineering projects and Location of site etc.

HS8381 - Interpersonal Skills / Listening & Speaking

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Listen and respond appropriately.
CO2	Participate in group discussions
CO3	Make effective presentations
CO4	Participate confidently and appropriately in conversations both formal and informal

Fifth Semester B.E

CE8501-Design of Reinforced Concrete Elements

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Understand the various design methodologies for the design of RC elements
CO2	Know the analysis and design of flanged beams by limit state method and sign of beams for shear, bond and torsion.
CO3	design the various types of slabs and staircase by limit state method.
CO4	Design columns for axial, uniaxial and biaxial eccentric loadings.
CO5	Design of footing by limit state method.

CE8502-Structural Analysis I

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method
CO2	Analyse the continuous beams and rigid frames by slope defection method.
CO3	Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway
CO4	Analyse the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.
CO5	Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.

EN8491-Water Supply Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	an insight into the structure of drinking water supply systems, including water transport, treatment and distribution
CO2	the knowledge in various unit operations and processes in water treatment
CO3	an ability to design the various functional units in water treatment
CO4	an understanding of water quality criteria and standards, and their relation to public health
CO5	the ability to design and evaluate water supply project alternatives on basis of chosen criteria

CE8591-Foundation Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Understand the site investigation, methods and sampling.
CO2	Get knowledge on bearing capacity and testing methods.
CO3	Design shallow footings.
CO4	Determine the load carrying capacity, settlement of pile foundation.
CO5	Determine the earth pressure on retaining walls and analysis for stability.

GE8071-Disaster Management (Professional Elective – I)

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Differentiate the types of disasters, causes and their impact on environment and society
CO2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.
CO3	Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management.

ORO551-Renewable Energy Sources(Open Elective)

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Understand the physics of solar radiation
CO2	Ability to classify the solar energy collectors and methodologies of storing solar energy
CO3	Knowledge in applying solar energy in a useful way
CO4	Knowledge in wind energy and biomass with its economic aspects
CO5	Knowledge in capturing and applying other forms of energy sources like wind, biogas and geothermal energies

Laboratory

CE8511-Soil Mechanics Laboratory

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Students are able to conduct tests to determine both the index and engineering properties of soils
CO2	Able to characterize the soil based on their properties.

CE8512-Water and Waste water Analysis Laboratory

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Quantify the pollutant concentration in water and wastewater
CO2	Suggest the type of treatment required and amount of dosage required for the treatment
CO3	Examine the conditions for the growth of micro-organisms

CE8513-Survey Camp

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Determine the area of traverse using Total station and GPS
CO2	Plot contours and the undulating ground surface.
CO3	Perform highway alignment and set out curves for new roads.
CO4	Handle total station and do field observation using it.
CO5	Participate as a team and work with fellow mates in carrying out the surveying of Sun observation to determine azimuth

Seventh Semester B.E.

CE6701-Structural Dynamics and Earthquake Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Implement the theory of vibration, and analyse a single degree of freedom system with and without damping
CO2	Analyze multi degree of freedom system and draw the mode shapes
CO3	Explain the theory of seismology
CO4	Demonstrate the response of RC, Steel and prestressed concrete structures to earthquakes
CO5	Explain the methods of introducing ductility in structures using codal provisions
CO6	Perform dynamic analysis and formulate the design methodology in aseismic design

CE6702-Prestressed Concrete Strcutures

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Describe the fundamental principles of pre and post tensioned concrete and compute loss of stresses and deflection of prestressed members
CO2	Design pre and post tensioned concrete Sections for flexure and shear as per codal provisions
CO3	Design pre and post tensioned water tank and pipes
CO4	Calculate the flexural and shear strength of composite sections
CO5	Design pre and post tensioned Bridges
CO6	Explain the various methods of design of anchorage zones

CE6703-Water Resources and Irrigation Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Illustrate the water resource potential in India and Tamil Nadu & explain the Importance of National water policy
CO2	Analyze the hydrologic data to design the hydrologic station network using various statistical techniques.
CO3	Distinguish between consumptive and non – consumptive use of water and estimate water requirement for various purposes
CO4	Compare the different types reservoir with their functions and explain the reservoir operation and storage fixation
CO5	Apply various discounting techniques and factors to do economic analysis of water resource projects
CO6	To combine the collection of relevant data & sources for water resources development and management

CE6704-Estimation and Quantity Surveying

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Outline the principles of Estimation, illustrating the various types and methods.
CO2	Estimate the quantities of various items of a work in residential and other major structures.
CO3	Classify the various types of specification relevant to each item of work in a various class of buildings.
CO4	Illustrate the different types of contracts, Tender documents for preparing a new project proposal.
CO5	Examine the capital value and standard rent of a residential and government building.
CO6	Outline the principles of report preparation and summarize a report for various structures.

CE6010-Pavement Engineering (Elective)

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Differentiate between flexible and rigid pavements and its stress distribution characteristics
CO2	Design flexible pavements as per codal provisions
CO3	Design rigid pavements as per codal provisions
CO4	Deduct the distress in flexible and rigid pavements and identify appropriate strengthening methods
CO5	Outline the maintenance strategies of highways. (IRC Standards)
CO6	Classify the choice of stabilizers for improving the performance of pavements.

EN6501-Municipal Solid Waste Management (Elective)

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Classify the sources and characteristics of municipal solid wastes and summarize the regulatory requirements regarding waste management.
CO2	Compare the on-site storage & processing methods and model source reduction & segregation of wastes assessing economic aspects.
CO3	Analyze waste collection systems & collection routes and select transport method suiting source nature.
CO4	Outline off-site waste processing techniques and plan sustainable technique for Indian conditions.
CO5	Design sanitary landfills along with leachate and landfill gas collection systems.
CO6	Summarize all aspects & elements of integrated municipal solid waste management, planning sustainable waste minimization techniques.

Laboratory

CE6711-Computer Aided Design and Drafting Laboratory

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Design and draft the reinforcement details of Cantilever and counterfort retaining wall using IS codes.
CO2	Design and draw reinforcement details of solid slabs and T-beam bridge for IRC loading class.
CO3	Design Intze type water tank and draw the sectional details.
CO4	Design and draw reinforcement details of rectangular and circular water tanks using IS codes
CO5	Design plate girder and truss girder bridges and draw the sectional details as per codal provisions
CO6	Present the drawings both in conventional method and using modern software tool

CE6712-Design Project

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Work as a team and select a design problem for project work
CO2	Review the available literature andformulate the methodology for the chosen design
CO3	Analyse the structure using modern tools applying the theoretical principles.
CO4	Design the structural elements pertaining to the design problem as per the codal provisions.
CO5	Conclude with a optimum design for the structure as a whole.
CO6	Prepare a detailed report and make presentation on the same.

Course Outcomes – EVEN Semester 2019-20

Sl. No.	Semester	Theory/Practical	Course Code / Course Name
1	4	Theory	MA 8491-Numerical Methods
2	4	Theory	CE 8401-Construction Techniques & Practices
3	4	Theory	CE 8402-Strength of Materials II
4	4	Theory	CE 8403-Applied Hydraulic Engineering
5	4	Theory	CE 8404-Concrete Technology
6	4	Theory	CE 8491-Soil Mechanics
7	4	Practical	CE 8481-Strength of Materials Laboratory
8	4	Practical	CE 8461-Hydraulic Engineering Laboratory
9	4	Practical	HS 8461-Advance Reading and Writing
10	6	Theory	CE 8601-Design of Steel Structures
11	6	Theory	CE 8602-Structural Analysis – II
12	6	Theory	CE 8603-Irrigation Engineering
13	6	Theory	CE 8604-Highway Engineering
14	6	Theory	EN8592-Waste Water Engineering
15	6	Theory	CE 8001-Ground Improvement Techniques (Elective 1)
16	6	Practical	CE 8611- Highway Engineering Laboratory
17	6	Practical	CE 8612-Irrigation and Environmental Engineering Drawing
18	6	Practical	HS 8581-Professional Communication
19	8	Theory	MG6851-Principles of Management
20	8	Theory	CE 6016-Prefabricated Structures
21	8	Theory	CE 6021-Repair and Rehabilitation of Structures
22	8	Practical	CE 6811-Project Work

Fourth Semester B.E.

MA 8491-Numerical Methods

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Understand the basic concepts and techniques of solving algebraic and transcendental equations.
CO2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations
CO3	Apply the numerical techniques of differentiation and integration for engineering problems.
CO4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications

CE 8401-Construction Techniques & Practices

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	know the different construction techniques and structural systems
CO2	Understand various techniques and practices on masonry construction, flooring, and roofing.
CO3	Plan the requirements for substructure construction.
CO4	Know the methods and techniques involved in the construction of various types of super structures Select, maintain and operate hand and power tools and equipment used in the building construction sites.
CO5	know the different construction techniques and structural systems

CE 8402-Strength of Materials II

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Determine the strain energy and compute the deflection of determinate beams, frames and trusses using energy principles.
CO2	Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements.
CO3	find the load carrying capacity of columns and stresses induced in columns and cylinders
CO4	Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure
CO5	Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and find the stresses in curved beams.

CE 8403-Applied Hydraulic Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Apply their knowledge of fluid mechanics in addressing problems in open channels
CO2	Able to identify a effective section for flow in different cross sections
CO3	To solve problems in uniform, gradually and rapidly varied flows in steady state conditions
CO4	Understand the principles, working and application of turbines
CO5	Understand the principles, working and application of pumps

CE 8404-Concrete Technology

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	The various requirements of cement, aggregates and water for making concrete
CO2	The effect of admixtures on properties of concrete
CO3	The concept and procedure of mix design as per IS method
CO4	The properties of concrete at fresh and hardened state
CO5	The importance and application of special concretes.

CE 8491-Soil Mechanics

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	classify the soil and assess the engineering properties, based on index properties.
CO2	Understand the stress concepts in soils
CO3	Understand and identify the settlement in soils.
CO4	Determine the shear strength of soil
CO5	Analyze both finite and infinite slopes.

CE 8481-Strength of Materials Laboratory

COs	Course Outcome : The students, after the completion of the course, are expected to .
CO1	The students will have the required knowledge in the area of testing of materials and components of structural elements experimentally.

CE 8461-Hydraulic Engineering Laboratory

COs	Course Outcome : The students, after the completion of the course, are expected to .
CO1	The students will be able to measure flow in pipes and determine frictional losses
CO2	The students will be able to develop characteristics of pumps and turbines

HS 8461-Advance Reading and Writing

COs	Course Outcome : The students, after the completion of the course, are expected to .
CO1	Write different types of essays
CO2	Write winning job applications
CO3	Read and evaluate texts critically
CO4	Display critical thinking in various professional contexts

Sixth Semester B.E.

CE 8601-Design of Steel Structures

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Understand the concepts of various design philosophies
CO2	Design common bolted and welded connections for steel structures
CO3	Design tension members and understand the effect of shear lag.
CO4	Understand the design concept of axially loaded columns and column base connections.
CO5	Understand specific problems related to the design of laterally restrained and unrestrained steel beams.

CE 8602-Structural Analysis – II

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Draw influence lines for statically determinate structures and calculate critical stress resultants.
CO2	Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams.
CO3	Analyse of three hinged, two hinged and fixed arches.
CO4	Analyse the suspension bridges with stiffening girders
CO5	Understand the concept of Plastic analysis and the method of analyzing beams and rigid frames.

CE 8603-Irrigation Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Have knowledge and skills on crop water requirements.
CO2	Understand the methods and management of irrigation.
CO3	Gain knowledge on types of Impounding structures
CO4	Understand methods of irrigation including canal irrigation.
CO5	Get knowledge on water management on optimization of water use.

CE 8604-Highway Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Get knowledge on planning and aligning of highway.
CO2	Geometric design of highways
CO3	Design flexible and rigid pavements.
CO4	Gain knowledge on Highway construction materials, properties, testing methods
CO5	Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.

EN8592-Waste Water Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to .
CO1	An ability to estimate sewage generation and design sewer system including sewage pumping stations
CO2	The required understanding on the characteristics and composition of sewage, self-purification of streams
CO3	An ability to perform basic design of the unit operations and processes that are used in sewage treatment
CO4	Understand the standard methods for disposal of sewage.
CO5	Gain knowledge on sludge treatment and disposal.

CE 8001-Ground Improvement Techniques (Elective 1)

COs	Course Outcome : The students, after the completion of the course, are expected to
CO1	Gain knowledge on methods and selection of ground improvement techniques.
CO2	Understand dewatering techniques and design for simple cases.
CO3	Get knowledge on insitu treatment of cohesionless and cohesive soils.
CO4	Understand the concept of earth renforcement and design of reinforced earth.
CO5	Get to know types of grouts and grouting technique.

Laboratory

CE 8611- Highway Engineering Laboratory

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Student knows the techniques to characterize various pavement materials through relevant tests.

CE 8612-Irrigation and Environmental Engineering Drawing

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	The students after completing this course will be able to design and draw various units of Municipal water treatment plants and sewage treatment plants.

HS 8581-Professional Communication

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Make effective presentations
CO2	Participate confidently in Group Discussions.
CO3	Attend job interviews and be successful in them.
CO4	Develop adequate Soft Skills required for the workplace

Eight Semester B.E.

MG 6851-Principles of Management

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Specify how the managerial tasks of planning, organizing, and controlling can be executed in a variety of circumstances for engineering students
CO2	Understand the managerial practices and choices, the roles and functions of managers both in traditional structures and evolving contemporary organizations.
CO3	Assess the situation, including opportunities and threats that will impact management of an organization.
CO4	Critically analyse the principles and theories to be applied in work environment.
CO5	Integrate management principles into management practices to take the most effective decisions / actions in specific situations.
CO6	Evaluate the work environment for taking managerial actions of planning, organizing, controlling and address the issues of diversity.

CE 6016-Prefabricated Structures

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Describe the principle of prefabrication, along with production and erection techniques.
CO2	Explain the construction of prefabricated structural components.
CO3	Design prefabricated cross sections based on efficiency of members used.
CO4	Identify problems in design and provide allowance for deformation
CO5	Classify joints for different structural connection in prefabricated system
CO6	Illustrate the importance of avoidance of progressive collapse and using Indian codal provisions for prefabricated concrete.

CE 6021-Repair and Rehabilitation of Structures

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Explain the causes of deterioration in concrete structures & the assessment procedures for evaluating damages in concrete structures
CO2	Identify the construction errors and suggest suitable methods for rectification
CO3	Outline the durability properties of concrete and report on quality of materials for construction
CO4	Suggest materials used in repairing / strengthening existing concrete structures
CO5	Construe the methods of corrosion protection in concrete structures
CO6	Develop cost effective rehabilitation and retrofitting strategies for repairs in buildings

Laboratory

CE 6811-Project Work

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Work as a team and select a problem for project work
CO2	Review and evaluate the available literature on the chosen problem
CO3	Formulate the methodology to solve the identified problem
CO4	Apply the principles, tools and techniques to solve the problem
CO5	Conclude with a feasible solution which address environment and society
CO6	Prepare a detailed report and make presentation on the same.