

MARTHANDAM COLLEGE OF ENGINEERING AND TECHNOLOGY**DEPARTMENT OF CIVIL ENGINEERING****Course Outcomes – Odd Semester 2021-22**

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
1)	3	Theory	MA8351-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	GE8393-Engineering Geology
7)	3	Practical	CE8311-Construction Materials Laboratory
8)	3	Practical	CE8361-Surveying Laboratory
9)	3	Practical	HS8381-Interpersonal Skills / Listening and Speaking
10)	5	Theory	CE3501-Design of Reinforced Concrete Structural Elements
11)	5	Theory	CE8501-Design of Reinforced Cement Concrete Elements
12)	5	Theory	CE8502-Structural Analysis I
13)	5	Theory	EN8491-Water Supply Engineering
14)	5	Theory	CE8591-Foundation Engineering
15)	5	Theory	GE8071Disaster Management
16)	5	Theory	OA1551-Environment & Agriculture
17)	5	Practical	GE6563-Soil Mechanics Laboratory
18)	5	Practical	CE8512-Water and Waste Water Analysis Laboratory
19)	5	Practical	CE8513-Survey Camp
20)	7	Theory	CE8701 -Estimation, Costing and Valuation Engineering
21)	7	Theory	CE8702 -Railways, Airports, Docks and Harbor Engineering
22)	7	Theory	CE8703-Structural Design and Drawing
23)	7	Theory	CE3030-Municipal solid Waste Management
24)	7	Practical	CE8711-Creative and Innovative Project (Activity Based Subject Related)
25)	7	Practical	CE8712-Industrial Training

Course Outcomes – EVEN Semester 2021-22

1)	4	Theory	MA8491 -Numerical Methods
2)	4	Theory	CE8401-Construction Techniques and Practices
3)	4	Theory	CE8402-Strength of Material-II
4)	4	Theory	CE8403-Applied Hydraulic Engineering
5)	4	Theory	CE8404-Concrete Technology
6)	4	Theory	CE8491-Soil Mechanics
7)	4	Practical	CE8481-Strength of Material Laboratory
8)	4	Practical	CE8461-Hydraulics Engineering Laboratory
9)	4	Practical	HS8491-Advanced Reading and Writing
10)	6	Theory	CE8601-Design of Steel Structural Elements
11)	6	Theory	CE8602-Structural Analysis-II
12)	6	Theory	CE8603-Irrigation Engineering
13)	6	Theory	CE8604-Highway Engineering
14)	6	Theory	EN8592-Waste water Engineering
15)	6	Practical	CE8611-Highway Engineering Laboratory
16)	6	Practical	CE8612-Irrigation and Environmental Engineering Drawing
17)	6	Practical	HS8581-Professional Communication
18)	8	Theory	CE8018-Geo-Environmental Engineering
19)	8	Theory	CE8020-Maintenance, Repair and Rehabilitation of Structures
20)	8	Practical	CE8811-Project Work
21)	8	Practical	CE8712-Industrial Training

ODD Semester 2021-22

3 rd. Semester B.E. Civil

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 Material I
Course Outcome: At the end of the course students will have the ability 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 Analyse 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.

CE 8351 Surveying
Course Outcome: The students, after the completion of the course, are expected to understand
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.

CE 8391 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

CE 8392 Engineering Geology
Course Outcome: Upon the completion of this course the students will be able to
CO1 Understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.
CO2 Get basics knowledge on properties of minerals
CO3 Gain knowledge about types of rocks, their distribution and uses.
CO4 Understand the methods of study on geological structure
CO5 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- Understand the properties of fine aggregate with different tests
CO2 - Understand the properties of coarse aggregate with different tests
CO3 - Understand the properties of concrete with different tests
CO4 - Understand the properties of bricks with different tests
CO5 - Understand the properties of blocks with different tests

CE8361 Surveying Laboratory
Course Outcome: The students, after the completion of the course, are having the
CO1 - Knowledge on the usage of basic surveying instruments like chain/tape, compass and leveling instruments
CO2 - Ability to use leveling instrument for surveying operations
CO3 - Ability to use theodolite for various surveying operations
CO4 - Ability to carry out necessary surveys for social infrastructures
CO5 - Ability to prepare planimetric maps

HS8381 Interpersonal Skills/ Listening and 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
CO5 - Speak fluently

5 th. Semester B.E. Civil

CE8501 Design of Reinforced Cement Concrete Elements
COs Course Outcome: The students, after the completion of the course, are having the ability 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. Analyse 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 deflection 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: Gain an insight into the structure of drinking water supply systems, including water transport, treatment and distribution
CO2: Gain knowledge in various unit operations and processes in water treatment
CO3: design the various functional units in water treatment

CO4: understand water quality criteria and standards, and their relation to public health
CO5: design and evaluate water supply project alternatives on basis of chosen criteria.

CE8591 Foundation Engineering
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
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, Scenarios in the Indian context, Disaster damage assessment and management.
CO4: Examine the mitigation measures and recovery for different types of disaster
CO5: Understand about the disasters based on case studies

OAI551 Environment and Agriculture
Course Outcome: The students, after the completion of the course, are expected to
CO1- Understand the role of environment in the current practice of agriculture and concerns of sustainability
CO2- Study the various impacts of environment due to various agricultural method
CO3- Understand the role of environment in the context of climate change
CO4-Ecological context of agriculture and its concerns will be understood.
CO5-Understand the role of environment in the context of emerging global issues

Laboratory

CE8511 Soil Mechanics Laboratory
Course Outcome: The students, after the completion of the course, are expected to
CO1 Conduct tests to determine the index properties of soils
CO2 Conduct tests to determine the density of soils
CO3 Conduct tests to determine the compaction properties of soils
CO4 Conduct tests to determine engineering properties of soils
CO5 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
CO3: Suggest the amount of dosage required for the treatment
CO4: Examine the conditions for the growth of micro-organisms
CO5: Quantify the sludge produced

CE8513 Survey Camp
Course Outcome: The students, after the completion of the course, are expected to
CO1 Acquire practical knowledge to carryout Triangulation including general field marking for various engineering projects and Location of site etc.
CO2 Acquire practical knowledge to carryout levelling for various engineering projects and Location of site etc.
CO3 Acquire practical knowledge on Theodolite surveying for various engineering projects and Location of site etc.
CO4 Acquire practical knowledge on Tacheometry surveying for various engineering projects and Location of site etc.
CO5 Acquire practical knowledge on Total Station surveying for various engineering projects and Location of site etc.

7 th. Semester B.E. Civil

CE8701 Estimation, Costing and Valuation Engineering
COs Course Outcome: The students, after the completion of the course, are having the ability to
CO1 - Estimate the quantities for buildings
CO2 - Rate Analysis for all Building works, canals, and Roads and Cost Estimate
CO3 - Understand types of specifications, principles for report preparation, tender notices types
CO4 - Gain knowledge on types of contracts
CO5 - Evaluate valuation for building and land

CE8702 Railways, Airports, Docks And Harbour Engineering
COs Course Outcome: The students, after the completion of the course, are having the ability to
CO1. Understand the methods of route alignment and design elements in Railway Planning and Constructions
CO2. Understand the Construction techniques and Maintenance of Track laying and Railway stations
CO3. Gain an insight on the planning and site selection of Airport Planning and design
CO4. Analyse and design the elements for orientation of runways and passenger facility systems
CO5. Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted

CE8703 Structural Design and Drawing
Course Outcome: The students, after the completion of the course, are having the ability to

CO1- Design and draw reinforced concrete Cantilever and Counterfort Retaining Walls
CO2- Design and draw flat slab and bridges as per code provisions
CO3- Design and draw reinforced concrete and steel water tanks
CO4- Design and draw the various steel trusses
CO5- Design and detail the various Gantry girders

GE 8077 Total Quality Management
COs Course Outcome: The students, after the completion of the course, are having the ability to
CO1. enumerate and justify the dimensions of product quality and service quality
CO2. justify strategic quality planning and performance appraisal
CO3. explain the concept of six sigma and benchmarking process
CO4. understand the importance of cost of quality and quality loss
CO5. understand the importance of various quality standardization organization

OML751 Testing of Materials
Course Outcome: The students, after the completion of the course, are expected to
CO1 Identify suitable testing technique to inspect industrial component
CO2 Possess the ability to use mechanical testing technique and know its applications and limitations
CO3 Possess the ability to use non-destructive testing technique and know its applications and limitations
CO4 Possess the ability to use material characterization testing technique and know its applications and limitations
CO5 Possess the ability to use thermal and chemical testing technique and know its applications and limitations

Laboratory

CE8711 Creative And Innovative Project
Course Outcome: The students, after the completion of the course, are expected to
CO1 Demonstrate a sound technical knowledge of their selected project topic.
CO2 Undertake problem identification, formulation and solution.
CO3 Design engineering solutions to complex problems utilizing a systems approach
CO4 Communicate with engineers and the community at large in written an oral form
CO5 Conduct an engineering project

CE8712 Industrial Training
COs Course Outcome: The students, after the completion of the course, are expected to
CO1. Understand the intricacies of implementation textbook knowledge into practice
CO2. Understand the concepts of developments and implementation of new techniques
CO3. Communicate with engineers and the community at large in written an oral forms
CO4. Undertake problem identification, formulation and solution.
CO5. Demonstrate the knowledge, skills and attitudes of a professional engineer

Even Semester 2021-22

4th. Semester B.E. Civil

MA8491 Numerical Methods
Course Outcome: Upon successful completion of the course, students should be able 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.

CE8401 Construction Techniques and Practices
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
CO5: Select, maintain and operate hand and power tools and equipment used in the building construction sites

CE8402 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. Analyse 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 centre, and find the stresses in curved beams

CE8403 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.

CE8404 Concrete Technology
Course Outcome: The students, after the completion of the course, are expected to understand the
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.

CE8491 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: Analyse both finite and infinite slopes

Laboratory

CE8481 Strength of Materials Laboratory
COs Course Outcome: The students, after the completion of the course, are expected to
CO1: Have the required knowledge about tension strength
CO2: Have the required knowledge in compression test
CO3: Find modulus of rigidity of mild steel using torsion test
CO4: Find impact strength using Izod and Charpy test
CO5: Determine hardness number of metal using Brinell and Rockwell testing machine

CE8461 Hydraulic Engineering Laboratory
COs Course Outcome: At the end of the course, the student should
CO1 have the ability to measure flow in pipes
CO2 have the ability to determine frictional losses
CO3 have the ability to develop characteristics curve of pumps.
CO4 have the ability to develop characteristics curve of turbines.
CO5 have the ability to determine metacentric height

HS8461 Advanced Reading and Writing
Course Outcome: The students, after the completion of the course, are expected to
CO1 Write different types of essays.
CO2 Write job applications
CO3 Read and evaluate texts critically
CO4 Display critical thinking in various professional contexts
CO5 Read with correct pronunciation

6 th. Semester B.E. Civil

CE8601 Design of Steel Structural Elements
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

CE8602 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 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 analysing beams and rigid frames

CE8603 Irrigation Engineering
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

CE8604 Highway Engineering
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 Wastewater Engineering
Course Outcome: The students, after the completion of the course, are having the
CO1- ability to estimate sewage generation and design sewer system including sewage pumping stations
CO2- required understanding on the characteristics and composition of sewage, self-purification of streams
CO3- ability to perform basic design of the unit operations and processes that are used in sewage treatment
CO4- Understanding about the standard methods for disposal of sewage
CO5- knowledge on sludge treatment and disposal

CE8005 Air Pollution And Control Engineering
Course Outcome: The students, after the completion of the course, are expected to
CO1 Have an understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management
CO2 Have the ability to identify, formulate and solve air and noise pollution problems
CO3 Have the ability to design stacks and particulate air pollution control devices to meet applicable standards
CO4 Have the ability to select control equipment's
CO5 Have the aability to ensure quality, control and preventive measures

Laboratory

CE8611 Highway Engineering Laboratory
COs Course Outcome: The students, after the completion of the course, are having the
CO1. Ability to understand the properties of aggregate with different tests
CO2. Ability to understand the properties of bitumen with different tests
CO3. Ability to understand the properties of bituminous mixes with different tests
CO4. Ability to understand the importance of Marshall stability value
CO5. techniques to characterize various pavement materials through relevant tests.

CE8612 Irrigation and Environmental Engineering Drawing
COs Course Outcome: The students, after the completion of the course, are expected to
CO1 design and draw various units of impounding structures
CO2 design and draw various units of cross drainage works
CO3 design and draw various units of canal regulation structures
CO4 design and draw various units of Municipal water treatment plants
CO5 design and draw various units of sewage treatment plants.

HS8581 Professional Communication
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
CO5 Enhance the Employability and Career Skills.

8th. Semester B.E. Civil

CE8018 Geo-Environmental Engineering
Course Outcome: The students, after the completion of the course, have the ability to
C01 Assess the contamination in the soil
C02 Understand the current practice of waste disposal
C03 Prepare the suitable disposal system for particular waste
C04 Select suitable remediation methods based on contamination
C05 Select suitable remediation methods based on contamination

CE8020 Maintenance, Repair And Rehabilitation Of Structures
Course Outcome: At the end of the course students will have the ability to
CO1 Understand the importance of maintenance and assessment method of distressed structures
CO2 Understand the strength and durability properties, their effects due to climate and temperature
CO3 Understand recent development in concrete
CO4 Understand the techniques for repair and protection methods
CO5 Understand repair, rehabilitation and retrofitting of structures and demolition methods

Laboratory

CE8811 PROJECT WORK	
COs Course Outcome:	The students, after the completion of the course, are expected to
CO1	Demonstrate a sound technical knowledge of their selected project topic.
CO2	Undertake problem identification, formulation and solution.
CO3	Design engineering solutions to complex problems utilising a systems approach
CO4	Communicate with engineers and the community at large in written and oral form
CO5	Conduct an engineering project