

**EXCEL ENGINEERING COLLEGE**

(Autonomous)

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
Accredited by NBA(AERO,CSE,ECE&MECH), NAAC with "A+" and Recognised by UGC (2f &12B)
KOMARAPALAYAM - 637303

**DEPARTMENT OF CIVIL ENGINEERING
REGULATION - 2020****Course Code:101 Sub Code & Name : 20CE101 & Basics of Civil Engineering**

CO	COURSE OUTCOME
101.1	Gain knowledge on scope and importance of civil engineering.
101.2	Acquire knowledge on the composition, properties and classification of building materials.
101.3	Analyze the properties of timber, and other building materials used in construction
101.4	Explain the various building components and their functions.
101.5	Differentiate the types of masonry and also enumerate the functions of super-structure.

Course Code: 102 Sub Code & Name : 20MA102 & Mathematics - I for Building Sciences

CO	COURSE OUTCOME
102.1	Apply the idea of reducing the complex problems into simple form using matrix technique
102.2	Use both the limit definition and rules of differentiation to differentiate functions.
102.3	Identify the circle of curvature, evolutes and envelope of the curves.
102.4	Explain different method of integration using in Engineering problems
102.5	Show the relationship between the derivative and the definite integral as expressed in both parts of fundamental theorem of Calculus.

Course Code: 103 Sub Code & Name : 20ME101 & Engineering Graphics

CO	COURSE OUTCOME
103.1	Develop the conic sections, special curves, and draw orthographic views from pictorial views.
103.2	Apply the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.
103.3	Construct the projections of simple solids like prisms, pyramids, cylinder and cone.
103.4	Build the sectional views of solids like cube, prisms, pyramids, cylinders & cones and development of its lateral surfaces.
103.5	Organize and draw isometric and perspective sections of simple solids.

Course Code: 104 Sub Code & Name : 20CH102 & Chemistry for Building Sciences	
CO	COURSE OUTCOME
104.1	Develop innovative and eco-friendly method for water purification to meet the growing industrial demand
104.2	Discuss the basic principles and mechanism of working of batteries and fuel cells
104.3	Discuss about various types of alloys and engineering materials
104.4	Identify the nature and problems of the soil
104.5	Demonstrate the importance of protection of metals from corrosion
Course Code: 105 Sub Code & Name : 20ENE01 & Communicative English	
CO	COURSE OUTCOME
105.1	Use effectively the lexical, grammatical and semantic knowledge
105.2	Communicate with clarity using intentional vocabulary in English
105.3	Articulate perfectly and express their opinions confidently using communicative strategies
105.4	Accomplish listening and reading skills for lifelong learning
105.5	Comprehend, interpret and present data
Course Code: 106 Sub Code & Name : 20CE102 & Civil Engineering Practices Laboratory	
CO	COURSE OUTCOME
106.1	Get trained in plumbing works
106.2	Fabricate joints in carpentry components
106.3	Experiment with arc welding equipment to make joints.
106.4	Carry out the basic machining operations for turning and drilling.
106.5	Make the models using sheet metal

Course Code: 107 Sub Code & Name :20MC101 & Induction Programme	
CO	COURSE OUTCOME
107.1	Perform curricular and co-curricular activities excellently.
107.2	Do the skill based training with excellence.
107.3	Work as team for the given task
107.4	Gain character and behavior
107.5	Demonstrate the acquired skills effectively
Course Code: 108 Sub Code & Name : 20ME201 & Engineering Mechanics	
CO	COURSE OUTCOME
108.1	Illustrate the vectorial and scalar representation of forces and moments
108.2	Find the rigid body in equilibrium.
108.3	Determine the properties of surfaces and solids.
108.4	Calculate dynamic forces exerted in rigid body
108.5	Determine the friction and the effects by the laws of friction
Course Code: 109 Sub Code & Name : 20MA202 & Mathematics - II for Building Sciences	
CO	COURSE OUTCOME
109.1	Apply the concepts of differentiation and integration to vectors.
109.2	Observe how the terms of a sequence are represented graphically.
109.3	Identify the Singularities and its corresponding Residues for the given function.
109.4	Construct the first order differential equations from real time phenomena and solve it by suitable method.
109.5	Compare Laplace transform, Inverse Laplace transform and solve the linear differential equations by Laplace transform techniques.

Course Code: 110 Sub Code & Name : 20ENE02 & Advanced Communicative English	
CO	COURSE OUTCOME
110.1	Apply knowledge of English grammar for effective communication
110.2	Make use of common English phrases and vocabulary strength.
110.3	Build self confidence and enhance professionalism
110.4	Implement listening, reading and writing skills in real - life situations
110.5	Speak fluently in English with proper pronunciation, intonation, tone and accent.
Course Code: 111 Sub Code & Name : 20CS201 & Problem Solving using Python	
CO	COURSE OUTCOME
111.1	Develop algorithmic solutions to simple computational problems and read, write, execute by simple python programs.
111.2	Structure simple python programs for solving problems.
111.3	Administer the role of control statements and functions involving the idea of modularity.
111.4	Represent compound data using python strings and lists.
111.5	Read and write data from/to files in python Programs.
Course Code: 112 Sub Code & Name : 20PH202 & Physics for Building Sciences	
CO	COURSE OUTCOME
112.1	Compare the working of lasers and propagation of light through Optical fibers and its applications
112.2	Demonstrate the thermal conductivity of good and bad conductors
112.3	Explain the knowledge about elastic modulus
112.4	Interpret the knowledge about the acoustics of buildings.
112.5	Ability to understand the Fundamentals Concepts of Communication Engineering Classify the natural calamities like seismic hazards, flood hazards in detail

Course Code: 113 Sub Code & Name : 20CE201 & Computer Aided Building Drawing Laboratory	
CO	COURSE OUTCOME
113.1	Gain the various basic commands used for drafting and known the type of coordinate system.
113.2	Utilize the software packages for drafting and modeling.
113.3	Prepare the plan of building components o satisfy the functional and orientation aspects.
113.4	Draw the plan, elevation and sectional views of load bearing structures and framed structures.
113.5	Visualize and draw 2D and 3D models of Engineering Components
Course Code: 114 Sub Code & Name : 20MC201 & Environmental Sciences	
CO	COURSE OUTCOME
114.1	Describe the ecosystem and environment
114.2	Understand the ecological balance and preservation of bio diversity
114.3	Demonstrate various types of pollution in order tocontrol pollution
114.4	Classify the energy sources for the conservation of non conventional energy sources
114.5	Identify the nature and management of e-waste and solid waste
Course Code: 201 Sub Code & Name : 20MA301 & Transforms and Boundary Value Problems	
CO	COURSE OUTCOME
201.1	Classify the linear and non-linear partial differential equations.
201.2	Determine the Fourier series expansion.
201.3	Interpret the solution of boundary value problems.
201.4	Apply transform techniques to solve engineering problems.
201.5	Illustrate the Z-transforms and difference equations.
Course Code: 202 Sub Code & Name : 20CE301 & Mechanics of Solids I	
CO	COURSE OUTCOME
202.1	Explain the concepts of stress and strain, principal stresses and principal planes.
202.2	Determine Shear force and bending moment in beams and understand the concept of theory of simple bending.
202.3	Calculate the slope and deflection of beams by various methods

202.4	Apply theory of torsion in analysis of circular shafts and helical springs
202.5	Analyze plane trusses

Course Code: 203 Sub Code & Name : 20CE302 & Fluid Mechanics	
CO	COURSE OUTCOME
203.1	Identify the fluids in static, kinematic and dynamic equilibrium.
203.2	Demonstrate and solve the problems related to equation of motion
203.3	Implement dimensional and model analysis
203.4	Demonstrate the types of flow and losses of flow in pipes
203.5	Solve the boundary layer problems.
Course Code: 204 Sub Code & Name : 20CE303 & Engineering Geology	
CO	COURSE OUTCOME
204.1	Explain the basic concepts of geology in civil engineering field.
204.2	Identify the formation, properties, types of rocks and its types
204.3	Recognize the physical and chemical properties of various types of minerals present in the types of rocks
204.4	Explain the causes of faults, joints, folds and its mitigation methods in detail
204.5	Identify the application of Geological investigation on construction of various structures such as dams, tunnels & bridges
Course Code: 205 Sub Code & Name : 20CE304 & Surveying I	
CO	COURSE OUTCOME
205.1	Implement the use of various surveying instruments and mapping
205.2	Sketch the traverse by compass and plane table surveying.
205.3	Execute the two types of Leveling
205.4	To undInterpret the leveling concepts in various construction field works
205.5	Identify the applications of theodolite surveying in construction site work.

Course Code: 206 Sub Code & Name : 20CE305 & Construction Materials	
CO	COURSE OUTCOME
206.1	Implement the masonry materials for construction based on the properties of stones, bricks and concrete blocks
206.2	Interpret a suitable binder either lime or cement for mortar and utilize aggregates complying with test standards.
206.3	Recognize the quality of concrete based on the properties of fresh and hardened concrete elements
206.4	Utilize various forms of timber, wood products and surface finishing materials in construction.
206.5	Identify modern construction materials for advanced construction
Course Code: 207 Sub Code & Name : 20MC301 & Interpersonal Skills	
CO	COURSE OUTCOME
207.1	Practice interpersonal communication skills to influence and build good relationships
207.2	Identify and pursue personal learning goals.
207.3	Give evident feedback
207.4	Reveal group dynamics and amiable behavior
207.5	Emphasis the communication process
Course Code:208 Sub Code & Name : 20MA401 & Numerical Analysis and Statistics	
CO	COURSE OUTCOME
208.1	Illustrate the algebraic and transcendental equations
208.2	Apply the numerical techniques of interpolation and error approximations in various intervals in real life situations.
208.3	Classify the numerical techniques for solving first and second order ordinary differential equations.
208.4	Interpret the testing of hypothesis for small and large samples.
208.5	Explain the basic concepts of classifications of design of experiments in the field of engineering

Course Code: 209 Sub Code & Name : 20CE401 & Concrete Technology	
CO	COURSE OUTCOME
209.1	Interpret the properties of ingredients of concrete.
209.2	Recognize the effect of admixtures on properties of concrete
209.3	Implement the concept and procedure of mix design as per IS guidelines
209.4	Demonstrate the concrete based on the properties and tests conducted on fresh and hardened concrete.
209.5	Select the various special concretes with respect to its performance and wide applications in modern construction.
Course Code: 210 Sub Code & Name : 20CE402 & Geotechnical Engineering I	
CO	COURSE OUTCOME
210.1	Classify the soil and assess the engineering properties, based on index properties.
210.2	Analyze the stress concepts in soils
210.3	Understand and identify the settlement in soils.
210.4	Determine the shear strength of soil
210.5	Analyze the stability of slopes
Course Code: 211 Sub Code & Name : 20CE403 & Mechanics of Solids II	
CO	COURSE OUTCOME
211.1	Determine the strain energy and compute the deflection of determinate beams, frames and trusses using energy principles.
211.2	Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements.
211.3	Find the load carrying capacity of columns and stresses induced in columns and cylinders
211.4	Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure
211.5	Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and find the stresses in curved beams
Course Code: 212 Sub Code & Name : 20CE404 & Surveying II	

CO	COURSE OUTCOME
212.1	Select the methods of control surveying
212.2	Identify the survey adjustment required in survey works
212.3	Execute the precise survey by using total station
212.4	Recognize the basic concepts and GPS surveying
212.5	Implement hydrographic surveying and astronomical surveying
Course Code: 213 Sub Code & Name : 20CE405 & Applied Hydraulic Engineering	
CO	COURSE OUTCOME
213.1	Interpret the best hydraulic sections for uniform flow
213.2	Identify an effective section for flow in different cross sections.
213.3	Solve problems in uniform, gradually and rapidly varied flows in steady state conditions.
213.4	Explain the performance of turbines.
213.5	Recognize the operating characteristics of pumps.
Course Code: 214 Sub Code & Name : 20CE406 & Strength of Materials Laboratory	
CO	COURSE OUTCOME
214.1	Evaluate the tensile, shear strength and deflection behavior of steel.
214.2	Identify the compressive resistance of wood
214.3	Evaluate the torsional resistance of steel.
214.4	Identify the quality of steel by conducting impact and hardness tests.
214.5	Recognize the deflection behavior of springs

Course Code: 215 Sub Code & Name : 20MC401 & Soft Skills	
CO	COURSE OUTCOME
215.1	Relate the significance and fundamental nature of soft skills
215.2	Take part in a wide range of Public speaking and professional group discussions
215.3	Plan one's time effectively and productively, especially at work
215.4	Make use of leadership skills to manage stress & conflict
215.5	Organize presentations effectively and participate in interview with confidence.
Course Code: 301 Sub Code & Name : 20CE501 & Design of Reinforced Cement Concrete Elements	
CO	COURSE OUTCOME
301.1	Understand the various design methodologies for the design of RC elements.
301.2	Know the analysis and design of flanged beams by limit state method and design of beams for shear, bond and torsion.
301.3	Design the various types of slabs and staircase by limit state method.
301.4	Design columns for axial, uniaxial and biaxial eccentric loadings.
301.5	Design of footing by limit state method.
Course Code: 302 Sub Code & Name : 20CE502 & STRUCTURAL ANALYSIS I	
CO	COURSE OUTCOME
302.1	Analyse the structures by Strain Energy method.
302.2	Implement the Concept of moving loads and influence lines for simple structures
302.3	Illustrate the analysis of indeterminate beams with influence lines.
302.4	Analyse the structures by slope deflection method
302.5	Analyse the structures by moment distribution method

Course Code: 303 Sub Code & Name : 20CEE07 & Municipal Solid Waste Management

CO	COURSE OUTCOME
303.1	Identify the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management.
303.2	Interpret the source reduction, reuse and recycling of waste.
303.3	Develop plan and design systems for storage, collection, transport, processing and disposal of municipal solid waste. •
303.4	Explain the issues on solid waste management from an integrated and holistic perspective, as well as in the local and international context.
303.5	Design and operation of sanitary landfill.

Course Code: 305 Sub Code & Name : 20CE503 & Environmental Engineering I

CO	COURSE OUTCOME
305.1	Explain the concept of source of water and their characteristics.
305.2	Insight into the structure of drinking water supply systems, including water transport, treatment, and distribution.
305.3	Identify the unit operations and processes in water treatment.
305.4	Recognize the water quality criteria, standards and their relation to public health.
305.5	Illustrate the requirements of water distribution and supply in buildings.

Course Code: 306 Sub Code & Name : 20CE504 & Geotechnical Engineering II	
CO	COURSE OUTCOME
306.1	Conduct site investigation and prepare the report for selection of foundation
306.2	Compute the bearing capacity and settlement of soil
306.3	Evaluate the size of shallow foundations
306.4	Estimate the load carrying capacity of piles and settlement of pile groups
306.5	Analyse the lateral earth pressure on retaining wall
Course Code: 307 Sub Code & Name : 20CE505 & Survey Camp	
CO	COURSE OUTCOME
307.1	Understanding the traversing methods and measuring quantity for before and after execution of a project.
307.2	Knowledge in area measuring and time calculating
307.3	Understanding the gradient of earth surface and to calculate level different.
307.4	Understanding the curve setting and marking in the field.
307.5	Identify the design requirements of water supply in buildings
Course Code: 308 Sub Code & Name : 20CE601 & Design of Steel Structural Elements	
CO	COURSE OUTCOME
308.1	Describe the concepts of various design philosophies.
308.2	Design common bolted and welded connections for steel structuresc
308.3	Design tension members and understand the effect of shear leg.
308.4	Implement the design concept of axially loaded columns and column base connections.
308.5	Interpret specific problems related to the design of laterally restrained and unrestrained steel beams.
Course Code: 310 Sub Code & Name : 20CE602 & Structural Analysis II	
CO	COURSE OUTCOME
310.1	Analyse the structures by matrix flexibility method.
310.2	Analyze the structure by matrix stiffness method.
310.3	Identify the arch structures.

310.4	Analyse and design the cable structures.
310.5	Analyse the plastic structures.

Course Code: 311 Sub Code & Name : 20CE603 & Environmental Engineering II	
CO	COURSE OUTCOME
311.1	Explain the wastewater generation and estimation of wastes.
311.2	Design Sewers and select pipes, pumps.
311.3	Describe the primary treatment sewage systems.
311.4	Summarize the secondary treatment sewage systems.
311.5	Implement the suitable methods of sludge disposal.
Course Code: 312 Sub Code & Name : 20CEE36 & Design of Masonry, Timber & Steel Elements	
CO	COURSE OUTCOME
312.1	Illustrate the basic requirements of Indian standards for the design of masonry walls
312.2	Design the timber beams for strength and stiffness
312.3	Identify the different failure modes of bolted and welded connections and design connections subjected to both axial and eccentric load
312.4	Compute the design strength of beams and connections
312.5	Implement the design of columns, lattices, battens and connections.
Course Code: 313 Sub Code & Name : 20CE003 & Renewable Energy Sources	
CO	COURSE OUTCOME
313.1	Implement the principles of solar radiation
313.2	Identify the solar energy collectors and methodologies of storing solar energy.
313.3	Interpret the methods of applying solar energy in a useful way.
313.4	Demonstrate the sources and potentials of wind energy with its economic aspects
313.5	Explain the methods of harnessing the energy sources like wind, biogas and geothermal energies

Course Code: 314 Sub Code & Name : 20CE604 & Highway Engineering

CO	COURSE OUTCOME
314.1	Demonstrate on highway planning and alignment.
314.2	Illustrate the Geometric design of highways.
314.3	Design the flexible and rigid pavements.
314.4	Interpret on the quality of highway construction materials.
314.5	Identify the pavement management system.

Course Code: 315 Sub Code & Name : 20CE605 & Mini Project	
CO	COURSE OUTCOME
315.1	Explain the knowledge gained in the construction field.
315.2	Identify suitable construction materials.
315.3	Implement the construction techniques in the field.
315.4	Execute the construction as per structural drawings.
315.5	Develop knowledge in preparing a detailed project report.
Course Code: 316 Sub Code & Name : 20CE606 & Internship	
CO	COURSE OUTCOME
316.1	Train in tackling a practical field/industry orientated problem related to construction projects
316.2	Schedule the construction activities from the knowledge gained
316.3	Implement the construction activities based on the practical knowledge gained
316.4	Solve the problems and find the solution for the work execution.
316.5	Identify the various types of construction projects.
Course Code: 401 Sub Code & Name : 20CE701 & Structural Dynamics and Earthquake Engineering	
CO	COURSE OUTCOME
401.1	Explain Types of Analysis.
401.2	Introduction of Structural Dynamics.
401.3	Vibrations of SDOF Systems.
401.4	Methods Solution of Equilibrium Equation
401.5	Identify UnDamped free Vibration
Course Code: 402 Sub Code & Name : 20CE702 & Estimation Costing and Valuation Engineering	
CO	COURSE OUTCOME
402.1	Estimate the quantities for buildings,
402.2	Rate Analysis for all Building works, canals, and Roads and Cost Estimate.
402.3	Understand types of specifications, principles for report preparation, tender notices types.

402.4	Gain knowledge on types of contracts
402.5	Evaluate valuation for building and land.