SCHEME OF INSTRUCTION AND SYLLABI

Master of Engineering

A TWO YEAR PG Program

In

M.E (Civil) (Structural Engineering)

(AICTE Model Curriculum with effect from AY 2023-24)

(R-23 Regulation)

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY

(Autonomous Institution under UGC, Affiliated to Osmania University)

Department of Electronics and Communication Engineering

Accredited by NBA and NAAC-UGC

Chaitanya Bharathi (Post), Gandipet, Hyderabad-500075

PROFESSOR & HEAD
Department of Civil Engineering
Chaitanya Bharathi Institute of Technology
GANDIPET, HYDERABAD-500075

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY

OUR MOTTO: SWAYAM TEJASWIN BHAVA

VISION and MISSION of the INSTITUTE

Vision

To be a centre of excellence in technical education and research.

Mission

To address the emerging needs through quality technical education and advanced research

VISION and MISSION of the DEPT. of Civil Engg.

Vision

To strive for excellence in academics, research and consultancy in the field of Civil Engineering and contribute to the sustainable development of the country by producing quality Civil Engineers with professional and ethical values.

Mission

1. Maintaining high academic standards to develop analytical thinking and independent judgment among the students so that they are fit for industry and higher studies.
2. Promoting skills and values among the students to prepare them as responsible global citizens who can solve complex problems.
3. Preparing the students as good individuals and team members with professional attitude, ethics, and concern for environment and zeal for lifelong learning who can contribute to society.

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DEPARTMENT OF Civil ENGINEERING

PROGRAM EDUCATIONAL OBJECTIVES (PG)

PEO 1: Analyze and design structural systems in compliance with guidelines of various codes.

PEO 2: Identify and employ sustainable, alternative, and cost-effective materials in construction with strict quality control practices in place.

PEO 3: Communicate effectively, and demonstrate leadership qualities and professional ethics.

PEO 4: Engage in life-long learning for career growth and to rise to societal needs.

PROGRAM OUTCOMES (PG)

PO1: An ability to independently carry out research /investigation and development work to solve practical problems

PO2: An ability to write and present a substantial technical report / document

PO3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program

PO4: Formulate / refine the problem and apply suitable methods of solution that result into a sustainable outcome.

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Department of Civil Engineering ME (Structural Engg)

Course Outcomes

Academic Year 2023-2024 1st Sem

S.No	Year/Sem	Name of the Course	
1	1/1	23CE C101-Advanced Structural Analysis	
		23CE C101 1	Analyze continuous beams and redundant trusses using force and displacement approaches (flexibility & stiffness approaches) of matrix methods
		23CE C101 2	Analyze rigid jointed plane frames and grids by flexibility methods.
		23CE C101 3	Analyze rigid jointed plane frames and grids by stiffness methods.
		23CE C101 4	Applies the concepts of (beams of semi-infinite and infinite lengths) an elastic foundation to field problems and analytical models.
		23CE C101 5	Solve the boundary value problems using approximate methods.
2	1/1	23CE C102- Theory of Elasticity	
		23CE C102 1	Will be able to solve the problems of 3-Delasticity with confidence.
		23CE C102 2	Can independently work with the problems of 2-D elasticity in Cartesian/Polar Coordinates.
		23CE C102 3	Are familiarized with the use of Airy's stress function in 2-D problems of elasticity in Cartesian/Polar Coordinates.
		23CE C102 4	Are equipped with the knowledge of various theories of torsion of prismatic bars of various cross sections and can solve the problems of torsion.
		23CE C102 5	Will be able to solve plasticity problems in Structural engineering
3	1/1	23CE E102- Design of Hydraulic Structures	
		23CE E102 1	Understand and analyze forces acting on a gravity dam.
		23CE E102 2	Analyze a gravity dam under dynamic loading such as earthquake.
		23CE E102 3	Design of an Energy Dissipator with horizontal apron.
		23CE E102 4	Investigate and design different components of vertical drop weir such as weir wall.
		23CE E102 5	Explore different types of cross drainage work and design a Syphon aqueduct.
4	1/1	23CE E105- Structural Health Monitoring	
		23CE E105 1	Appraise importance of Diagnosis the distress in the structure, develop an understanding the root causes and factors.
		23CE E105 2	Assess the health of structure using static field methods.
		23CE E105 3	Assess the health of structure using dynamic field tests.
		23CE E105 4	Identify the locations for repairs and various repair methods, can able to suggest rehabilitation methods for structure
		23CE E105 5	Adapt and implement EMI technique

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S.No	Year/Sem	Name of the Course	
5	1/1	23EG A101- English for Research Paper Writing	
		23EG A101 1	Interpret the nuances of research paper writing.
		23EG A101 2	Differentiate the research paper format and citation of sources.
		23EG A101 3	To review the research papers and articles in a scientific manner.
		23EG A101 4	Avoid plagiarism and be able to develop their writing skills in presenting the research work.
		23EG A101 5	Create a research paper and acquire the knowledge of how and where to publish their original research papers.
6	1/1	23EC A101- Value Education	
		23EC A101 1	Gain necessary Knowledge for self-development
		23EC A101 2	Learn the importance of Human values and their application in day-to-day professional life.
		23EC A101 3	Appreciate the need and importance of interpersonal skills for successful career and social life
		23EC A101 4	Emphasize the role of personal and social responsibility of an individual for all-round growth.
		23EC A101 5	Develop a perspective based on spiritual outlook and respect women, other religious practices, equality, non-violence and universal brotherhood.
7	1/1	23CE C103- Structural Design Lab	
		23CE C103 1	Idealize beam grids and frames for the given plan of abuilding
		23CE C103 2	Calculate loads on building elements for a given plan
		23CE C103 3	Analyse building frames using a manual method and software
		23CE C103 4	Design all structural elements of a given building with a practical approach and grouping the design.
		23CE C103 5	Prepare structural drawings with good detailing, in a professional way.
8	1/1	23CE C104- Advanced Concrete Lab	
		23CE C104 1	Develop the stress - strain values for a given high strength concrete and checks its suitability for a purpose.
		23CE C104 2	Interpret the correlation between the cube strength, cylindrical strength split tensile strength and modulus of rupture.
		23CE C104 3	Suggest suitable grade and quality of steel for resisting cyclic loads.
		23CE C104 4	Conduct suitable non-destructive test for the condition assessment of existing concrete members
		23CE C104 5	Carryout the mix design procedure for high strength concrete using various codes
		23CE C104 6	Take proper precaution to avoid flexural and shear failures in concrete beams
		23CE C104 7	Analyze the beam for torsion and calculate the torsional forces and moments.

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Department of Civil Engineering ME (Structural Engg)

Course Outcomes 1nd Sem

Academic Year 2023-2024

S.No	Year/Sem	Name of the Course	
1	I/2	23CE C105- Finite Element Method in Structural Engineering	
		23CE C105.1	The fundamentals of FEM, elements of theory of elasticity.
		23CE C105.2	Principle of minimum potential energy and variation formulation of FEM and analyze simple problems using bar elements.
		23CE C105.3	The analysis of trusses beams and rigid jointed plane frames.
		23CE C105.4	The formulation of Global stiffness matrix, load matrix and analysis structures using 1storder triangular elements, isoparametric elements, and quadrilateral elements.
		23CE C105.5	Application of Axi-Symmetric and Tetra-Hedro elements.
2	I/2	23CE C106- Structural Dynamics	
		23CE C106.1	The student gains expertise and confidence to tackle field dynamic problems, especially in the field of earthquake and wind engineering.
		23CE C106.2	Gets the ability to model any dynamic system and get its response.
		23CE C106.3	Can carry out modal analysis and can easily handle any software and can correctly interpret the results.
		23CE C106.4	Can effectively use practical vibration analysis methods and obtain the dynamic parameters.
		23CE C106.5	Gets the ability to apply numerical methods to get the dynamic response of the systems.
3	I/2	23CE C107- Design of Advanced Concrete Structures	
		23CE C107.1	Analyze and Design curved and deep beam as per the field requirements.
		23CE C107.2	Be able to find the stresses in domes for various loads and design them.
		23CE C107.3	With the thorough knowledge acquired during the course, the student is able to analyze and design Bunkers and Silos with ease.
		23CE C107.4	Be able to assess the structural behavior of Raft, Pile and Machine foundations and design them.
		23CE C107.5	Gets reasonable expertise to implement ductile detailing and also design solid shear walls.
4	I/2	23CE E108- Repair and Retrofitting of Structures	
		23CE E108.1	Identify reasons for distress and suggest remedial measures
		23CE E108.2	Analyze the causes for corrosion and identify the durability factors for the safety of structures
		23CE E108.3	Identify and suggest various repair materials
		23CE E108.4	Analyze and suggest the retrofitting methods
		23CE E108.5	Identify the suitable Tests required for SHM

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S.No	Year/Sem	Name of the Course	
5	1/2	23CE E111- Advanced Foundation Design	
		23CE E111 1	Decide the sustainability of soil strata for different projects.
		23CE E111 2	Design shallow foundations by deciding the bearing capacity of Soil.
		23CE E111 3	Analyze and design the pile foundation.
		23CE E111 4	Understand analysis methods and design for well foundation.
		23CE E111 5	Interpret and implement the concepts of coffer dams and sheet piles.
6	1/2	23CE C108- Model Testing Lab	
		23CE C108 1	Estimate the natural frequencies and mode shapes of a beam.
		23CE C108 2	Evaluate the dynamic response of a building model using shake table
		23CE C108 3	/ Mini shake table set up.
		23CE C108 4	Evaluate the response of building models under wind loads, using wind tunnel setup.
		23CE C108 5	Determine the pattern of deflection and cracks in RC slab elements and portal frames, under static loading. .
7	1/2	23CE C109- Numerical Analysis Lab	
		23CE C109 1	To find roots of nonlinear equations by using numerical methods
		23CE C109 2	To know how to fit the given data in different curves
		23CE C109 3	To know how to solve system of linear equations by using direct and indirect methods
		23CE C109 4	To know how to integrate by using numerical methods
		23CE C109 5	To find solution of first order ODE by numerical methods
		23CE C109 6	To know how to apply computational methods in engineering by using MAT Lab program
8	1/2	23CE C110- Mini Project with Seminar	
		23CE C110 1	As part of the curriculum in the II- semester of the programme each students shall do a mini project, generally comprising about three to four weeks of prior reading, twelve weeks of active research, and finally a presentation of their work for assessment.
		23CE C110 2	Each student will be allotted to a faculty supervisor for mentoring.
		23CE C110 3	Mini projects should present students with an accessible challenge on which to demonstrate competence in research techniques, plus the opportunity to contribute something more original.
		23CE C110 4	Mini projects shall have inter disciplinary/ industry relevance.
		23CE C110 5	The students can select a mathematical modelling based/Experimental investigations or Numerical modeling.
		23CE C110 6	All the investigations are clearly stated and documented with the reasons/explanations.
		23CE C110 7	The mini-project shall contain a clear statement of the research objectives, background of work, literature review, techniques used, prospective deliverables, and detailed discussion on results, conclusions and references.

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Course Outcomes

ME (Structural Engg)
III Sem

Academic Year 2024-2025

S.no	Year/Sem	Name of the Course	
1	2/1	23CE E113- Design of Pre-Stressed Concrete Structure	
		23CE E113 1	Understand the basic aspects of pre stressed concrete fundamentals, and calculate losses in the pre stressed concrete.
		23CE E113 2	Analyze and design pre stressed concrete beam/girders.
		23CE E113 3	Design pre stressed concrete end blocks and understand the mechanism of anchorage zones.
		23CE E113 4	Analyze and Design continuous prestressed beams members.
		23CE E113 5	Analyze and design slabs with partial and full prestressing, and also analyze the crack formations rationally
2	2/1	23EE O101- Waste to Energy	
		23EE O101 1	Understand the concept of conservation of waste
		23EE O101 2	Identify the different forms of wastage
		23EE O101 3	Chose the best way for conservation to produce energy from waste
		23EE O101 4	Explore the ways and means of combustion of biomass
		23EE O101 5	Develop a healthy environment for the mankind
3	2/1	23EC A101- Value Education	
		23EC A101 1	Gain necessary Knowledge for self-development
		23EC A101 2	Learn the importance of Human values and their application in day to day professional life.
		23EC A101 3	Appreciate the need and importance of interpersonal skills for successful career and social life
		23EC A101 4	Emphasize the role of personal and social responsibility of an individual for all-round growth.
		23EC A101 5	Develop a perspective based on spiritual outlook and respect women, other religious practices, equality, non-violence and universal brotherhood.
4	2/1	23CE C111- Dissertation Phase-I	
		23CE C111 1	Students will be exposed to self-learning various topics
		23CE C111 2	Students will learn to survey the literature such as books, national/ international refereed Journals and contact resource persons for the selected topic of research.
		23CE C111 3	Students will learn to write technical reports.
		23CE C111 4	Students will develop oral and written communication skills to present. 5. Student will defend their work in front of technically qualified audience.
		23CE C111 5	The Student will be able to carry out the dissertation/ Research work independently.

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ME (Structural Engg)

Department of Civil Engineering

IV Sem

Course Outcomes

Academic Year 2024-2025

S.no	Year/Sem	Name of the Course	
1	2/2	23CE C112- Dissertation Phase-II	
		23CE C112 1	Students will be able to use different experimental techniques and will be able to use different software/computational/analytical tools.
		23CE C112 2	Students will be able to design and develop an experimental set up/ equipment/test rig.
		23CE C112 3	Students will be able to conduct tests on existing setups/equipment and draw logical conclusions from the results after analyzing them
		23CE C112 4	Students will be able to either work in a research environment or in an industrial environment
		23CE C112 5	Students will be conversant with technical report writing and will be able to present and convince their topic of study to the engineering community.

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