JNTUH UNIVERSITY COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY
HYDERABAD
B.Tech. in CIVIL ENGG.
COURSE STRUCTURE & SYLLABUS (R25 Regulations)
Applicable from AY 2025-26 Batch

I Year I Semester (25 Hours)

S. No.	Course Code	Course Title	L	T	P	Credits
1	BSC	Matrices and Calculus	3	1	0	4
2	BSC	Engineering Physics	3	0	0	3
3	CSC	C Programming and Data Structures	3	0	0	3
4	MEC	Computer Aided Engineering Graphics	2	0	2	3
5	MEC	Engineering Workshop	0	0	2	1
6	HSC	English for Skill Enhancement	3	0	0	3
7	BSC	Engineering Physics Laboratory	0	0	2	1
8	CSC	C Programming and Data Structures Laboratory	0	0	2	1
9	HSC	English Language and Communication Skills Laboratory	0	0	2	1
10	MC	Induction Program				
		Total Credits	**14**	**01**	**10**	**20**

I Year II Semester (27 Hours)

S. No.	Course Code	Course Title	L	T	P	Credits
1	BSC	Ordinary Differential Equations and Vector Calculus	3	0	0	3
2	BSC	Applied Chemistry	3	0	0	3
3	ESC	Basic Electrical and Electronics Engineering	3	0	0	3
4	DC	Engineering Geology and Building Materials	3	0	0	3
5	DC	Geology and Building Materials Testing Laboratory	0	0	2	1
6	DC	Engineering Mechanics	3	1	0	4
7	BSC	Chemistry Laboratory for Engineers	0	0	2	1
8	CSC	Python Programming Laboratory	0	1	2	2
9	ESC	Basic Electrical Engineering Laboratory	0	0	2	1
10	MC	NSS	0	0	2	0
		Total Credits	**15**	**2**	**10**	**21**

II YEAR I SEMESTER(25 Hours)

S. No.	Course Code	Course Title	L	T	P	Credits
1	BSC	Probability and Statistics	3	0	0	3
2	DC	Building Planning and Construction	3	0	0	3
3	DC	Strength of Materials	3	0	0	3
4	DC	Surveying and Geomatics	3	0	0	3
5	DC	Fluid Mechanics	3	0	0	3
6	BSC	Computational Mathematics Laboratory	0	0	2	1
7	DC	Computer Aided Building Drafting Laboratory	0	0	2	1
8	DC	Strength of Materials Laboratory	0	0	2	1
9	DC	Surveying and Geomatics Laboratory	0	0	2	1
10	SDC	Design Thinking Laboratory	0	0	2	1
		Total Credits	**15**	**0**	**10**	**20**

II YEAR II SEMESTER(27 Hours)

S. No.	Course Code	Course Title	L	T	P	Credits
1	DC	Concrete Technology	3	0	0	3
2	DC	Advanced Strength of Materials	3	0	0	3
3	DC	Environmental Engineering	3	0	0	3
4	DC	Hydraulics and Hydraulic Machinery	3	0	0	3
5	DC	Basic Structural Analysis	2	0	0	2
6	DC	Innovation and Entrepreneurship	2	0	0	2
7	DC	Environmental Engineering Laboratory	0	0	2	1
8	DC	Concrete Technology Laboratory	0	0	2	1
9	DC	Hydraulics and Hydraulic Machinery Laboratory	0	0	2	1
10	SDC	Digital Surveying and GIS Laboratory	0	0	2	1
11	MC	Environmental Science	1	0	0	0
12	DC	Real Time / Field Based Project	0	0	2	1
		Total Credits	**17**	**0**	**10**	**21**

III YEAR I SEMESTER(26 Hours)

S. No.	Course Code	Course Title	L	T	P	Credits
1	DC	Reinforced Concrete Design	3	0	0	3
2	DC	Soil Mechanics	3	0	0	3
3	DC	Estimation , Quantity Surveying & Valuation	2	0	0	2
4	PE	Professional Elective-I	3	0	0	3
5	OE	Open Elective-I	2	0	0	2
6	DC	Water Resources Engineering	3	0	0	3
7	DC	Geotechnical Engineering Laboratory	0	0	2	1
8	DC	Advanced English Communication Skills Laboratory	0	0	2	1
9	SDC	Project Management Software Laboratory	0	0	2	1
10	MC	Gender Sensitization Lab*/ Human Values and Professional Ethics*	1	0	0	0
11	MC	Yoga	0	0	2	0
		Total Credits	**18**	**0**	**08**	**20**

***Note: For the courses Gender Sensitization Lab and Human Values and Professional Ethics-** one hour of instruction will be conducted on alternate weeks. For example, if a one-hour class for Gender Sensitization Lab is conducted this week, then a one-hour class for Constitution of India will be conducted in the following week.

III YEAR II SEMESTER(25 Hours)

S. No	Course Code	Course Title	L	T	P	Credits
1	DC	Foundation Engineering	3	0	0	3
2	DC	Design of Steel Structures	3	1	0	4
3	MS	Business Economics and Financial Analysis	3	0	0	3
4	PE	Professional Elective-II	3	0	0	3
5	OE	Open Elective – II	2	0	0	2
6	DC	Transportation Engineering	3	0	0	3
7	DC	Computer Aided Design Laboratory	0	0	2	1
8	DC	Transportation Engineering Laboratory	0	0	2	1
9	SDC	Building Information Modelling Laboratory	0	0	2	1
10	MC	Indian Knowledge System	1	0	0	0
		Total Credits	**18**	**1**	**06**	**21**

IV YEAR I SEMESTER (25 Hours)

S. No.	Course Code	Course Title	L	T	P	Credits
1	DC	Railways, Waterways and Airport Engineering	3	0	0	3
2	DC	Prestressed Concrete	3	0	0	3
3	MS	Fundamentals of Management	3	0	0	3
4	PE	Professional Elective-III	3	0	0	3
5	PE	Professional Elective – IV	3	0	0	3
6	OE	Open Elective – III	2	0	0	2
7	DC	Civil Engineering Software Laboratory	0	0	2	1
8	DC	Computational Laboratory	0	0	2	1
9	DCP	Industry Oriented Mini Project/ Summer Internship	0	0	4	2
		Total Credits	**17**	**0**	**08**	**21**

IV YEAR II SEMESTER(34 Hours)

S. No.	Course Code	Course Title	L	T	P	Credits
1	PE	Professional Elective – V	3	0	0	3
2	PE	Professional Elective – VI	3	0	0	3
3	DCP	Project Work	0	0	28	14
		Total Credits	**6**	**0**	**28**	**20**

***Note:** Students who wish to exit after II Year II Semester has to register for this optional course and acquire the credits allotted by doing 6 weeks Work-based Vocational Course/ Internship or Apprenticeship. Please refer R25 Academic Regulations for more information.

Professional Elective - I

1	Indeterminate Structural Analysis
2	Air Pollution and Control Measures
3	Green Building Technologies
4	Advanced Construction Technologies
5.	Advanced Concrete Technology

Professional Elective – II

1	AI and ML Applications in Civil Engineering
2	Remote Sensing and GIS
3	Construction Planning and Management
4	Industrial Waste Water Treatment
5	EIA and Life Cycle Assessment

Professional Elective- III

1	Smart Cities and Urban Innovation
2	Big Data Analytics in Civil Engineering
3	Ground Improvement Techniques
4	Ground Water Hydrology
5	Pre-Engineered Buildings

Professional Elective- IV

1	Solid and Hazardous Waste Management
2	IoT Applications in Civil Engineering
3	Intelligent Transportation Systems
4	Elements of Earthquake Engineering
5	Hydraulic Structures

Professional Elective- V

1	Pavement Engineering
2	Digital Image Processing in Civil Engineering
3	Urban Hydrology
4	Earth Retaining Structures
5.	Finite Element Analysis

Professional Elective- VI

1	Repair and Rehabilitation of Structures
2	Highway Construction and Practices
3	Sustainable Engineering Technologies
4	Climate Change Adaptation and Mitigation
5	Rock Mechanics

OPEN ELECTIVES

Open Elective- I

1	Disaster Management
2	Low Carbon Materials and Green Buildings

Open Elective- II

1	Building Science and Technology
2	Environmental Impact Assessment

Open Elective- III

1	Road Safety Engineering
2	Building Services Engineering

ASIC STRUCTURAL ANALYSIS – I

II Year II Sem. **L T P C**

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Pre-Requisites: Strength of Materials – I

Course Objectives: The objective of the course is to

- Differentiate the statically determinate and indeterminate structures.
- To understand the nature of stresses developed in perfect frames and three hinged arches forvarious types of simple loads
- Analyse the statically indeterminate members such as fixed bars, continuous beams and forvarious types of loading.
- Understand the energy methods used to derive the equations to solve engineering problems
- Evaluate the Influence on a beam for different static & moving loading positions

UNIT – I

Analysis of Perfect Frames: Types of frames- Perfect, Imperfect and Redundant pin jointed plane frames - Analysis of determinate pin jointed plane frames using method of joints, method of sections and tension coefficient method for vertical loads, horizontal loads and inclined loads.

UNIT – II

Energy Theorems: Introduction-Strain energy in linear elastic system, expression of strain energy dueto axial load, bending moment and shear forces - Castigliano's theorem-Unit Load Method - Deflections of simple beams and pin- jointed plane frames - Deflections of statically determinate bent frames.

Three Hinged Arches – Introduction – Types of Arches – Comparison between Three hinged and Two hinged Arches - Linear Arch - Eddy's theorem - Analysis of Three hinged arches - Normal Thrust and radial shear and bending moment - Geometrical properties of parabolic and circular arches - Three hinged parabolic circular archeshaving supports at different levels.

UNIT - III

Propped Cantilever and Fixed Beams: Determination of static and kinematic indeterminacies for beams- Analysis of Propped cantilever and fixed beams, including the beams with different moments of inertia - subjected to uniformly distributed load - point loads - uniformly varying load, couple and combination of loads - Shear force, Bending moment diagrams and elastic curve for Propped Cantileverand Fixed Beams-Deflection of Propped cantilever and fixed beams - effect of sinking of support, effect of rotation of a support.

UNIT – IV

Continuous Beams: Introduction-Continuous beams - Clapeyron's theorem of three moments- Analysis of continuous beams with constant and variable moments of inertia with one or both ends fixed- continuous beams with overhang - eeffect of sinking of supports.

Slope Deflection Method: Derivation of slope-deflection equation, application to continuous beams with and without sinking of supports -Determination of static and kinematic indeterminacies for frames

- Analysis of Single Bay, Single storey Portal Frames by Slope Deflection Method including Side Sway
- Shear force and bending moment diagrams and Elastic curve.

UNIT – V

Moving Loads and Influence Lines: Introduction maximum SF and BM at a given section and absolute maximum shear force and bending moment due to single concentrated load ,uniformly distributed load longer than the span, uniformly distributed load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length - Definition of influence line for shear force and bending moment - load position for maximum shear forceand maximum bending Moment at a section - Point loads, uniformly distributed load longer than the span, uniformly distributed load shorter than the span.

Course Outcomes: At the end of the course the student will able to

- An ability to apply knowledge of mathematics, science, and engineering.
- Analyse the statically indeterminate bars and continuous beams.
- Draw strength behaviour of members for static and dynamic loading.
- Calculate the stiffness parameters in beams and pin jointed trusses.
- Understand the indeterminacy aspects to consider for a total structural system.
- Identify, formulate, and solve engineering problems with real time loading.

TEXT BOOKS:

1. Basic Structural Analysis by K.U. Muthu *et al.,* I.K. International Publishing House Pvt. Ltd
2. Structural Analysis Vol I & II by G. S. Pandit and S.P. Gupta, Tata McGraw Hill Education Pvt.Ltd.

REFERENCE BOOKS:

1. Structural Analysis by R. C. Hibbeler, Pearson Education
2. Structural Analysis Vol –I & II by V.N. Vazirani and M.M. Ratwani, Khanna Publishers.
3. Mechanics of Structures Vol – I and II by H.J. Shah and S.B. Junnarkar, Charotar Publishing House Pvt. Ltd.
4. Basic Structural Analysis by C. S. Reddy, Tata McGraw Hill Education Pvt. Ltd.
5. Fundamentals of Structural Analysis by M.L. Gamhir, PHI Learning Pvt. Ltd.