



School of Planning and Architecture: Vijayawada
(An institution of National Importance under the Ministry of Education, Govt. of India)
Survey No.4/4, ITI Road, Vijayawada-520008, Andhra Pradesh, India

Department of Architecture

Course: ARC 124; Introduction to Structures **Class:** I Yr B.Arch V Sem A.Y. 2022-23
Instructors: Dr. G.V. Rama Rao (VF) /Dr. P. Siva Prasad **Internal Assessment:** 50
Contact Periods/ week: 04 periods (55 min each) **External Theory Exam:** 50
Time Table: **Total Marks:** 100
Attendance: Min 75% **Credits:** 4
Min. Passing Marks: 50% each in Internal & External Assessment, 50% in Aggregate

Objective: To make students familiar with the basic theorems and mechanical properties of engineering materials, elastic constants, types of stresses and strains, deformation of elastic bodies under simple stresses, the use and principles of composite sections, analysis of frames subjected to vertical loads

Out Line of the Course:

LECTURE PLAN

WEEK	DATE	TOPIC OF CLASS LECTURE & DISCUSSION	TOPIC OF STUDIO WORK& ASSIGNMENTS / REMARKS
1	Week-1	Introduction to development of monolithic, rock-cut structures, trabeated construction, arcuate construction, vaults, flying buttresses, tents, masted structures.	Lecture/Discussion/Studio
2	Week-2	Introduction to development of bridges through ancient & medieval history. Post Industrial modular construction of large span & suspension structures in steel and concrete examples of iconic projects.	Lecture/Discussion/Studio
3	Week-3	Characteristics and strength of natural and manmade building materials like stone, clay, brick.	Lecture/Discussion/Studio
4	Week-4	Characteristics and strength of natural and manmade building materials like terracotta, cement and aggregate.	Lecture/Discussion/Studio
5	Week-5	Introduction of forces, composition, resolution, moments and couples, Resultant of forces.	Lecture/Discussion/Studio
6	Week-6	Lami's theorem, principle of moments, Vargion's theorem. Principle of equilibrium.	Lecture/Discussion/Studio

7	Week-7	Simple problems. Concurrent and non-concurrent co-planar force systems, resultant.	Lecture/Discussion/Studio
8	Week-8	Mid-Semester examination	Mid-semester examination
9	Week-9	Simple stresses and strains, elasticity. Stress, strain, types of stresses, elastic limit, modulus of elasticity, composite sections.	Lecture/Discussion/Studio
10	Week-10	Stresses due to change in temperature. Elastic constants, linear strain, lateral strain.	Lecture/Discussion/Studio
11	Week-11	Poisson's ratio, volumetric strain, relation between E, N, and K.	Lecture/Discussion/Studio
12	Week-12	Introduction to trusses, Elements of truss, Assumptions for truss analysis, structural determinacy.	Lecture/Discussion/Studio
13	Week-13	Methods of analysis of trusses. Problems.	Lecture/Discussion/Studio
14	Week-14	Laboratory Testing on Compression test on Bricks and Solid Blocks, Water absorption test on Bricks and Pressed Tiles, Fineness test of cement, Determination of Bulking of Sand.	Demo
15	Week-15	Laboratory Testing on Study of Universal Testing Machine, Compression Testing Machine, Torsion Testing Machine, Hardness Testing Machine for its operation and application	Demo

S. No.	Stages of Evaluation	Weightage
1	First stage: Assessment –1	15
2	Second stage: Mid-semester Examination	20
3	Third stage: Assessment –3	15
	Total	50

Reference Books:

1. Ferdinand, L. S. (1975). Engineering Mechanics: Statics and Dynamics. 3rd Ed. New York : Harper Collins Publishers.
2. Junnarkar, S. B. (1991). Mechanics of Structures. Vol. 1. 21st Ed. Delhi : Charotar.
3. Kumar, K. L. (2003). Engineering Mechanics. Delhi : Tata McGraw-Hill Education.
4. Ramamrutham, S. (2008). Engineering Mechanics: A Textbook of Applied Mechanics. New Delhi: Dhanpat Rai Publishing Company.
5. Timoshenko, S., Young, D. H. and Rao, J. V. (2007). Engineering Mechanics. 4th Ed. New Delhi :Tata McGraw-Hill Education

Course Instructors:

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(Dr. G. V. Rama Rao / Dr. P. Siva Prasad)

Head of Department :

sd/-

