

CA3633: STRUCTURAL ANALYSIS

Effective Term

Semester A 2022/23

Part I Course Overview

Course Title

Structural Analysis

Subject Code

CA - Civil and Architectural Engineering

Course Number

3633

Academic Unit

Architecture and Civil Engineering (CA)

College/School

College of Engineering (EG)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

CA3632 Mechanics of Structural and Materials

Students must have attempted (including class attendance, coursework submission, and examination) the precursor course(s) so identified.

Equivalent Courses

BC3633/BC3633P Structural Analysis

Exclusive Courses

Nil

Part II Course Details

Abstract

The course provides the knowledge about the physical nature of structural determinacy and the basic techniques used for solving structural problems, and the conceptual understanding of structural behaviour. It deals with analysis of planar statically determinate and indeterminate structures by various methods.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if DEC-A1 app.)		
		DEC-A1	DEC-A2	DEC-A3
1	Calculate the determinacy for various structures (e.g. truss, beam and frame);	20		x
2	Evaluate appropriate approaches used to calculate the reaction and internal forces, moments, and displacements of statically determinate and indeterminate structures under a variety of loading conditions;	50	x	x
3	Explain the importance of the structural analysis approaches;	15	x	x
4	Calculate the deflections, rotations and influence lines of various structures.	15		x

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Teaching and Learning Activities (TLAs)

TLAs	Brief Description	CILO No.	Hours/week (if applicable)	
1	Lecture	Introducing the principles and formulations	1, 2, 3, 4	2 hours/week
2	Tutorial	Discussion with students on tutorial questions	1, 2, 3, 4	1 hour/week

Assessment Tasks / Activities (ATs)

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)	
1	Test	1, 2, 3, 4	20	
2	2 Assignment	1, 2, 3, 4	10	
3	2 Quizzes	1, 2, 3, 4	20	10% each

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

3

Additional Information for ATs

To pass a course, a student must obtain minimum marks of 30% in both coursework and examination components, and an overall mark of at least 40%.

Assessment Rubrics (AR)

Assessment Task

Test

Criterion

ABILITY to USE the math techniques in solving structural analysis problems

ABILITY to Explain the importance of the structural analysis approaches

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

2 Assignment

Criterion

ABILITY to USE the math techniques in solving structural analysis problems

ABILITY to Explain the importance of the structural analysis approaches

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

2 Quizzes

Criterion

ABILITY to USE the math techniques in solving structural analysis problems

ABILITY to Explain the importance of the structural analysis approaches

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Examination

Criterion

ABILITY to USE the math techniques in solving structural analysis problems

ABILITY to Explain the importance of the structural analysis approaches

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

Concept of indeterminacy, principle of superposition. Method of consistent deformations. Slope deflection method. Moment distribution method. Stiffness (displacement) matrix method. Lack-of-fit, support settlement, temperature effects. Modern approaches to structural analysis of frameworks. Influence line. Classical approaches to structural analysis of beams/frames.

Reading List

Compulsory Readings

	Title
1	Aslam Kassimali, Matrix Analysis of Structures
2	Kenneth M. Leet Fundamentals of Structural Analysis
3	Harry H. West and Louis F. Geschwindner Fundamentals of Structural Analysis

Additional Readings

	Title
1	J. D. Todd, Structural Theory and Analysis
2	T. H. G. Megson Structural and Stress Analysis
3	C. K. Wang Intermediate Structural Analysis