

## Faculty of Engineering & Technology

### Theory of Structures

#### Information :

**Course Code :** SCM 214

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Department of Architectural Engineering

#### Instructor Information :

Title	Name	Office hours
Lecturer	Dina Muhammad Fathy Ors	
Assistant Lecturer	MUHAMMAD DIAB SAAD ELDIN ABDLAAL	

#### Area Of Study :

Upon successful completion of the course, the student should be able to:

1. Identify the types of structural members.
2. Verify the stability of various types of structural systems.
3. Name the causes of instability of structures.
4. Identify the determinacy of a structure and its degree.
5. Apply the equations of equilibrium to get the reactions at supports for different structures subjected to different load types.
6. Calculate the internal force values at any sections in beam or frame structures under various loads.
7. Draw the internal force diagrams for beam and frame structures subjected to concentrated, uniform and triangle loads.
8. Recognize the relationship between load, shear and bending moment in frame elements.
9. Analyze truss structures and determine internal forces in truss members using joint and section methods.

#### Description :

Types of structures and loads, classification of structural elements (link, beam, column and shell), types of structures (trusses, frames, arches, cables and surface structures), analysis of statically determinate structures for beams and frames using the equations of equilibrium, stability and determinacy for beams and frames, internal forces developed in structural members subjected to different types of loads (normal force, shear force and bending moment), analysis of truss structures, determine the internal forces in truss members using section and joint methods.  
Lecture Hours 2, Exercise/Lab 2.

#### Course outcomes :

##### **a. Knowledge and Understanding: :**

1 -	Define various types of structural members.
2 -	Identify the stability of structures.
3 -	Identify the determinacy of structures.
4 -	State the equations of equilibrium.

**b. Intellectual Skills: :**

1 -	Apply the equations of equilibrium.
2 -	Analyze various types of instability of structures.
3 -	Relate the relationship between load, shear and bending moment in frame elements.
4 -	Analyze the determinacy of structures and the degree of indeterminacy.

**c. Professional and Practical Skills: :**

1 -	c1. Determine the reactions of determinate structures using the equations of equilibrium.
2 -	Calculate the internal force values at any sections in beam or frame structures under various loads.
3 -	Draw the internal force diagrams for beam and frame structures subjected to concentrated, uniform and triangle loads.
4 -	Determine the internal forces in truss members.

**d. General and Transferable Skills: :**

1 -	Work within constraints of time.
2 -	Managing time and meeting deadlines.

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction to structural analysis. Types of structures and members.	4	2	2
Equations of equilibrium. Application on simple and continuous beams.	4	2	2
Application of the equations of equilibrium on frames.	4	2	2
Stability and determinacy	4	2	2
Internal forces in simple beam.	8	4	4
Internal forces in continuous beam.	8	4	4
Internal forces in frames I.	8	4	4
Internal forces in frames II.	8	4	4
Internal forces in inclined members under uniform and triangular distributed loads.	4	2	2
Analysis of truss structures I.	4	2	2
Analysis of truss structures II.	4	2	2

**Teaching And Learning Methodologies :**

Lecture
Class Work

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Assignment	20.00		–
Final-term Examination	40.00		–
Mid-Term Examinations	30.00		–

Performance & Participation	10.00		
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**Course Notes :**

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**Recommended books :**

- 1-Structural Analysis, R. C. Hibbeler, Pearson Education, 2014.
- 2-Handouts, prepared by the instructor.

**Periodicals :**

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**Web Sites :**

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