

## FACULTY OF **ENGINEERING**

DEGREE COURSE: **CIVIL AND ENVIRONMENTAL ENGINEERING**

MASTER DEGREE: **CIVIL ENGINEERING**

**SUBJECT:** STRUCTURAL ANALYSIS

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### **OBJECTIVES**

1. To provide the analytical tools for the dynamic analysis of the structures.
2. To provide the basic concepts for the limit analysis of the structures.

### **CONTENTS**

1. Structural dynamics of single degree of freedom structures.
2. Structural dynamics of multi degree of freedom structures.
3. Structural dynamics of continuous structures.
4. Yield criteria: Tresca yield criterion and von Mises yield criterion.
5. Elastic and plastic deformations, Hill's postulate, Drucker stability criterion, convexity of the yield surface.
6. Interaction curves for cross sections subjected to bending moment and axial force.
7. Collapse mechanisms for elastic-plastic structures.
8. The limit analysis theorems and the evaluation of the collapse load multiplier for elastic-plastic structures.
9. No tension materials.
10. Collapse mechanisms for structures made of no tension material.
11. The limit analysis theorems and the evaluation of the collapse load multiplier for structures made of no tension materials.
12. Stability of the elastic equilibrium.
13. The Kirchhoff-Love theory of plates.

### **LEARNING OUTCOMES**

1. Modal response spectrum linear analysis of structures.
2. Evaluation of the collapse mechanism and the load collapse multiplier of elastic-plastic structures.
3. Evaluation of the collapse mechanism and the load collapse multiplier of structures made of no tension materials.

### **ASSESSMENT**

Written exam: multiple choice and open questions

### **RECOMMENDED TEXTBOOKS**

Anderson, J. C., Farzad, N. Basic Structural dynamics. John Wiley & Sons, 2012.

Martin, J. B. Plasticity: fundamentals and general results. The MIT press, 1975.  
Como, M. Statics of masonry constructions. Springer, 2013.  
Heyman, J. Elements of the theory of structures. Cambridge University Press, 1996.