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UNIVERSITY OF ZAMBIA  
School of Engineering  
Civil and Environmental Engineering CEE 2219

## STATICS AND INTRODUCTION TO MECHANICS OF MATERIALS

2019/2020

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<b>Class Information:</b>	Lecture: Mines Lecture Theatre, 08:00, <u><i>Always Keep Time &amp; You Miss You Loss</i></u> Tutorial: Mines Lecture Theatre, 14:00, Always Keep Time Credit: 0.5 Credits
<b>Lecturer:</b>	Mr. J.Q. Liyungu, - joshua.liyungu@unza.zm
<b>Tutor</b>	TBA.
<b>Targeted Group:</b>	Second Year Students in School of Engineering and School of Mines
<b>Prerequisite:</b>	PHY 1010, MAT 1100
<b>Office Hours:</b>	14:00 to 15:30 By Appointment By E-mail
<b>Office:</b>	SR07 Annex Building
<b>Allocated Time:</b>	2 Hours Lecture + 2 Hours Tutorials per Week over two terms of the academic year

### Rationale

Knowledge of Mechanics is essential in all branches of engineering. This course is intended to introduce the basic concepts of mechanics to the beginners in the engineering study.

### Course Objectives

The primary objective of this course is to introduce students to topics in statics and mechanics of materials. At the end of this course, the students should be able to:

- (a) Construct and solve mathematical models which describe the effects of force on rigid bodies under statical conditions.
- (b) Learn the essential concepts in dealing with similar problems involving deformable bodies.
- (c) Develop the habit of clear and logical thinking leading to a well-disciplined method of attack from hypothesis to solution.

## **Course Content**

STATICS: Basic concepts, composition and resolution of force, couple and moment, resultant of a system of forces and moments, analysis of trusses, frames and machines, phenomena and types of frictional forces, problems involving dry friction in wedges, screws, bearings and belt drives.

Determination of centre of mass and centroid of area, definition and determination of second moments of area and mass, parallel axis and inclined axis theorems, Mohr's circle of inertia.

STRENGTH OF MATERIALS: Mechanical and elastic properties of materials, concepts of stress and strain, elasticity and elastic constants, direct and shear stresses and strains, strain energy.

Indeterminate problems involving thermal stresses, compound stress and strain, general two-dimensional stress system, principal stress and strain, Mohr's circle of stress and strain.

Analysis of beams, bending moment and shear force diagrams, relationships between distributed load, bending moment and shear force in beams.

## **Prescribed Texts**

- 1) Russell C. Hibbeler: Engineering Mechanics – Statics, Prentice Hall.
- 2) Rajput R.K., Strength of Materials, S Chand Publication.
- 3) Internet connectivity and availability of a computer are a must.

## **Recommended Texts**

- 1) Meriam J.L., *Engineering Mechanics (Vol 1) – Statics J Wiley, New York.*
- 2) Ryder G.H. *Strength of Materials. ELBS, London.*

## **Assessment**

- 1) Mid-term: 10% Assignments + 20% Tutorial Tests + 70% Mid-term Test
- 2) Final: 5% Assignments + 15% Tutorial Tests + 20% Mid-term test + 60% Final Examination.