

University of Nairobi

Department of Environmental & Bio-systems Engineering

4th Year Second Semester – Start: 13/01/2014 End: 27/04/2014

FEB 404 – Structural Design

COURSE OUTLINE

Lecturer: Eng. Stephen Mwaura

Mondays, 2pm – 4pm & Fridays, 2pm – 4pm

Course Objective

The objective of this course is to introduce students to civil engineering structural design and enable them appreciate the basic concepts and principles of structural design. Through the course, the students will be introduced to and undertake simple designs of various structural elements in reinforced concrete, steel, timber and masonry.

Course Content

This course will introduce students to Structural Design: Reinforced Concrete; Pre-stressed Concrete; Timber; Steel; Masonry; Composite Materials. It will also introduce students to methods of design: Elastic Method; Plastic Method; Limit State Method. The course will also delve into foundation design: Foundation types; Modes of load transfer; Simple design. The course will also have a Laboratory Assignment: Design and verification of strength by testing (one assignment) and a class trip to a construction site. Lastly there will be introduction to students on computer applications in structural design.

Expectations and Evaluation

Class attendance is compulsory and active participation is expected of each student. 5% of the final mark will be on class attendance and participation. One Continuous Assessment Test (CAT), worth 15% of the final mark, will be given during the CAT Week (March 3rd, 2014 – March 7th, 2014). In the CAT, students are to answer all three questions. There will also be a Laboratory Assignment culminating in writing a laboratory report by each student that will constitute 10% of the final total marks. This report will be handed in two weeks after the last laboratory loading exercise. The end of semester examination will be during the exam weeks (April 14th, 2014 – April 27th, 2014) and will constitute 70% of the final mark. The exam will have five questions and students are to answer any three.

Teaching Schedule (January 2014 – April 2014)

Week 1	January 13 th , January 17 th	-
Week 2	January 20 th , January 24 th	Introduction to Structural Design: Plain Concrete, Reinforced Cement Concrete (RCC)
Week 3	January 27 th , January 31 st	Introduction to Structural Design: Failure in RCC Structures; Pre-stressed Concrete; Timber; Steel; Masonry; Composite Materials.
Week 4	February 3 rd , February 7 th	Types of Designs – Elastic Method; Plastic Method; Limit State Method. Design of RCC Slabs – Theory and Examples
Week 5	February 10 th , February 14 th	Design of RCC Slabs – Theory and Examples
Week 6	February 17 th , February 21 st	Design of RCC Beams – Theory and Examples
Week 7	February 24 th , February 28 th	Introduction to Columns Design: Theory and Examples
Week 8	March 3 rd , March 7 th	Introduction to Foundation Design: Foundation Types, Modes of Load Transfer, Simple Design. CAT
Week 9	March 10 th , March 14 th	Introduction to Foundation Design: Foundation Types, Modes of Load Transfer, Simple Design. Laboratory Assignment: Design and

