



UNIVERSITY OF NAIROBI

DEPARTMENT OF ENVIRONMENTAL AND BIOSYSTEMS ENGINEERING

FEB 403 : MECHANICAL DESIGN – 2012/2013

Course instructor: Eng. Dr. A.N. Gitau – Senior Lecturer

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Office hours: Immediately following each class.

Students are encouraged to make use of office hours

Course Objectives

To assist students in;

- Understanding the engineering design process
- Applying engineering skills to a design project that includes building and testing a prototype
- Working successfully in an engineering team to develop a detailed design of a subsystem, prototype, test and evaluation of their design.
- Successful writing of engineering and technical reports

Course Outline

1. Introduction to Engineering Design
 - Basis of mechanical engineering design and it's process.
2. Application of general principles and empiricism of mechanics of solids to the creative design of equipment
 - Dimension Analysis (DA) in design
3. Product development, management and economics

- Methodology of intermediate design and practice in the design of a specific system (fasteners, shafts, coupling, hydraulics and pneumatic machinery sealing)
- Practical design processes including but not limited to; modification of a sample excluder, subsoiler, ripper, decorticators (sisal, groundnut) etc. Generally equipment for Biosystems and environmental applications.

4. Report writing

- Technical and engineering reports

Grading system

A	Team/Group Grade	Wt. (%)
1	Written progress report	10
2	Oral presentation	10
3	Fabricated prototype	20
B	Individual Grades	
1	Assignment	10
2	Lecture and class attendance	15
3	Final report	10
4	CAT	25
	Total	100%

Note:

- Students are encouraged to use the libraries and the internet (numerous websites) as frequently as possible
- To be graded for University examinations in any course unit, you must have attended over 75% of the time allocated to that course
- This course is the culmination of your undergraduate engineering education. As part of a student team; you will apply your engineering skills to a design project that includes building and testing a prototype, with the guidance and advice of Faculty members
- This semester, you must work successfully in an engineering team to develop a detailed design of one or more of the subsystems of the surveillance system, then prototype, test and evaluation of your design. All students will be responsible for integration of the subsystems into an overall solution. A core requirement of this course is application of engineering design methodology, employing both engineering analysis and synthesis, to solve problems. Each student team must employ various analyses, methodologies and other engineering tools and processes throughout the design project.
- University policy on **ACADEMIC DISHONESTY** will be followed in this course. Be aware of plagiarism issues especially regarding directly reproducing web based materials. When in doubt, cite your source.

References

- **Designing for humans: The human factor in Engineering** (1986) by John Burgess
- **Designing for economic production** (1987) by H.E. Trucks
- **Engineering graphics** (1981) by Giesecke et al.
- **Human engineering guide to Equipment Design** (2008) by a joint Army- Navy- Air force Steering committee.
- **Machinery's Handbook** (24th revised edition-2007) edited by Robert E. Green
- **Mechanical Design**. Childs P.R.N. 2004. 2nd edition.
- **Step an introduction** *Technical report* (1997) j. owen.
- **The Elements of Style** (3rd Edition ,1979) by Williams Strunk Jr. and E.B. White
- **The Mechanical Design Process**. 3rd Ed, Mc Graw- Hill, 2003 David G. Ullman.
- **Total Design: Integrated methods for successful product engineering** (1991) by Stuart Plugh
- **User's Guide: Engineering Materials Properties Database System** (1995-97) by Scott McCormick. <http://www.epmtech.jotne..com/training/>

- *Have a Productive Designing Semester* -