King Saud University – Al-Muzahmyiah Branch
College of Engineering
AGE 2330 Engineering Mechanics
Course Syllabus

Lecture Information:

Module: Engineering Mechanics – AGE 2330.
Where: Engineering Faculty bldg.
When: See your timetable.
Pre-requisites: Calculus for Engineers MATH 1110, Linear Algebra and Vector Analysis MATH 1120.

Staff:

Module Convenor: Dr. Feras Younes.
Where:Engineering Faculty bldg. 1st floor RoomF097.
Office Hours: Tue 9-10, 11-12, and Wed. 8-9, 11-12. Open door policy is applied.
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Module Description:

Force systems; vector analysis, moments and couples in 2D and 3D. Equilibrium of force systems. Analysis of structures; plane trusses and frames. Distributed force system; centroids and composite bodies. Area moments of inertia. Analysis of beams. Friction. Kinematics of a particle: curvilinear motion, and relative motion; Kinematics of a rigid body in plane motion: relative velocity and acceleration, and rotating axes; Kinetics of particles: Newton's law, work and energy, impulse and momentum, and impact; Kinetics of a rigid body in plane motion: translation, fixed axis rotation, general motion, work and energy, and impulse and momentum.

Module Aims:

The aims of this module are:

- Analysis of simple mechanical systems.
- Modelling and analysis of mechanical systems that are in static equilibrium.
- Follow general, well-systemized procedures
- Drawing a free-body diagram and on selecting an appropriate coordinate system.
- The application of Newton's second law to engineering problems
- Knowledge of kinematics of particles and rigid bodies.
- Knowledge of kinetics of particles and rigid bodies using Newton's laws.
- Knowledge of how to understand and apply work-energy and
- Proficiency in the analysis of the motion of particles and rigid bodies.

Module Learning Objectives:

At the end of this module, the student is expected to:

i. Become proficient in the modeling and analysis of simple static and dynamic mechanical systems, (2-D and 3-D particle and rigid body equilibrium, 2-D trusses and frames, virtual work, dry friction), and the effects of simplified loading scenarios including the use of appropriate diagrams (physical, free body). (a,e)

ii. Gain experience in carrying out a complex, long term design project (a, b, c, d, e, f, g, h, j, k)

iii. Gain experience in working in a team environment in group problems in class and in the design project. (d)

iv. Gain an appreciation of and a facility for producing well-organized and clearly written work to facilitate communications with others and review by tutors. (g)

v. Gain exposure to the greater engineering community through receiving announcements in class of Career Development and student professional activities and through presentations in class on relevant contemporary issues and faculty research. (h, i, j)

Course Learning Outcomes mapped to Student Outcomes:

Student Outcomes (ABET)	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes	i	ii	ii	ii, iii	i, ii	ii	ii, iv	ii, v	ii, v	ii, v	ii
Emphasis	**5**	2	3	4	**5**	3	3	2	2	2	3

Module Schedule:

The lectures will follow the same order as that on the textbooksgiven below. The module will include the followingtopics:

Topics	**№ofWeeks**	**Contact hours**
General Principles, and Force Vectors. Vector Operations	**1**	**3**
Equilibrium of a Particle and Force System Resultants.	**1**	**3**
Equilibrium of a Rigid Body and Structural Analysis	**1**	**3**
Friction	**1**	**3**
Center of Gravity, Centroid and Moments of Inertia	**1**	**3**
Kinematics of a Particle: curvilinear motion, and relative motion.	**2**	**6**
Kinetics of a Particle: Newton's law, work and energy, impulse and momentum, and impact;	**2**	**6**
Planar Kinematics of a Rigid Body: relative velocity and acceleration, and rotating axes.	**2**	**6**
Planar Kinetics of a Rigid Body: translation, fixed axis rotation, general motion, work and energy, and impulse and momentum.	**3**	**9**
Total number of weeks and contact hours per semester	**14**	**42**

Textbook and Materials needed:

The textbook isEngineering Mechanics, Vol. 1, Statics and Vol. 2, Dynamics, SI Version, by J.L. Meriam and L.G. Kraige. The latest editions are recommended and other editions should be fine to use.

Other references cover the above sections and the one highlighted in the lectures should be ok to use as well.

The lecturer is highly recommending the students to serve the internet for preparation and study subjects related to this module.

You will need a simple scientific calculator that has sine, cosine, and exponential functions, along with their inverse functions. Please note that sharing calculators will not be allowed during exams.

Lectures:

The chapters to be presented during each lecture are indicated on the course schedule. To gain the most from the lectures, you should read the chapters and work through the entire example problems prior to attending a lecture. You are expected to attend all lectures and tutorials. Excessive absences will reduce your grade.

Exams:

The exams will be all closed book with formula sheet given if needed. Each student should bring his calculator. No sharing of calculators in exams is allowed. **Assessmenttool table is highlighted below.** The student should know that cheating on exams or other coursework will not be tolerated.

No.	Assessment tool	Due Date	Proportion of Final Assessment (%)
1	Quiz I	Thursday 19/10/2017	5
2	Mid-term Exam I	Sunday 29/10/2017	20
3	Quiz II	Thursday 16/11/2017	5
4	Mid-term Exam II	Sunday 3/12/2017	20
5	Final Exam	See your table	40
6	Sharing, discussion and homework	Throughout the term	10

Notes:

If you have difficulty with any of the problems or if you have questions about the course material, come to my office hours and discuss with the teaching assistant (TA) as well. Feel free to contact me by e-mail as well. Let me know if you have any kind of disability. All help available will be given.

Good Luck, *Dr. Feras Fraige*