

DEPARTMENT OF MECHANICAL ENGINEERING
STONY BROOK UNIVERSITY
Design of Machine Elements

COURSE TITLE: MEC410 Design of Machine Elements, Spring 2017 (3 credits)

PREREQUISITES: MEC310, MEC363

BLACKBOARD <http://blackboard.stonybrook.edu>
(It is required that you use the Blackboard for this course.)

LECTURE: 5:30 – 6:50 PM, Mon, Wed; Room: Engineering 143

INSTRUCTOR: Jay Mendelson, Professor email: jay.mendelson@stonybrook.edu

OFFICE: Light Engineering 171

OFFICE HOURS: Mon and Wed 1:00-3:00 PM

TA: Mr. Carlos Saldarriaga; carlos.saldarriaga@stonybrook.edu & Office: office hours by appointment

Ms. Mariya Boryssenko mariya.boryssenko@stonybrook.edu; office hours by appointment

COURSE OBJECTIVES:

Application of analytical methods, material science, and mechanics to problems in design and analysis of machine components. Includes the design of mechanical components such as bearings, gears, shafting, springs, fasteners, belts, clutches, and brakes, and takes into consideration factors such as manufacturability and reliability. Design projects with open-ended and interactive problems are assigned to integrate several machine elements in a system.

ASSIGNMENTS: (i) Homework problems are due one week after they are assigned; Solutions will be posted one day after the due date. Late homework will not be accepted. (ii) Design projects are due one week following their assignment unless otherwise stated. Written reports are expected for all design projects.

TEXT: R. L. Mott, "Machine Elements in Mechanical Design," 5th ed., Pearson, 2014 (ISBN-10: 0-13-507793-1, ISBN-13: 978-0-13-507793-1)

EXAMINATIONS: 3 Midterms (in class, 80 minutes). Only the highest 2 of 3 grades will be counted.

1 Final, to be scheduled during finals week in May 2017

_ All exams are scheduled in class, using a student prepared equation sheet and a calculator

_ NO make-up exams unless arranged prior to the exams and for extenuating circumstances

GRADING: Semester letter grade is based upon performance in the following categories.

Homework assignment 10%

Design projects 20%

Midterm exams 30%

Final exam 40%

Course Outline and Assignments:

wk	dates	Subject	Reading	Misc.
1	1/23-1/25	Introduction; Belt Drives and Chain Drives	ch 7	Course overview
2	1/30-2/1	Kinematics of Gears	ch 8	
3	2/6-2/8	Spur Gear Design	ch 9	
4	2/13-2/15	Helical Gears, Bevel Gears, and Worm Gears	ch 10	Exam #1: Wednesday 2/15
5	2/20-2/22	Keys, Couplings, Seals and Shaft Design	ch 11 and 12	
6	2/27-3/1	Rolling Contact Bearing	ch 14	
7	3/6-3/8	Design of a Power Transmission System	ch 15	Design project I in lieu of homework
8	3/13-3/15	Spring Recess		<i>No classes</i>
9	3/20-3/22	Tolerances	Ch 13	Exam #2: Wednesday 3/22
10	3/27-3/29	Linear Motion Elements	ch 17	
11	4/3-4/5	Springs	ch 18	
12	4/10-4/12	Fasteners	ch 19	
13	4/17-4/19	Electric Motors and Controls	ch 21	
14	4/24-4/26	Motion Control: Clutches and Brakes	ch 22, first half	Exam #3: Wednesday 4/26
15	5/1-5/3	Motion control: Clutches and Brakes <i>Wrap up and Review</i>	ch 22, second half	Design project 2 in lieu of homework
16	5/8-5/12	Study week		Final Exam: TBD, mid-May

ABET Student Outcomes:

(a) An ability to apply knowledge of mathematics, science, and engineering:
(a3) apply knowledge of science in the analysis of engineering systems;
(a4) apply engineering concepts to devise mechanical engineering solutions in thermal and mechanical systems

(c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability:

(c1) assess desired needs and multiple realistic constraints in the development of design specifications;

(c2) generate and evaluate design concepts according to a set of specifications;

(c3) design physical systems, components, or processes

(e) An ability to identify, formulate, and solve engineering problems:

(e1) integrate engineering knowledge to recognize problems and identify models of thermal and mechanical systems;

(e2) develop criteria for the evaluation of proposed solutions to engineering problems;

(e3) generate and evaluate possible solutions to engineering problems

(f) An understanding of professional and ethical responsibility:

(f1) know the principles of ethics in engineering;

(f2) consider the ethical implications of an engineering solution

(k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice:

(k1) utilize engineering standards in design and analysis

The Bachelor of Science (B.S.) degree program of Mechanical Engineering is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>.

Usage of Blackboard

Students are required to use Blackboard, where important announcements, slides, homework, assignments, and supplementary materials of the course are posted.

<http://blackboard.stonybrook.edu>

Use your NetID and password to login. You can also call the Blackboard Support Team at: 631-632-2777

or

e-mail: blackboard@stonybrook.edu for further information.

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Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website:

<http://www.stonybrook.edu/ehs/fire/disabilities>

ACADEMIC INTEGRITY STATEMENT: Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>

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