

MEC 410 – Design of Machine Elements

The State University of New York, Korea

Spring 2018

Instructor: Prof. Achilles Vairis, B625 Academic Building
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Lectures: Tuesday and Thursday @ 14:00-15:20 (TBA)

Textbook : R. L. Mott, "Machine Elements in Mechanical Design," 6th ed., Pearson, 2018 (ISBN-10: 0-13-4441118-4, ISBN-13: 978-0-13-444118-4)

Prerequisites : MEC 310, MEC 363;

Office Hours: Tuesday and Thursday 1530 -1700 (or by appointment)

Grading:

Homework	10%
Midterm exams (three)	30%
Final exam	35%
Attendance	3%
Design Projects (two)	20%
Quiz	2%

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

Late homework will not be accepted, unless you have made prior arrangements.

All midterm exams will be scheduled in class.

No makeup exam unless arranged prior to the exam and for extenuating circumstances.

Policies:

- Students are required to use Blackboard, where important announcements, slides, homework, assignments, and supplementary materials of the course are posted. The Blackboard can be accessed at <https://blackboard.stonybrook.edu/>.
- The time and details about exams will be announced in the class (and also posted on the Blackboard).
- It is the responsibility of students to make sure that they can access the Blackboard and they have a working email registered with it. The Blackboard should be checked frequently for new materials.
- Exams will be closed book and note. Each person should have a calculator for the required computations.

Course Overview:

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 belts, chains, gears, shafts, bearings, linear motion elements, springs, fasteners, frames, motors, brakes, and clutches. It 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.

Course outline:

- Design for Different Types of Loading
- Belt Drives and Chain Drives
- Kinematics of Gears
- Spur Gear Design
- Helical Gears, Bevel Gears
- Worm Gears, Keys, Couplings, and Seals
- Design of Shafts
- Spring Recess
- Tolerances and Rolling Contact Bearings
- Design of a Power Transmission System and Linear Motion Elements
- Springs
- Fasteners
- Frames and AC Motors
- DC Motors
- Clutches and Brakes

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

¹The Bachelor of Science (B.S.) degree program of Mechanical Engineering is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>.

Disability Support Services (DSS):

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact One-Stop Service Center, Academic Building A201, (82) 32-626-1117. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

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. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website: http://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical Incident Management Statement:

The State University of New York, Korea expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.

Attendance Policy of SUNY Korea:

1. All students of SUNY Korea are required to attend every class.
2. Unexcused absences will affect seriously the student's final grade in the course.
3. If a student has over 20% unexcused absence, the student's final course grade will be an 'F'.
4. Students should report the reason of absence to the instructor in advance, or immediately after the absence.
5. When a student excuses his/her absence, the student must provide documentation of the reason for the absence to the instructor.
6. The instructor of the course reserves the right to excuse absences.
7. The course instructor may excuse the absence if the submitted documentation fulfills the conditions below.
 - Extreme emergencies (e.g. death in the family)
 - Severe medical reasons with doctor's note (Not a slight illness)
 - Very important events (e.g. national conference, official school event)

8. At the end of semester, the course instructor should submit a copy of the attendance sheet to the Academic Affairs Office.