

# MEC 410 – Design of Machine Elements

The State University of New York, Korea

Spring 2020

**Instructor:** Prof. Jong Jin Park, B622 Academic Building (jongjin.park@sunykorea.ac.kr)

**Lectures:** Tuesday and Thursday 3:30-4:50 PM (A117 Academic Building)

**Textbook:** R. G. Budynas and J. K. Nisbett, “Shigley’s Mechanical Engineering Design” (10th ed. in SI unit, McGraw-Hill, 2015, ISBN 978-981-4595-28-5 or MHID 981-4595-28-4)

**Office Hours:** Tuesday and Thursday @ 5:00-6:30 PM

**TA:** TBA

**Prerequisites:** MEC 310 and MEC 363

<b>Grading:</b> Homework	10%
2 Midterm exams @ 30% each	60%
Final exam	30%

**Exams:** 2 Midterms (80 minutes each)

1 Final (80 minutes)

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

**Homework:** Late homework will not be accepted.

## **Course Objective:**

Application of analytical methods, materials science, and solid mechanics to problems in design and analysis of machine components. Includes the design of mechanical components such as shafts, screws, fasteners, mechanical springs, rolling-contact bearings, spur and helical gears, clutches, brakes, couplings, flywheels, and power transmissions.

## **Course outline:**

- Materials
- Load and Stress Analysis
- Deflection and Stiffness
- Failures Resulting from Static Loading

- Fatigue Failure Resulting from Variable Loading
- Midterm 1
- Shafts and Shaft Components
- Screws, Fasteners, and the Design of Permanent Joints
- Mechanical Springs
- Rolling-Contact Bearings
- Midterm 2
- Gears – General
- Spur and Helical Gears
- Clutches, Brakes, Couplings, and Flywheels
- Power Transmission Case Study
- Geometric Dimensioning and Tolerancing
- Final exam

*It is important to note that in order for the student to earn a passing grade, he or she has to complete and pass all “Competency Questions” as well as earn a passing grade (60/100 percentile) in all design projects. The reports are graded using rubric that will be made available to you in class. Failure to comply with this requirement of competency questions and design reports will result in a letter grade of “F.”*

**ABET Student Outcomes:**

1. *An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.*
2. *An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.*
3. *An ability to communicate effectively with a range of audiences.*
4. *An ability to acquire and apply new knowledge as needed, using appropriate learn strategies.*

**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.

**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.

**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 is 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](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.