MEC 410
Design of Machine Elements
Fall 2012
Required Course

2012 – 13 Catalog Data:
MEC 410: Design of Machine Elements. Credit 3. 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. Prerequisites: MEC 310; MEC363.

NOTE: McGraw-Hill also published a version in paperback (SI unit version), which will not be used for this course.

Course Website: http://blackboard.stonybrook.edu/

Instructor: Chad S. Korach, 141 Light Engineering, 632-1182, chad.korach@stonybrook.edu, office hours: Monday 3pm-5pm; Thursday, 10am – 12pm.

Teaching Assistant: Jingfang Tang, 134 Light Engineering, gladystangjf@gmail.com, office hours: Friday, 9am – 11am.

Class Schedule: Three lectures/week, Monday/Wednesday/Friday, 12:00pm – 12:53pm, Javits Lecture Hall 103.

Topics: Stress analysis, deflection analysis, and energy methods
Statistical considerations in design
Dimension and tolerance, Materials
Static loading, failure, fatigue analysis and synthesis
Design of bolted joints, Power Screws
Design of mechanical springs, Welded joints
Design of rolling contact and journal bearings
Design of gears, Kinematics and force analysis
Design of flexible mechanical elements and belts
Design of clutches and brakes
Design of shafts and modern means of power transmission
Engineering Ethics

Course Objectives:
The goal of this course is to introduce the engineering of machine design
The course introduces practical knowledge and design experience in various machine elements
Students are required to practice design of machine elements through special design projects
Industry analysis, synthesis, design, and statistical consideration in design
Assignments: (a) Homework sets are due 1 week after assignment; Late homework will receive \( \frac{1}{2} \) credit and will not be accepted after the solutions are posted.
(b) Design projects are due two weeks following their assignment unless otherwise stated. Written reports are required for all design projects.

Grading: Letter grade is based upon your performance in the following categories:

- Final Exam: 30%
- Exams (2): 2 @ 15% each
- Design Project(s): 30%
- Homework: 10%
- Competency Exams (see below)

Examinations: 3 in-term exams (in-class, 53 mins.) will be given, each worth 15% of your final grade, with the lowest exam grade dropped.
Cumulative final exam given at the end of the semester, worth 30% of your final grade.
All exams are open book/notes, unless noted otherwise.
No make-up exams given, unless arranged for prior to the exam.

- If you miss an exam due to unforeseen events, you will have to provide me a proof of the reason, such as doctor’s certificate for a medical emergency or death certificate for death in family before I will give you a makeup exam. There will be no make-up exams for reasons that I deem are or were within your control. Thus, this rules out reasons such as pre-arranged vacation, travel, conflict with other exams or engagements. An exception to this is the student athletes who are to provide me with their playing schedule for the semester within the first week of the class.
- It is important to note that in order for you to earn a passing grade in this class, you have to complete and pass all “Competency Exams” assigned. Failure to comply with this requirement of competency exams and will result in a letter grade of “F”.

Academic Integrity:
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/

Americans with Disabilities Act:
If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room 128, (631) 632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Critical Incident Management:
Stony Brook University 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. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures.

**Allowed Calculators:**
Following the Mechanical Engineering Department’s mandatory calculator policy, **only** the following calculators will be allowed to be used on the midterm and final exams. *There will be no exceptions.*

- **Casio:** All fx-115 models. Any Casio calculator must contain **fx-115** in its model name.
- **Hewlett Packard:** The **HP 33s** and **HP 35s** models, but no others.
- **Texas Instruments:** All **TI-30X** and **TI-36X** models. Any Texas Instruments calculator must contain either **TI-30X** or **TI-36X** in its model name.

Prepared by Chad S. Korach  Date: August 2012