

Fall 2013
EML4501 Mechanical Design II

Instructor Professor Benjamin Boesl, Department of Mechanical and Materials Engineering
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Periods W 11:00-11:50 F 11:00-12:50, EC 1115

Office Hours W F 3:00 – 5:00, or by appointment. Office EC3465

Textbook Shigley's Mechanical Engineering Design, Richard G. Budynas, and J. Keith Nisbett,
Ninth Edition, 9e, McGraw Hill, 2011.

Description Continuation of design analysis of elementary machine elements, including lubrication bearings,
and gearings. Introduction to advanced analysis techniques. Gear geometry, force, and
nomenclature. Traditional and planetary gear trains. Design of spur, helical, bevel and work gears.
Rollers, ball and journal bearings. Brakes, clutches, belts and chains.

Prerequisites EML3500 Mechanical Design I

Objectives

1. This course presents a review of mechanical elements such as gears, ball and journal bearings, belts, brakes, and so on.
2. Introduction to gear geometry and reaction forces. Gear trains. Traditional and epicyclic/planetary gear trains. Spur, helical, bevel and worm gears. Design of spur and helical gears using AGMA procedure. Review of bevel and worm gear selection procedure.
3. Ball bearing design, selection of ball and cylindrical bearings, deep groove ball bearings, roller bearings. Journal bearings. Bearing characteristic number. Use of Raimondi-Boyd charts.
4. Open-ended design project to integrate various components.

Outline

1. Introduction to Gears, Ch. 13
2. Spur Gears, Ch. 14
3. Helical Gears, Ch. 14
4. Rolling Contact Bearings, Ch. 11
5. Journal Bearings, Ch. 12
6. Clutches, Brakes, Couplings and Flywheels, Ch. 16
7. Flexible Elements: Belts and Chains, Ch. 17

Grading

Quizzes (6 Total Graded)	24 %
Exam 1 (Chapters 13 and 14)	13 %
Exam 2 (Chapters 11 and 12)	13 %
Final Exam (Comprehensive)	20 %
Project (Team project with open-ended design)	30 %

Grading Rubric All final grades will be rounded up to the next integer. For instance a grade of 89.0000000000000000000000000000000001 will become a 90. No additional considerations will be made to improve grades that are near the grading borders. At this point each grade will be assigned a letter based on the rubric below.

A : 100-92	B+ : 87-89	C+ : 77-79	D : 60-65
A- : 90-91	B : 84-86	C : 70-76	F : 59 and below
	B- : 80-83	C- : 66-69	

Quiz Policy Eight in class quizzes will be offered during the semester. For six of the quizzes, the content will come directly from assigned (and ungraded) homework problems from the text. Two additional quizzes will be offered during the course period that directly follows an exam. Content will directly repeat the solution process from an exam question. Problems will use the same methodology as the assigned problems or exam problem, though problems may be combined and the given values and order of questions may change.

During each quiz, each student will only be allowed a writing utensil.

The first six quizzes that are submitted to the instructor will be graded at that point no additional quizzes can be completed. There will be no quiz drops.

Make up quizzes will only be offered if a student has a verified absence for a minimum of 3 quiz dates. Individual quizzes cannot be made up.

Exam Policy During the exams a personal calculator may be used. Laptops, computers, phones, mp3 players or any electronic device will not be allowed. No material or calculator may be shared by students. Individually prepared letter-size sheet of formulas will be allowed in each exam and three sheets in the final exam.

Make-up exams will be allowed only after the student provides a medical doctor's original report describing the problem and a statement that it was an emergency. The report must include the doctor's address and phone number. The Department will contact and verify the situation before a test day is scheduled.

Any scheduling conflicts with Exam dates should be discussed with the instructor as early as possible to allow for additional accommodations (at the instructors discretion).

Email Each student is required to provide a reliable e-mail address for correspondence. Various announcements and reminders will be sent via e-mail throughout the semester. Students are expected to check their e-mail regularly and make sure their inboxes are not full as the bounced mail messages will not be sent again.

ABET Outcome (Note regarding ABET MME Objectives and Outcomes: ABET program objectives and outcomes are defined for the MME program that must be achieved by graduating students. Each course supports several of the objectives and outcomes incrementally but must not necessarily achieve them fully.)

- (a) Ability to apply knowledge of mathematics including statistics, multivariable calculus and differential equations, science including physics, and engineering
- (b) Ability to design a system, component, or process to meet desired needs.
- (c) Ability to function on multi-disciplinary teams.
- (d) Ability to identify, formulate, and solve engineering problems.
- (e) Understanding of professional and ethical responsibility.
- (f) Ability to communicate effectively.
- (g) Recognition of the need for, and ability to engage in life-long learning.
- (j) Knowledge of contemporary issues.
- (k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

Ethics All work prepared and submitted in this course in the form of projects, presentations, problem solutions in quizzes and exams are expected to be original and produced by the submitting student. Any portion that may have been borrowed from a previous work must be clearly identified and referenced to indicate the original author along with the title of the work, and where and when it appeared. It is extremely important to realize that not doing so may result in an accusation of plagiarism.

Plagiarism Final versions of Project reports will be submitted to www.turnitin.com to be evaluated against plagiarism. The site compares the submitted document for similarities against the works published by others and assigns a similarity index. Lower similarity percentages (0 to 10%) indicate less similarity and are interpreted as good. Higher percentages mean that plagiarism is likely and your report grade will be adversely affected. Each team is required to upload their reports by one team member since multiple entries of the same report result in very bad similarity indices for later submissions. In order to improve the similarity index, the same team member will be permitted to resubmit the revised report before the deadline expires.

Incomplete A grade of “incomplete” will not be assigned to replace an unwanted grade. In order to be eligible to receive “incomplete,” only a single component of the entire coursework needs to be missing. The reason for failure to fulfill the requirement in time must be officially proved by the student (e.g., a medical doctor’s official letter), and verified by the Department in order to receive an “incomplete” grade.

The University requires that a student must fill out an “Incomplete Grade Form” before the incomplete grade is assigned. The form will be signed by the student and the professor before such grade is assigned.

Misconduct Academic dishonesty is a serious offense and will be treated according to the University policy as outlined below.

Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, rigorous and respectful exchange of ideas, and community service.

All students should respect the right of others to have an equitable opportunity to learn and honestly to demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University.

All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.