



Machine Design Lecture: Spring 2010
Course # MEC K281
Technologies Department

Course Description:

This course utilizes skills from previous courses and gives students the opportunity to investigate the design of machine elements. Actual design conditions are studied along with classical engineering design practice utilizing the concepts of stress, materials, pneumatics, economy, safety, strength and appearance.

Instructor:

PROF Patrick H. Knowles Jr. Room C-160 ph: 885-2379 pknowles@trcc.commnet.edu

Text Book:

Machine Design – Wentzell, T.H. ISBN 978-1401805173

Procedure:

The course will consist of a lecture. The lecture will consist of open discussion, during which the student is encouraged to ask questions and relate their own experiences. The discussions will be conducted around the reading assignments and the comprehension quizzes.

Lecture Outcomes:

- Students will demonstrate the ability to use appropriate mathematical and computational skills needed for engineering technology applications.
- Students will have the ability to work professionally in both thermal and mechanical systems areas including the design and realization of such systems.
- Students will illustrate an ability to think critically and identify, evaluate and solve complex technical and non-technical problems; demonstrate creativity in designing problem solutions; and conduct and interpret experimental data and outcomes.
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Lecture Performance Criteria:

The above outcomes will be assessed using these performance criteria:

- Mathematical and computational skills-
 - ✓ Ascertain problem conditions by identifying known and unknown quantities in formulating a problem for solution
 - ✓ Demonstrates the correct selection and application of pertinent formulae, principles and concepts.
 - ✓ Pursue solutions in a methodical, logical manner with results correctly explained with sufficient detail and properly documented
 - ✓ Submit problem solutions with a minimum of computational errors, identifying and selecting the correct dimensional units

- Work in both thermal and mechanical systems areas including design-
 - ✓ Show an understanding of the engineering design process by designing a mechanical system
 - ✓ Be able to design a multi-component thermo-fluid system.
- Illustrate an ability to think critically and identify-
 - ✓ Show the ability to evaluate the credibility of sources of information
 - ✓ Demonstrate the ability to refine generalizations, establish rational & pertinent assumptions, and avoid oversimplifications.
 - ✓ Exhibit the ability to generate, analyze / evaluate, and assess multiple engineering problem solution options
 - ✓ Produce documentation that reflects organization and application of engineering principles in specifying solution to an engineering problem
- Illustrate an ability to think critically and identify-
 - ✓ Show the ability to evaluate the credibility of sources of information
 - ✓ Demonstrate the ability to refine generalizations, establish rational & pertinent assumptions, and avoid oversimplifications.
 - ✓ Exhibit the ability to generate, analyze / evaluate, and assess multiple engineering problem solution options
 - ✓ Produce documentation that reflects organization and application of engineering principles in specifying solution to an engineering problem

Instructor Assistance:

Seeking help from the instructor outside of class is encouraged if you are having difficulty understanding course material. Feel free to Email/call for an appointment during office hours.

Academic Integrity:

Academic integrity is essential to a useful education. Failure to act with academic integrity severely limits a person's ability to success in the classroom and beyond. Furthermore, academic dishonesty erodes the legitimacy of every degree awarded by the College. In this class and in the course of your academic career, present only your own best work; clearly document the sources of the material you use from others; and act at all times with honor.

Comprehension Quizzes:

Comprehension quizzes will be conducted each week. The quiz material is from the assigned reading and lectures. The quizzes will be posted on Blackboard Vista. Each quiz will have an expiration date by which it must be completed

Attendance:

Attendance will be taken and although it is not intended to be use for grading purposes, it maybe used for decision on the part of the final grade.

Grading Policy:

Several exams will be given during the semester. The dates of the exams are noted in the Lecture Schedule. Approximately one hour of the class meeting will be devoted for each exam. Final grades will be based on a normal distribution of all students taking the course based on the following weighting:

Exam Average	35%
Design Project	30%
Homework & Quizzes	35%

Withdrawal:

A student who finds it necessary to discontinue a course must complete a "Withdrawal Request Form" available in the Registrar's office within the time limits of the semester calendar. Students who do not withdraw, but stop attending will be assigned an "F" signifying a failing grade. The last day to withdraw from classes is 14December2009.

Disabilities Statement:

If you have a question regarding a disability that may affect your progress in this course, please contact one of the college's Disability Service Providers as soon as possible. Chris Scarborough (892-5751) generally works with students who have learning disabilities or attention deficit disorder. Kathleen Gray (885-2328) generally works with students who have physical, visual, hearing, medical, mobility, and psychiatric disabilities. Matt Liscum (383-5240) also works with students who have disabilities.

If you will need accommodations for this class, you must contact the Disabilities Counseling Services. To avoid any delay in the receipt of accommodations, you should contact the counselor as soon as possible. *The instructor cannot provide accommodations until an accommodation letter from the Disabilities Counselor is received.*

Date	Class #	Topic	Reading	Hmwk
01/26/09	1	WHAT IS MECHANICAL DESIGN?		Ch 1: 1 Ch 2: 1, 3, 5, 11 Ch 3: 3, 6, 12, 13, 16, 17
		FORCE, WORK, AND POWER		
		STRESS AND DEFORMATION		
02/02/09	2	COMBINED STRESS AND FAILURE THEORIES		Ch 4: 8, 10, 11
02/09/09	3	REPEATED LOADING		
02/16/09	4	FASTENERS AND FASTENING MECHODS; Exam 1		
02/23/09	5	IMPACT AND ENERGY ANALYSIS		
		SPRING DESIGN		
03/02/09	6	ELECTRIC MOTORS		
		PNEUMATIC AND HYDRAULIC DRIVES		
		GEAR DESIGN; Exam 2		
03/16/09	7	SPUR GEAR DESIGN AND SELECTION		
		HELICAL, BEVEL, AND WORM GEARS		
03/23/09	8	BELT AND CHAIN DRIVES		
		KEYS AND COUPLINGS		
		CLUTCHES AND BRAKES		
03/30/09	9	SHAFT DESIGN		
04/06/09	10	POWER SCREWS AND BALL SCREWS		
04/13/09	11	PLAIN SURFACE BEARINGS		
04/20/09	12	BALLANDROLLERBEARINGS		
04/27/09	13	THEDESIGNPROCESS		
05/04/09	14	ENGINEERING ETHICS		
05/11/09	15	Project Presentations		
05/11/09	16	Final Exam		