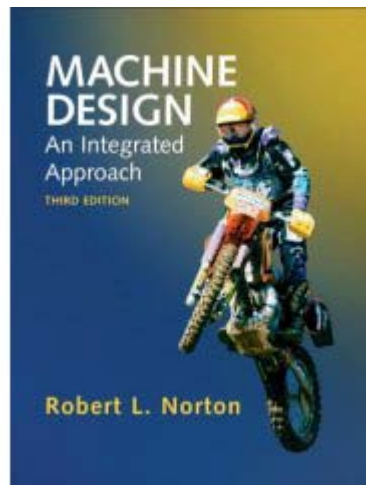


**MAE 4342**

## ***MECHANICAL DESIGN II***



**SESSION:** FALL 2011

**DEPARTMENT:** MECHANICAL & AEROSPACE ENGINEERING  
(UNIVERSITY OF TEXAS, ARLINGTON)

**INSTRUCTOR:** RATAN KUMAR

*The Department of Mechanical & Aerospace Engineering complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disabilities. Please present your written accommodation request to me prior to the fourth day of class. See the Undergraduate Catalog for further details*

## MECHANICAL DESIGN II (MAE 4342)

**Instructor's Name:** Ratan Kumar

**Office Number:** WH 306C

**Office Telephone Number:** (817) 272-0740

**Email Address:** ratan.kumar@uta.edu

**Office Hours:** Monday & Wednesday (1:30 pm – 3 pm)

**Course Number, Section Number and Course Title:** MAE 4342-001; Mechanical Design II

**Time and Place of Class Meetings:** Monday-Wednesday-Friday (10am – 10:50am); GACB 105

**Description of Course Content:** This course covers the practice of mechanical component design by analytical and computational methods. It will provide students with an understanding of different aspects of machine element design by making use of theoretical analysis, standards and computer-based analysis.

**Student Learning Outcomes:** The student will learn about:

- a variety of machine components
- failure theories for mechanical parts.
- machine element design criteria
- appropriate safety analysis for different design situations
- standard techniques for analyzing performance condition

**Required Textbooks and Other Course Materials:**

- Machine Design an Integrated approach (4<sup>th</sup> ed.): Robert L. Norton; Prentice Hall
- Handouts provided by instructor

**Descriptions of major assignments and examinations with due dates:**

• Homework	(5%)	
• Quiz	(25%)	
• Project	(10%)	
• Examination 1	(20%)	<b>**KEY ASSIGNMENT</b>
• Examination 2	(20%)	
• Finals	(20%)	

**\*\* Examination # 1 is designated as the key assignment. In order to pass this class, students must submit and pass this key assignment. If the key assignment is not submitted and passed, the student will not pass the class even if he/she scores perfectly on all exams and other assignments.**

**Grading Policy:** Course grade will be earned based on the following criteria:

A= 90% and above, B=80% - 89%, C=70% - 79%, D=60% - 69 %, F=0% - 59%

**Drop Policy:** Refer to the University drop policy at <http://www.uta.edu/catalog/general/academicreg>

**Americans with Disabilities Act:**

The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal opportunity legislation; reference Public Law 92-112 – The Rehabilitation Act of 1973 as amended. With the passage of federal legislation entitled *Americans with Disabilities Act (ADA)*, pursuant to section 504 of

the Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens.

As a faculty member, I am required by law to provide “reasonable accommodations” to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty of their need for accommodation and in providing authorized documentation through designated administrative channels. Information regarding specific diagnostic criteria and policies for obtaining academic accommodations can be found at [www.uta.edu/disability](http://www.uta.edu/disability). Also, you may visit the Office for Students with Disabilities in room 102 of University Hall or call them at (817) 272-3364.

**Academic Integrity:**

It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University.

“Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or part to another person, taking an examination for another person any act designed to give unfair advantage to a student or the attempt to commit such acts.” (Regents’ Rules and Regulations, Series 50101, Section 2.2)

**Student Support Services Available:**

The University of Texas at Arlington supports a variety of student success programs to help you connect with the University and achieve academic success. These programs include learning assistance, developmental education, advising and mentoring, admission and transition, and federally funded programs. Students requiring assistance academically, personally or socially should contact the Office of Student Success Programs at (817) 272-6107 for more information and appropriate referrals.

**Librarian to Contact:** Please check with the instructor.

**E-Culture Policy:** The University of Texas at Arlington has adopted the University email address as an official means of communication with students. Through the use of email, UT Arlington is able to provide students with relevant and timely information, designed to facilitate student success. In particular, important information concerning registration, financial aid, payment of bills, and graduation may be sent to students through email.

All students are assigned an email account and information about activating and using it is available at [www.uta.ed/email](http://www.uta.ed/email). New students (first semester at UT Arlington) are able to activate their email account 24 hours after registering for courses. There is not additional charge to students for using this account, and it remains active as long as a student is enrolled at UT Arlington. Students are responsible for checking their email regularly.

**Make-up Exam Policy:** Please contact your instructor for further details.

**Grade Grievance Policy:** Refer to the University grievance procedure related to grades at <http://www.uta.edu/catalog/general/academicreg>

# SYLLABUS

**Course #** MAE 4342 (M-W-F 10:00am – 10:50 am; GACB 105)  
**Title:** Mechanical Design II  
**Instructor:** Ratan Kumar (Room # WH 306C, Phone: 817 272 0740)  
 (Office hours: M & W 1:30 pm – 3 pm)

**WEEK 1:**

- Introduction and course overview
- Review of Normal, Shear and Principal Stress
- Review of Combined Stress
- Quiz # 1
- Home Work 1

**WEEK 2:**

- Review of Failure Theory
- Shaft design: Shaft Loading
- Quiz # 2
- Home Work # 2

**WEEK 3:**

- Shaft Design: Shaft Diameter
- Quiz # 3
- Home Work 3

**WEEK 4:**

- Shaft Design: Keyways
- Shaft Design: Critical Speed
- Quiz # 4
- Home Work # 4

**WEEK 5:**

- Gear Design: Gear Intro, Gear Train
- Review for Exam # 1
- Exam # 1 / Handout Project
- Home Work # 5

**WEEK 6:**

- Gear Design: Bending stress
- Gear Design: Surface Stress, Gear Material
- Quiz # 5
- Home Work # 6

**WEEK 7:**

- Gear Design: Gear Material, Helical Gear, Bevel Gear
- Quiz # 6
- Home Work # 7

**WEEK 8:**

- Spring Design: Types, Deflection, Spring rate
- Spring Design: Helical Compression
- Quiz # 7
- Home Work # 8

<b>WEEK 9:</b>	<ul style="list-style-type: none"> <li>- Spring Design: Helical Extension</li> <li>- Spring Design: Helical Torsion</li> <li>- Quiz # 8</li> <li>- Home Work # 9</li> </ul>
<b>WEEK 10:</b>	<ul style="list-style-type: none"> <li>- Bearing Design: Intro &amp; sliding bearing</li> <li>- Bearing Design: Sliding bearing</li> <li>- Exam # 2</li> <li>- Home work # 10</li> </ul>
<b>WEEK 11:</b>	<ul style="list-style-type: none"> <li>- Rolling Element Bearing</li> <li>- Power Screws</li> <li>- Quiz # 9</li> <li>- Home work # 11</li> </ul>
<b>WEEK 12:</b>	<ul style="list-style-type: none"> <li>- Power Screw</li> <li>- Fasteners</li> <li>- Quiz # 10</li> <li>- Home work # 12</li> </ul>
<b>WEEK 13:</b>	<ul style="list-style-type: none"> <li>- Fastener</li> <li>- Clutches</li> <li>- Quiz # 11</li> <li>- Home Work # 13</li> </ul>
<b>WEEK 14:</b>	<ul style="list-style-type: none"> <li>- Brakes</li> <li>- Review for Final</li> <li>- Submit Project</li> </ul>
<b>WEEK 15:</b>	<b>- FINAL EXAM</b>

*The instructor reserves the right to alter the syllabus and grading policy*