

MAE 3318 Kinematics and Dynamics

TTH 5:30PM~6:50PM at NH 106

INSTRUCTOR

Daejong Kim, Ph.D., Assistant Professor

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Instructor office hours: TTh 3:00-5:00pm and by appointment

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TA office hours: MW 2-3pm

Location: WH 108

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COURSE DESCRIPTION

This course teaches how to analyze motions (position, velocity, acceleration) of kinematic linkage using vector algebra and modern engineering tool. The course also teaches how to synthesize specific kinematic linkage to achieve certain prescribed motion, The course also teaches force analysis on the kinematic joints within a linkage when the linkage is under certain motion.

STUDENT'S LEARNING OUTCOMES

1. Students will be able to identify degree of freedom of any linkage system
2. Students will be able to synthesize mechanism to perform certain prescribed task
3. Students will be able to apply mathematical skills to analyze motion of mechanism
4. Students will be able to identify, formulate and solve engineering dynamics to find joint forces, and external forces/ moments
5. Students will be able to apply computing software to reach the outcomes listed above

TEXTBOOKS

Design of Machinery (4th Edition)-An Introduction to the Synthesis and Analysis of Mechanisms and Machines by Robert L. Norton

CLASS SCHEDULE (Tentative, subject to change over semester)

Weeks	Topics	Assignments
Week 1 Aug 20~	Chapter 1: Introduction Ch 2: Kinematics Fundamentals (D.O.F.)	
Week 2 Aug 27~	Ch 2: Kinematics Fundamentals; cont.	HW 1 (Ch.2) _ posted
Week 3 Sep 3~	Ch.4 Position analysis	
Week 4 Sep 10~	Ch.5 Analytical linkage synthesis	HW 2 (Ch.4) _ posted

Week 5 Sep 17~	Ch.5 Analytical linkage synthesis; cont.	
Week 6 Sep 24~	Ch.5 Analytical linkage synthesis; cont. Ch. 6 Velocity analysis	HW 3 (Ch.5) _ posted
Week 7 Oct 1~	Ch. 6 Velocity analysis; cont. Exam 1 review	HW 4 (Ch.6) _ posted
Week 8 Oct 8~	Exam 1 (Oct 9, Weeks 1~7) Exam 1 overview, Ch. 7 Acceleration analysis	
Week 9 Oct 15~	Ch. 7 Acceleration analysis; cont.	HW 5 (Ch.7) _ posted
Week 10 Oct 22~	Ch. 7 Acceleration analysis; cont. Exam 2 review, Ch. 8 Cam design	HW 6 (Ch.7) _ posted
Week 11 Oct 29~	Exam 2 (Oct 30, Ch. 7) Exam 2 overview, Ch. 8 Cam design; cont.	
Week 12 Nov 5~	Ch. 8 Cam design; cont.	
Week 13 Nov 12~	Ch. 8 Cam design; cont.	HW 7(Ch.8) _ posted
Week 14 Nov 19~	Ch. 10 Dynamics fundamental Ch. 11 Force analysis	
Week 15 Nov 26~	Ch. 11 Force analysis; cont.	HW 8 (Ch.11) _ posted
Week 16 Dec 3~	Dec 04: Last day of class (Tuesday, Final exam review) Final exam: Comprehensive Dec 11 th (Tuesday): 5:30~8:00pm, NH 106	

GRADING

5% - Class participation (attendance, attitude at classroom, etc)

10% - Homework

25% - First exam

25% - Second exam

35% - Final exam

Course grading will be based on the following scale:

A (100-85%), B (84-75%), C (74-65%), D (64-50%) and F (below 50%)

COURSE REQUIREMENTS

1. Attendance - Students are expected to be on time, attend class sessions, complete reading assignments and be prepared to participate in class discussions. If a student misses a class, it is his/her responsibility to make up the missed class (i.e. get the course notes, assignments or

announcement from other students). 5% of total course grade is from class participation, of which class attendance will be significant portion.

2. Homework assignments - Students should submit their homework assignments by 5:00pm on due dates in the classroom. **Late submission will not be graded.** The due dates will be announced during the class. If HW due date does not fall on lecture date, due is at 5:00pm at the instructor's office at WH213 or mailbox at WH 211

3. Exams - There will be one midterm exam and final exam. You must take all the tests at their scheduled times.

4. Course website - We will use black board at elearn.uta.edu. Login with your NetID and password to access the course-related materials and announcement.

6. Academic honesty - 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 in 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)

7. Students with disability - The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal 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. Also, you may visit the Office for Students with Disabilities in room 102 of University Hall or call them at (817) 272-3364.