

MAE 3318 Kinematics and Dynamics

TTH 2:00PM~3:20PM, SH 330

INSTRUCTOR

Daejong Kim, Ph.D., Associate Professor

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Instructor office hours: Tuesday and Thursday 12:30pm~2pm and by appointment

Teaching assistant: TBD

Email: TBD

TA office hours: Monday and Wednesday 9:00am~11:00am

Location: TBD

COURSE DESCRIPTION

This course teaches how to analyze motions (position, velocity, acceleration) of machine components within 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 covers cam design principle and 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 linkage system
2. Students will be able to synthesize mechanism to perform certain prescribed task/motion
3. Students will be able to apply math 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 (5th 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	HW (posting schedule)
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)
Week 3 Sep 3~	Ch.4 Position analysis	
Week 4 Sep 10~	Ch.4 Position analysis; cont. Ch. 6 Velocity analysis	HW 2 (Ch.4)
Week 5 Sep 17~	Ch. 6 Velocity analysis; cont.	

Week 6 Sep 24~	Ch. 7 Acceleration analysis	HW 3 (Ch.6)
Week 7 Oct 1~	Ch. 7 Acceleration analysis; cont.	HW 4 (Ch.7)
Week 8 Oct 8~	Ch.5 Analytical linkage synthesis Exam 1 review, TA problem session 1	
Week 9 Oct 15~	Ch.5 Analytical linkage synthesis; cont. Midterm exam (Chapters 2, 4, 6, 7)	
Week 10 Oct 22~	Ch. 8 Cam design	HW 5 (Ch.5)
Week 11 Oct 29~	Ch. 8 Cam design; cont.	
Week 12 Nov 5~	Ch. 8 Cam design; cont. TA problem session 2	HW 6 (Ch.8)
Week 13 Nov 12~	Ch. 11 Force analysis	
Week 14 Nov 19~	Ch. 11 Force analysis; cont. Thanksgiving week	
Week 15 Nov 26~	Ch. 11 Force analysis; cont. Final exam review	HW 7 (Ch.11)
Week 16 Dec 3~	Dec 04: Last day of class (Tuesday): Q &A Final exam: Chapters 5, 8, 11 Dec 6 th (Thursday): 2:00~4:30pm	

GRADING

20% - Homework
40% - Midterm exam
40% - Final exam

Course grading will be based on the following scale:
A (100-90%), B (89-80%), C (79-70%), D (69-60%) and F (below 60%)

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).

2. Homework assignments - Students should submit their homework assignments by 2:00pm 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 2:00pm at the instructor's office at WH213 or mailbox at WH 211

3. Exams - There will be one midterm exam and final exam given during this course. You must take all tests at their scheduled times. Any appeal of an exam grade must be made within a week after the date of post-exam review.

4. Course website - We will use black board at elearn.uta.edu

5. Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>

6. Academic honesty - Students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents' Rule 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

7. Students with disability - The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the Americans with Disabilities Act (ADA). All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

8. Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.