

## ***MECH 3350 Course Syllabus***

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### **MECH 3350.001.15F – Kinematics and Dynamics of Mechanical Systems**

MW 2:30-3:45 Aug 24 – Dec 9, 2015

ECSN 2.126

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#### **Professor Contact Information**

Dr. J.M. Hilkert [hilkert@utdallas.edu](mailto:hilkert@utdallas.edu)

off: ECSN 2.504

Ext 4681

office hours: TBD

#### **TA Contact Information**

Cory Seidel [cas150930@utdallas.edu](mailto:cas150930@utdallas.edu)

Off: TBD

office hours: TBD

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#### **Course Pre-requisites, Co-requisites, and/or Other Restrictions**

Pre-requisite(s):

ENGR 2300 – Linear Algebra for Engineers

MATH 2420 – Differential Equations with Applications

MECH 2330 – Dynamics

ENGR 3300 – Advanced Engineering Mathematics

Co-requisite(s): None

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#### **Course Description**

Lecture course. Motion and interaction of machine elements and mechanisms. Kinematics, statics, and dynamics are applied for analysis and design machines and machine components such as planar mechanisms, cams and gears.

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#### **Student Learning Objectives/Outcomes**

1. Students will be able to compute the position, velocity and acceleration of mechanisms.
  2. Students will be able to obtain the static and dynamic forces and torques of mechanisms.
  3. Students will be able to quantify the requirements, constraints and trade-offs in the selection and design of select mechanism components such as cams and gears.
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#### **Required Textbooks and Materials**

Theory of Machines and Mechanisms, 4th Ed.

by John J. Uicker, Gordon R. Pennock and Joseph E. Shigley

ISBN-13: 978-0195371239

#### **Suggested Course Materials**

Student's edition of Matlab / Simulink

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**Topics:**

*(topics and times are approximate and subject to change at the instructors discretion)*

- I. Kinematics of Mechanisms:
  - a. Definitions / Degrees-of-Freedom (chap 1)
  - b. Geometry / displacement analysis (chap 2)
  - c. Velocity analysis / instant centers (chap 3)
  - d. Acceleration analysis (chap 4)
- II. Dynamics & Torques / Forces in Mechanisms:
  - a. Static force / torque analysis (chap 13)
  - b. Review of Mass Properties / the Inertia Tensor (chap 14)
  - c. Dynamic force / torque analysis (chap 14)
  - d. Static & dynamic unbalance effects (chap 17)
  - e. Gyroscopic & other distinct forces / torques (select sections & supp mat'l)
- III. Analysis of select mechanism components & mechanism trains
  - a. Spur & planetary gears & gear trains (chaps 7 & 9)
  - b. Belt and screw mechanisms (supp material)
  - c. Cams (chaps 6 & 18)
  - d. Select topics as time permits (TBA)

**Tentative Exam Schedule:**

Midterm: Oct 7 (est)

Final (comprehensive): TBD per university schedule

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**Grading Policy:**

Homework / special assignments	25%
Midterm exam	35%
Final exam	40%
Overall Score	100%

**Grading Goals** (note: +/- may be assigned within these brackets):

- A 91-100
  - B 81-90
  - C 71-80
  - D 61-70
  - F < 61
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**Course & Instructor General Policies**

Hard copy homework is due at the beginning of the class period on the scheduled due date. Late homework will not be accepted without the consent of the instructor or TA prior to the due date and will not be accepted except for unusual circumstances (Note: discounted grades may apply). All questions related to homework should be addressed to your class TA.

Makeup exams will only be given in cases of verified emergencies. Students are expected to attend lectures, read the text and other assigned material such as supplementary material posted on eLearning. Students are responsible for all reading assignments as well as material presented in the lectures.

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## **UT Dallas Syllabus Policies and Procedures**

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus: <http://go.utdallas.edu/syllabus-policies> .

### **Comet Creed**

*This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:*

***“As a Comet, I pledge honesty, integrity, and service in all that I do.”***

***The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.***