

## *Course Syllabus* MECH3302 Intermediate dynamics

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### Course Information

Term: Spring 2012

Course name: MECH3302- Intermediate dynamics

Date: Tuesday & Thursday: 11:30am-12:45pm

Room: ECSN 2.126

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**Professor contact Information:** Yonas Tadesse

Office: ECSN 3.204

Email: yonas.tadesse@utdallas.edu

Office hours: Tuesday and Thursday: 2:00-3:00pm

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**Teaching Assistant:** Kyle Anderson

Email: kba095020@utdallas.edu

Office: ECSS 3.619 , Tuesday and Thursday: 12:45-5:30

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*Course Pre-requisites co-requisites and/or restrictions*

Prerequisites: ENGR 3300, MECH 2310. Recommended co-requisite: MECH 2320. (3-0) Y

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### Description:

**MECH 3302 - Intermediate Dynamics** (3 semester hours) Lecture course.

A continuation of the study of kinematics and kinetics of particles and rigid bodies, with applications to mechanical systems of current interest to engineers. Topics include three-dimensional kinematics of a rigid body, planar kinetics of a rigid body, three-dimensional kinetics of a rigid body, equations of motion and introduction to vibration.

-Derivation and calculation of the inertia tensor and other mass properties of rigid bodies.

-Apply and interpret Newton's three laws and write the equations of motion for systems of particles and rigid body dynamic systems in stationary and moving reference frames.

- The course is accompanied by simulation of the dynamical systems using Simulink and Matlab

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### Student Learning Objectives/Outcomes

- (1) Apply and interpret the principles of mass & energy conservation, and work to systems of particles and rigid body dynamic systems.
- (2) Apply and interpret the principles of impulse and momentum to systems of particles and rigid body dynamic systems.
- (3) Demonstrate the ability to apply all of the above to realistic dynamic systems and engineering mechanisms.
- (4) Simulate the dynamical systems using modern engineering tools.

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### Topics

- Introduction and essential materials for dynamics,
- Introduction to Simulink and Matlab, [Appendix A, Da Silva](#)
- Kinematics and dynamics of point mass with simulation, [chapter 2 , problems with Simulink](#)
- Kinematic analysis of planar mechanisms. [chapter 3](#)

- General planar kinematics of rigid bodies and systems of particles with translation and rotation. [Chapter 4 & 5.](#)
- Introduction to dynamics of rigid bodies in general motion. [Chapter 6](#)
- Introduction to analytic dynamics , [chapter 7](#)
- Introduction to vibration, [chapter 8](#)

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### Grading policy

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|---------------|-----|
| Midterm Exam1 | 20% |
| Midterm Exam2 | 20% |
| Homework      | 20% |
| Final Exam    | 40% |

Scale:

|    |         |
|----|---------|
| A  | > 90%   |
| A- | 86 - 89 |
| B+ | 82 - 85 |
| B  | 78 - 81 |
| B- | 74 -77  |
| C+ | 70 -73  |
| C  | 66 - 69 |
| C- | 63 - 65 |
| D  | 59 - 62 |
| F  | < 58    |

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### Required Textbook and references materials

- Marcelo Crespo da Silva, Intermediate Dynamics for Engineers: Complemented with Simulations and Animations, ISBN-10 : 1121418503 , ISBN-13: 9781121418509

#### Reference books:

- Meriam & Kraige, Engineering Mechanics – Dynamics, 6th ed., J. Wiley & Sons

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### Policies and Procedures for Students

The University of Texas at Dallas provides a number of policies and procedures designed to provide students with a safe and supportive learning environment. Brief summaries of the policies and procedures are provided for you at <http://provost.utdallas.edu/home/index.php/syllabuspolicies-and-procedures-text> and include information about technical support, field trip policies, off-campus activities, student conduct and discipline, academic integrity, copyright infringement, email use, withdrawal from class, student grievance procedures, incomplete grades, access to Disability Services, and religious holy days. You may also seek further information at these

Websites:

[http://www.utdallas.edu/BusinessAffairs/Travel\\_Risk\\_Activities.htm](http://www.utdallas.edu/BusinessAffairs/Travel_Risk_Activities.htm)  
<http://www.utdallas.edu/judicialaffairs/UTDJudicialAffairs-HOPV.html>  
<http://www.utsystem.edu/ogc/intellectualproperty/copypol2.htm>  
<http://www.utdallas.edu/disability/documentation/index.html>