University of Victoria Engineering

Faculty of Engineering

COURSE OUTLINE

MECH 450A – Advanced Dynamics

Term – SUMMER 2015 (201505)

Instructor

Dr. Ben Nadler
Phone: (250) 721-6050
E-mail: bnadler@uvic.ca

Office Hours

Days: Monday and Thursday
Time: 2:30pm – 4:00pm
Location: EOW 507

Course Objectives

In this course we will examine the dynamics of rigid bodies moving in three dimensions. Topics include kinematics of rigid bodies, Euler angles and parameters, equations of motion, principle of work and energy, principle of impulse and momentum, and gyroscopic effects.

Prerequisites

Mech 242 and Math 204.

Learning Outcomes

On completion of this course students will be able to understand and analyze the dynamics of particles and system of rigid bodies in three-dimensions using the equations of motion, principle of work and energy, principle of impulse and momentum. Students will be able to apply their knowledge to real-world applications such as gyroscopes, robotics and vehicle, aircraft and satellite dynamics.

Syllabus

1) Kinematics of systems of particles and rigid bodies.
2) Kinetics of a system of particles: equations of motion, impulse and momentum, work and energy.
3) Kinetics of rigid bodies: equations of motion, impulse and momentum, work and energy.
4) Inertia tensor.
5) Euler angles and parameters.
6) Gyroscopic effects.

A-Section(s): A01 / CRN 31641
Days: Monday and Thursday
Time: 1:00pm – 02:20pm
Location: ECS 104

Optional Texts

Title: Dynamics	Title: Advanced Dynamics	Title: Engineering Dynamics: A primer
Author: R.C. Hibbeler	Author: D.T. Greenwood	Author: O.M. O'Reilly
Publisher: Pearson	Publisher: Cambridge	Publisher: Springer
Year: 2013	Year: 2003	Year: 2001

Assessment:

Assignments:	30%	
Mid-term	35%	Date: June 30, 2015 at 4 pm
Final Project	35%	

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Undergraduate Calendar.

There will be no supplemental examination for this course.

Note to Students:

Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair's Secretary to set up an appointment.

Accommodation of Religious Observance

See entry in current Undergraduate Calendar

Policy on Inclusivity and Diversity

See entry in current Undergraduate Calendar

Standards of Professional Behaviour

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour in current Undergraduate Calendar, which contains important information regarding conduct in courses, labs, and in the general use of facilities.

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult entry in current Undergraduate Calendar for the UVic policy on academic integrity.

Course Lecture Notes

Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.