University of Victoria Engineering

Faculty of Engineering

COURSE OUTLINE

MECH 330 – Introduction to Mechanical Vibrations

Term – FALL 2015 (201509)

Instructor

Dr. Ben Nadler
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Office Hours

Days: Mon, Thu
Time: 13:00 – 14:00
Location: EOW 507

Course Objectives

To develop students' fundamental knowledge and understanding of the oscillating response of various mechanical systems, and to provide students with knowledge and skills in vibration testing and measurements.

Learning Outcomes

Students who successfully complete this course will be able to:

- Translate a physical problem in mechanical vibration to an appropriate mathematical model.
- Apply Newton's second law and energy method to formulate the dynamic equations of motion of one- and multi-degree-of-freedom systems.
- Solve the dynamic equations of motion using university level mathematics (ordinary differential equations and linear algebra).
- Calculate the natural frequencies, mode shapes and the time response of one- and multi-degree-of freedom systems under free and force vibrations.
- Analyze the risk of transmissibility and resonance.
- Use vibration measurement techniques.
- Carry out experiments in mechanical vibration.
- Analyze experimental data.
- Use vibration analysis in the design of mechanical system to determine the operation frequency range.

Syllabus

Vibrations of single degree of freedom systems; free undamped and damped vibration characteristics, harmonic forcing, frequency response functions, Fourier series method for periodic forcing. Multi degree of freedom systems; frequencies and modes analysis, matrix methods, and orthogonality of modes. Free and forced vibration characteristics of undamped and damped multi degree of freedom systems. Applications in vibration isolation and control.

Lectures: A01 / CRN 12307
Days: Mon, Thu
Time: 11:30 – 12:50
Location: ELL 167

Tutorials

T01	Tue	17:30 – 18:20	ELL 062
T02	Wed	16:30 – 17:20	ELL 062

Teaching Assistance: Italo Franchini, iafranch@uvic.ca
Office hours: Wed 1400 - 1600 ELW A229

Labs

B01	Tue	08:30 - 11:20	ELW A243
B02	Tue	14:30 - 17:20	ELW A243
B03	Fri	14:30 - 17:20	ELW A243
B04	Thu	16:00 - 18:50	ELW A243
B05	Wed	13:30 - 16:20	ELW A243

Teaching Assistance: Hongbo (Herbert) Zhu, hongboz@uvic.ca

Marking
Mana Norouzpour, mananrp@uvic.ca
Altayeb Mahfouth, mahfouth@uvic.ca

Required Course-pack

Title: *Fundamentals of Mechanical Vibrations*
Author: S. Graham Kelly
Publisher: McGraw Hill
Year: 2000

Assessment:

Assignments (5):	15%	
Labs (4):	15%	
Mid-term	20%	Date: Thursday, Oct 22, 2015 19:00-21:00 BWC B150
Final Exam	50%	

Note: Failure to complete all laboratory requirements will result in a grade of N being awarded for the course. Failure to pass the final exam will result in a failing grade for the course.

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.

Assignment of E grade and supplemental examination for this course will be at the discretion of the Course Instructor. The rules for supplemental examinations can be found in the current Undergraduate Calendar.

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.