Course Outline

Semester I 2018

MECH4305

FUNDAMENTAL AND ADVANCED VIBRATION ANALYSIS

Contents

3. Course details

Credit Points

This is a 6 unit-of-credit (UoC) course, and involves 3 hours per week (h/w) of face-to-face contact.

approximately 25 hours per semester for each UoC, including class contact hours, other learning activities, preparation and time spent on all assessable work. Thus, for a full-time enrolled student, the normal workload, averaged across the 16 weeks of teaching, study and examination periods, is about 37.5 hours per week.

This means that you should aim to spend about 9 h/w on this course. The additional time should be spent in making sure that you understand the lecture material, completing the set assignments, further reading, and revising for any examinations.

Contact hours

	Day	**Time**	**Location**
Lectures	Tuesday	9am 11am	Old Main Building 149
Demonstrations	Tuesday	12pm 1pm	Ainsworth 101
	Tuesday	1pm 2pm	Law Building 203
	Tuesday	1pm 2pm	Law Building 303

Please refer to your class timetable for the learning activities you are enrolled in and attend only those classes.

Summary and Aims of the course

This course is a sequel to an introductory course in Vibrations (such as MMAN2300) where you will have studied oscillatory systems under a number of simplifying assumptions linearity, sinusoidal forcing, constant coefficients, simple boundary conditions, etc. In this course, you will examine systems that are not so nicely behaved. As such, you will be exposed to new techniques for seeing, measuring, thinking about, analysing, designing and controlling oscillatory systems.

The aim of this course can be stated simply: For everyone involved (staff, students and demonstrators) to progress further towards becoming exceptional engineers. Our field of endeavour will be the concepts and applications of Vibration Analysis. Additionally, we will not measure our progress as the number of equations or facts or theories that we know. Rather we will undertake to measure our degree of transformation into someone who sees, understands, can make relevant and accurate predictions, and communicates about the world around us through the lens of Vibration Analysis.

Student learning outcomes

This course is designed to address the learning outcomes below and the corresponding Engineers Australia Stage 1 Competency Standards for Professional Engineers as shown. The full list of Stage 1 Competency Standards may be found in Appendix A.

After successfully completing this course, you should be able to:

Learning Outcome	EA Stage 1 Competencies

2. **Peer Interaction:** Learning is a social activity, and research shows that you will learn most and best when you are actively taught by your peers and, in turn, when you teach them.
3. **Authenticity:** We will have as much authenticity of engineering practice as is possible within the constraints of the course and where it does not restrain your learning.
4. **High standards:** We will have high standards for achievement in the course, and everyone (including staff) will be accountable for putting in the effort to get you to the standard.
5. **Openness:** As much as possible, this course will be conducted in the open where all participants can be aware of it and can comment upon it.
6. **Process:** The focus of the course will be on processes, not outcomes. The right outcomes will be a by-product of following the correct processes.

The lectures in this course will cover core concepts and background theory in Vibration Analysis. The lecture material is available to students electronically before each class via I.52 Tf1 0 0 1 475.3 571/F1 112 reW*nBT/F2 11.52 Tf1 0 0 1 108.02 613.66 Tm0 g0 [(Pr)4(s)-2(s)-2 11.

6. Assessment

Assessment overview

Assessment	Length	Weight	Learning outcomes assessed

Assignments

Presentation

All non-electric submissions should have a standard School cover sheet which is available from this Moodle page.

All submissions are expected to be neat and clearly set out. Your results are the pinnacle of all your hard work and should be treated with due respect. Presenting results clearly gives the marker the best chance of understanding your method; even if the numerical results are incorrect.

Submission

Late submissions will be penalised 5 marks per calendar day (including weekends). An extension may only be granted in exceptional circumstances. Special consideration for assessment tasks must be processed through student.unsw.edu.au/special-consideration.

It is always worth submitting late assessment tasks when possible. Completion of the work, even late, may be taken into account in cases of special consideration.

in the table above indicates the time after which a submitted assignment will not be marked, and will achieve a score of zero for the purpose of determining overall grade in the course.

Marking

Marking guidelines for assignment submissions will be provided at the same time as assignment details to assist with meeting assessable requirements. Submissions will be marked according to the marking guidelines provided.

Examinations

It is your responsibility to ensure that your calculator is of an approved make and model, and

t be allowed into the examination room.

Special consideration and supplementary assessment

For details of applying for special consideration and conditions for the award of supplementary assessment, see the School intranet Special Consideration page.

7. Attendance

You are required to attend a minimum of 80% of all classes, including lectures, labs and seminars. It is possible to fail the course if your total absences equal to more than 20% of the required attendance. Please see the School intranet and the UNSW attendance page for more information.

8. Course resources for students

Recommended textbook (available through the UNSW bookshop):

Rao, S.S. Mechanical Vibrations, 6th Edition in SI Units, Pearson

Other suggested books:

Meirovitch, L. Fundamentals of Vibrations, 1st Edition, Waveland Press
Timoshenko, Young, Weaver, Vibration Problems in Engineering, 1975, Wiley
Thomson & Dahleh, Theory of Vibrations with Applications, 2013, Pearson
Den Hartog, Mechanical Vibration, Dover
Bendat and Piersol, Random Data: Analysis and Measurement Procedures, 2010, John Wiley and Sons
Fuller, Elliott and Nelson, Active control of vibration, Academic Press

UNSW Library website: https://www.library.unsw.edu.au/
Moodle: https://moodle.telt.unsw.edu.au/login/index.php

9. Course evaluation and development

Feedback on the course is gathered periodically using various means, including the UNSW myExperience process, informal discussion in the final class for the course, and

A more detailed introduction and fundamental review of vibration concepts
More worked examples provided in class

All students are expected to read and be familiar with School guidelines and polices, available on the intranet. In particular, students should be familiar with the following:

Attendance, Participation and Class Etiquette
UNSW Email Address
Computing Facilities
Assessment Matters (including guidelines for assignments, exams and special consideration)
Academic Honesty and Plagiarism
Student Equity and