Module Definition Form (MDF)

Module code: MOD011139	**Version:** 1 **Date Amended:** 10/Jul/2025

1. Module Title
Mechanical Vibrations

2a. Module Leader
Hossein Bisheh

2b. School
School of Engineering and the Built Environment

2c. Faculty
Faculty of Science and Engineering

3a. Level
5

3b. Module Type
Standard (fine graded)

4a. Credits
15

4b. Study Hours
150

5. Restrictions			
Type	**Module Code**	**Module Name**	**Condition**
Pre-requisite:	MOD009156	Engineering Dynamics	Compulsory
Pre-requisite:	MOD009161	Structural Mechanics	Compulsory
Pre-requisite:	MOD007035	Applied Engineering Mathematics	Compulsory
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:	None		

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

This module serves as your introduction to the fascinating world of vibration engineering. You'll explore the theory, computational aspects, and applications of vibration in a simple manner. You'll cover fundamentals of vibration, free and forced vibration of mechanical engineering systems. You'll also understand the importance of vibration in the design of machinery and engineering systems/structures and how it can be constructive or destructive and causing to a catastrophic failure, if we don't control them.
By the end of the module, you'll understand how to analyse vibrations, why they're important in engineering design, and how to control them to keep systems safe and effective.

6b. Outline Content

The module covers following contents:
- Fundamentals of Vibration
- Free Vibration of Single-Degree-of-Freedom Systems
- Harmonically Excited Vibration
- Vibration Under General Forcing Conditions
- Vibration of Two-Degree-of-Freedom Systems

6c. Key Texts/Literature

The reading list to support this module is available at: https://readinglists.aru.ac.uk/

6d. Specialist Learning Resources

Computer Room and Mechanical Engineering Laboratory

7. Learning Outcomes (threshold standards)		
No.	**Type**	**On successful completion of this module the student will be expected to be able to:**
1	Knowledge and Understanding	Understand the fundamental concept of mechanical vibrations and demonstrate their impact on the performance and integrity of engineering systems and structures.
2	Knowledge and Understanding	Understand and apply the principles of mechanical vibrations with the knowledge of engineering mathematics, engineering dynamics, and structural mechanics to construct a vibration model for engineering systems/structures to demonstrate their oscillation under applied forces and boundary conditions.
3	Intellectual, practical, affective and transferrable skills	Demonstrate independent analytical skills in mechanical vibrations, supporting critical analysis of input data and results of vibration modelling of engineering systems/structures and understanding of scopes and limitations.
4	Intellectual, practical, affective and transferrable skills	Effectively function as an individual and as a member of a team; establish the proficiency to communicate effectively on complex vibration engineering subjects with technical and non-technical audiences.

8a. Module Occurrence to which this MDF Refers				
Year	**Occurrence**	**Period**	**Location**	**Mode of Delivery**
2026/7	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence			
Learning Activities	**Hours**	**Learning Outcomes**	**Details of Duration, frequency and other comments**
Lectures	36	1-4	3 hours lecture per week
Other teacher managed learning	21	1-4	3-hour weekly (for 7 weeks) tutorial, practice, and supervised activity in the computer room and laboratory
Student managed learning	93	1-4	Self-directed activity and learning
TOTAL:	150		

9. Assessment for the above Module Occurrence					
Assessment No.	**Assessment Method**	**Learning Outcomes**	**Weighting (%)**	**Fine Grade or Pass/Fail**	**Qualifying Mark (%)**
010	Practical	1-4	50 (%)	Fine Grade	30 (%)
2 Components (1500 words equivalent) Component 1 - 20-min group oral presentation of the group design project followed by 5 minutes of Q&A, associated with the requirements of Engineering Council Learning Outcome C3 (Equivalent to maximum 1000 words) Component 2 - Individual laboratory report, maps to Engineering Council Learning Outcome C12 (Equivalent to maximum 500 words)					

Assessment components for Element 010				
Component No.	**Assessment Title**	**Submission Method**	**Weighting (%)**	**Components needed for Mark Calculation?**
010/1	20 Minutes Group Presentation (equivalent to 1000 words)		70 (%)	All
010/2	Individual Laboratory Report (500 words)		30 (%)	

Assessment No.	**Assessment Method**	**Learning Outcomes**	**Weighting (%)**	**Fine Grade or Pass/Fail**	**Qualifying Mark (%)**
011	Coursework	1-3	50 (%)	Fine Grade	30 (%)
In-Class Test (2 hours) (Equivalent to maximum 1500 words), maps to Engineering Council Learning Outcome C13					

In order to pass this module, students are required to achieve an overall mark of 40% (for modules at levels 3, 4, 5 and 6) or 50% (for modules at level 7*).

In addition, students are required to:
(a) achieve the qualifying mark for each element of fine graded assessment as specified above
(b) pass any pass/fail elements

[* the pass mark of 50% applies for all module occurrences from the academic year 2024/25 – see Section 3a of this MDF to check the level of the module and Section 8a of this MDF to check the academic year]