Course Outline (Higher Education)

School: School of Engineering, Information Technology and Physical Sciences

Course Title: INTRODUCTION TO VIBRATION ANALYSIS

Course ID: ENGIN3302

Credit Points: 15.00

Prerequisite(s): (ENGIN2302)

Co-requisite(s): Nil

Exclusion(s): Nil

ASCED: 030701

Description of the Course:

This course introduces students to the aspects of mechanical vibration in a mathematical and theoretical context. The course will employ experimental methods to highlight the concepts presented.

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience: Student is not undertaking work experience in industry.

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the course but gained a final mark of 45 per cent or above and submitted all major assessment tasks.

Program Level:

Level of course in Program	AQF Level of Program					
	5	6	7	8	9	10
Introductory						
Intermediate						
Advanced			✔			

Learning Outcomes:

On successful completion of the course the students are expected to be able to:

Knowledge:

K1. Describe the behaviour of dynamic systems in the time domain.
K2. Explain the transient response of vibrating system.
K3. Relate experimental findings to the analytical model and system variables.
K4. Describe dynamic systems in the frequency domain.
K5. Discuss how vibration systems respond to a harmonic excitation.

Skills:

S1. Demonstrate how computer algebra systems are employed for modelling and simulation.
S2. Solve real engineering problems through symbolic, numeric and experimental dynamic analysis.
S3. Evaluate analytical models and reflect on practice.
S4. Work effectively, both independently and in teams.
S5. Present findings in manners which can be appreciated by professional and lay people.

Application of knowledge and skills:

A1. Test and evaluate an existing vibrating system.
A2. Apply dynamic analysis techniques to a variety of real engineering applications.
A3. Apply existing and developing knowledge and experience to the modelling and analysis of a variety of dynamic engineering systems.

Course Content:

Topics may include:

- Mathematical background (linearization and Laplace Transforms)
- Mathematical description of mechanical systems
- Transient and free vibration
- Harmonically-Forced Vibration System and Resonance
- Vibration Isolation and Measurement

Values:

V1. Recognise common principles of mechanical vibration in a variety of engineering applications.
V2. Develop an understanding of system variables and their impact on the overall dynamic behaviour of engineering systems.
V3. Appreciate the importance of understanding how integrated engineering systems behave, through modelling, simulation and testing.

V4. Appreciate learning as a lifelong process.

Graduate Attributes

The Federation University FedUni graduate attributes (GA) are entrenched in the Higher Education Graduate Attributes Policy (LT1228). FedUni graduates develop these graduate attributes through their engagement in explicit learning and teaching and assessment tasks that are embedded in all FedUni programs. Graduate attribute attainment typically follows an incremental development process mapped through program progression. **One or more graduate attributes must be evident in the specified learning outcomes and assessment for each FedUni course, and all attributes must be directly assessed in each program**

Graduate attribute and descriptor		Development and acquisition of GAs in the course	
		Learning Outcomes (KSA)	Assessment task (AT#)
GA 1 Thinkers	Our graduates are curious, reflective and critical. Able to analyse the world in a way that generates valued insights, they are change makers seeking and creating new solutions.	K1-K5, S1-S3, A1-A3	AT1, AT2, AT3, AT4
GA 2 Innovators	Our graduates have ideas and are able to realise their dreams. They think and act creatively to achieve and inspire positive change.	NA	NA
GA 3 Citizens	Our graduates engage in socially and culturally appropriate ways to advance individual, community and global well-being. They are socially and environmentally aware, acting ethically, equitably and compassionately.	S4-S5	AT3
GA 4 Communicators	Our graduates create, exchange, impart and convey information, ideas, and concepts effectively. They are respectful, inclusive and empathetic towards their audience, and express thoughts, feelings and information in ways that help others to understand.	K1, K4, K5, S4-S5	AT1-AT4
GA 5 Leaders	Our graduates display and promote positive behaviours, and aspire to make a difference. They act with integrity, are receptive to alternatives and foster sustainable and resilient practices.	NA	NA

Learning Task and Assessment:

Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
K1-K5, S1-S5, A1-A3	A modelling exercise based on a real-world problem that exposes the student to numerical modelling techniques.	Numerical project	40 - 60%
K1 - K5, S3	Assessment of all or part of the course by examination.	Examination	40 - 60%

Adopted Reference Style:

Other (IEEE: Refer to the library website for more information)

Refer to the library website for more information

Fed Cite - referencing tool