



Unit Outline (Higher Education)

Institute / School: Institute of Innovation, Science & Sustainability

Unit Title: ADVANCED VIBRATION ENGINEERING

Unit ID: ENPGG9308

Credit Points: 15.00

Prerequisite(s): (ENPGG9303)

Co-requisite(s): Nil

Exclusion(s): (ENGRG9305)

ASCED: 030701

Description of the Unit:

This unit equips participants with advanced theoretical and technical knowledge and skills in the area of Mechanical Vibration. After having, successfully, completed the unit, participants will be qualified to undertake highly-skilled engineering work and engage in further learning and research.

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 Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment

Course Level:

| Level of Unit in Course | AQF Level of Course | | | | | |
|-------------------------|--------------------------|--------------------------|--------------------------|-------------------------------------|--------------------------|--------------------------|
| | 5 | 6 | 7 | 8 | 9 | 10 |
| Introductory | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Intermediate | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Advanced | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Learning Outcomes:

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

Knowledge:

- K1.** Investigate and explain how advanced mathematical and numerical methods are employed in the field of machine dynamics and vibration.
- K2.** Explain the principles and concepts underlying the technical field of machine dynamics.
- K3.** Explain and differentiate research methods and analytical tools applied in the field of machine dynamics.
- K4.** Evaluate the operating and design parameters which impact the performance of machinery.

Skills:

- S1.** Evaluate and transform information relevant to field of machine dynamics
- S2.** Identify and provide solutions to complex problems in the field of machine dynamics and mechanical vibration.
- S3.** Apply advanced understanding of the body of knowledge and theoretical concepts underlying the field of machine dynamics.
- S4.** Communicate knowledge and ideas using textual, mathematical and graphical means.

Application of knowledge and skills:

- A1.** Exercise critical thinking and judgement in developing new understanding of machinery dynamics and creatively synthesise solutions for dynamics problems.
- A2.** Plan and execute a project work in the area of machine dynamics and research with some independence.
- A3.** Adapt knowledge and skills acquired in the unit in diverse engineering and industrial contexts.

Unit Content:

Topics may include:

- Revision of the basic vibration concepts: single degree of freedom.
- Vibration of two and higher degree of freedom systems.
- Mechanical absorber and vibration elimination
- Dynamic effects in rotating machinery (out of balance masses and correction)
- Vibration and Safety

Learning Task and Assessment:

| Learning Outcomes Assessed | Assessment Tasks | Assessment Type | Weighting |
|-----------------------------|--|-----------------------------------|-----------|
| K1 - K4, S1 - S4, A1 - A3 | Hands-on project incorporating numerical and conceptual tasks. | Report | 10% - 30% |
| K1 - K4, S1 - S4 | Assessment of all or part of the unit by examination. | Test and/or Examination | 30% - 50% |
| K1 - K4, S2 - S4, A1 and A3 | Demonstrate an understanding of fundamental knowledge of the topics, tests, or experiments to solve design-based problems. | Submitted problem solving reports | 40% - 60% |

Adopted Reference Style:

IEEE

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