

Course Title: **System Dynamics and Vibrations**

Course Code: **ENME701**

Descriptor Start Date: **31/01/2025**

POINTS: **15.00**

LEVEL: **7**

PREREQUISITE/S: **ENME510, ENME511**

COREQUISITE/S: **None**

RESTRICTION/S: **None**

LEARNING HOURS

Hours may include lectures, tutorials, online forums, laboratories. Refer to your timetable and course information in Canvas for detailed information.

Total learning hours: 150

PRESCRIPTOR

Introduces modelling of mechanical, electrical, fluid and thermal systems. Various tools will be used for modelling and analysis including but are not limited to differential equations, Laplace transform, transfer function, block diagram, time domain and frequency domain methods. Principles of vibration will also be introduced. Single degree, multi-degree and continuous systems will be discussed and analysed.

LEARNING OUTCOMES

1. Apply different methods for system modelling (a, b, c, d)
2. Analyse system responses and their relations to the system properties (a, b)
3. Analyse and simulate the control of vibrations (a, b, c, e, i)

Disclaimer: Course descriptors may be amended between teaching periods/semesters

CONTENT

- Mathematical tools for system modelling – complex analysis, ODE, Laplace transform, matrix analysis
- Modelling of mechanical, electrical and electromechanical systems
- Modelling of fluid and thermal systems
- Transient and steady-state response analysis
- Frequency-response analysis
- One degree of freedom
- Vibration absorbers and modal analysis
- Two degree of freedom
- Multi-degree
- Continuous system

Key to Graduate Capabilities Profile

- Engineering knowledge
- Problem analysis
- Design/development of solutions
- Investigation
- Modern tool usage
- The engineer and society
- Environment and sustainability
- Ethics
- Individual and teamwork
- Communication
- Project management and finance
- Lifelong learning

LEARNING & TEACHING STRATEGIES

Blended and Online delivery.

ASSESSMENT PLAN

Assessment Event	Weighting %	Learning Outcomes
Assignments	20.00	1,2,3
Questionnaires	80.00	1,2,3

Grade Map	MAP1
	A+ A A- Pass with Distinction
	B+ B B- Pass with Merit
	C+ C C- Pass
	D Fail

Overall requirement/s to pass the course:

To pass this course, students must attempt all summative assessments and achieve a minimum overall grade of C-.

LEARNING RESOURCES

Prescribed text: K. Ogata, System Dynamics, Pearson, 3rd or 4th Edition, PEARSON, 2014.

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Principal Programme: AK3751, Bachelor of Engineering (Honours)

Related Programme/s: ICE1
INEXCH1
SABRD1