Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	Physics for Engineers 1
Unit ID:	ENGRG1002
Credit Points:	15.00
Prerequisite(s):	Nil
Co-requisite(s):	Nil
Exclusion(s):	ENGIN1002
ASCED:	039999

Description of the Unit:
Within all engineering disciplines, core concepts from various fields of physics such as materials, Newtonian mechanics, fluids, heat and mass transfer, electronics, and electromagnetism underpin the knowledge of practising engineers. This unit will introduce students to the principles that engineers frequently use to understand and analyse the behaviour of Newtonian mechanics systems, fluids systems, and heat and temperature; these areas are of crucial importance in the 21st century. The unit will introduce students to the fundamental concepts needed to analyse these topics that will support their learning in the later years of the engineering course. At the end of this unit, students will have a fundamental understanding that will allow them to solve problems related to the introduced concepts and design and analyse simple systems.

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			✔			
Intermediate						
Advanced						

Learning Outcomes:

Knowledge:

K1. Explain the techniques for the analysis of Newtonian mechanics, fluid systems, and heat and mass transfer.

K2. Recognise the laws governing the behaviour of Newtonian mechanics, fluid systems, and heat and mass transfer.

Skills:

S1. Develop appropriate mathematical models for the analysis of Newtonian mechanics systems, fluid systems, and heat and mass transfer.

S2. Perform laboratory experiments to validate the theoretical predictions and compare the real and nominal values of the system.

S3. Demonstrate problem-solving techniques related to the topics in a clear, logical and concise way.

Application of knowledge and skills:

A1. Analyse simple Newtonian mechanics systems, fluid systems, and heat and mass transfer.

A2. Apply the principles in the analysis of experimental outcomes and simple design situations.

A3. Communicate and present the engineering concepts and solutions clearly and effectively using appropriate technical terminologies and visualisation techniques.

Unit Content:

Topics may include:

- Newton's laws of motion, rectilinear and curvilinear motions, conservation of energy, impulse and momentum, and kinematics.
- Modes of heat transfer: Conduction, Convection, and Radiation
- Fluid pressure, buoyancy, viscosity, surface tension, hydraulics, and Bernoulli's equation.

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, S1, S3, A1, A2, A3	Participate in all learning activities including lectures, tutorials, laboratory activities, group activities, and supplementary reading activities. Undertake problem-solving tasks relevant to the topics in this unit in both invigilated and non-invigilated modes.	Assessed tutorials, quizzes, assessment tasks, mid-semester test, and/or final test.	40% - 60%
K1, K2, S1, S3	Demonstrate an understanding of fundamental knowledge of the topics delivered in the lectures and relate to observations, tests, or experiments to solve design-based problems.	Oral or written explanatory tasks, or a small design task.	10% - 30%

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
S2, S3, A3	Undertake laboratory activities relevant to the topics introduced in this unit to validate the theory and confirm the application of theory in practice	Laboratory report	10% - 30%

Adopted Reference Style:

IEEE

Refer to the library website for more information

Fed Cite - referencing tool