Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	Thermofluids
Unit ID:	ENGIN2304
Credit Points:	15.00
Prerequisite(s):	(ENGIN1005 and MATHS1001)
Co-requisite(s):	Nil
Exclusion(s):	(ENCOR2100)
ASCED:	030701

Description of the Unit:

This unit is an introduction to fluid mechanics, knowledge of which is readily applicable in various industries like water distribution, oil & gas, pharmaceuticals, energy conversion (conventional and renewables) and aerodynamics among many others. The unit will cover all of the fundamental aspects of fluid mechanics including pressure measurement, hydrostatics, continuity, momentum and energy equations together with an introduction to applications of these basic principles to various fluid mechanics devices like pumps and turbines.

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:

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

Knowledge:

K1. Explain the origin and derivation of the basic governing equations of mass, momentum and energy and their application to engineered fluid systems.

K2. Characterise the different types of fluids and flows.

K3. Explain the Lagrangian and Eulerian methods of fluid flow description.

K4. Describe the importance of the Reynolds number and its importance in fluid engineering problems.

K5. Explain the energy equation and its application to energy conversion devices like pumps and turbines.

Skills:

S1. Identify the basic governing equations responsible for fluid behavior in engineered fluid systems.

S2. Apply the Lagrangian and Eulerian framework to practical fluid mechanics devices like jets, blades, mixers, pumps and turbines.

S3. Calculate the hydrostatic forces present on horizontal and inclined planes.

S4. Solve all of the simple forms of fundamental fluid mechanic equations (energy, continuity and momentum).

S5. Demonstrate the use of the Moody diagram to interpret friction factors, relative roughness and Reynolds Number.

S6. Solve simple problems relating to drag and lift;

S7. Solve simple work and energy analysis problems;

Application of knowledge and skills:

A1. Select and justify the application of the mass and momentum equations to solve practical engineering problems such as pipe flow, flow measurement and the determination of hydrostatic forces on submerged structures;

A2. Select and justify the application of the energy equation to solve practical engineering problems relating to energy conversion devices like pumps and turbines.

Unit Content:

Topics may include:

- Introduction to fluids, fluid statics and fluids in motion.
- Basic conservation equations: Mass, momentum and energy, their integral and differential forms.
- Internal and external flows
- Fluid measurement principles and instruments.
- Energy equation application to pumps and turbines

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-K5, S1-S7, A1-A2	Numerical problems and practical industrial scenarios are provided to assess students ability to apply the fluid mechanics principles.	Quiz/Tests/Final exam	10-50%
K1-K5, S1-S6, A1-A2	Numerical problems to develop critical thinking and problem solving skills.	Numerical assignments	10-20%
S3, S6, S7, A1-A2	Practical application of the fluid mechanics priniciples and team work assessed by a lab report.	Lab report	15-30%

Adopted Reference Style:

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

Refer to the library website for more information

Fed Cite - referencing tool