



Course Outline (Higher Education)

Institute / School: Institute of Innovation, Science & Sustainability

Course Title: MATERIALS IN ENGINEERING

Course ID: ENGIN1003

Credit Points: 15.00

Prerequisite(s): Nil

Co-requisite(s): Nil

Exclusion(s): (ENCOR1110)

ASCED: 039999

Description of the Course:

For all engineering disciplines a fundamental understanding of how materials behave is core to being able to effectively select and design solutions to the challenges that are faced by the world. This course will introduce you to the basic properties of the most commonly used materials in engineering. To develop your understanding both the micro-structural and macroscopic behaviour of materials and fundamental chemistry will be studied, so that an understanding of how a material can be used safely is developed. In addition you will be introduced to the common processing methods, life cycle assessment and material selection techniques.

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	■	■	✓	■	■	■

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

Learning Outcomes:

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

Knowledge:

- K1.** Identify and explain how material properties and behavior are dependent on the crystallinity, microstructure, and phase composition and how these can be controlled by processing.
- K2.** Outline the interface between the design process, materials selection and manufacturing.
- K3.** Review the common manufacturing processes available for engineering materials and the role of life cycle analysis.

Skills:

- S1.** Apply the processes of materials and manufacturing process selection to practical problems in design.
- S2.** Solve problems relating to material properties in a clear, logical and concise way.
- S3.** Demonstrate problem-solving and teamwork techniques for laboratory experiments.

Application of knowledge and skills:

- A1.** Interpret information of engineering significance to material selection and present them in a professional manner
- A2.** Demonstrate knowledge and practical problem-solving skills in materials engineering by preparing a technical report based on laboratory exercises.

Course Content:

Topics may include:

- Material Properties, including atomic number, atomic mass, stoichiometry, crystal structure, mass and density.
- Introduction to stress and strain and their measurement, modulus of elasticity, ductility, brittleness and hardness, electrical and magnetic properties, fracture, fatigue and creep, corrosion mechanisms.
- Introduction to materials commonly used in engineering applications; steel and other major metals, concrete, ceramics, polymers, composites
- For each material, the following issues will normally be covered - manufacture; introduction to their microstructure; material properties; main tests conducted; most common engineering applications

Values:

- V1.** Recognise the connection between physics, chemistry, materials science and engineering.

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1 - K3, S1 - S2, A1	An examination covering all or some of the material covered in the course.	Test/Exam	40 - 50%
K1 - K3, S1- S3, A1 - A2	A range of laboratory and other exercises will be undertaken to support the theoretical development during lectures.	Report/Presentation	30-40%

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](#)