

Fundamentals of Materials

Module Code:	MAE3003-B
Academic Year:	2018-19
Credit Rating:	20
School:	Department of Mechanical and Energy Systems Engineering
Subject Area:	Mechanical and Automotive Engineering
FHEQ Level:	FHEQ Level 3

Pre-requisites:

Co-requisites:

Contact Hours

Type	Hours
Lectures	36
Tutorials	12
Laboratory	16
Directed Study	120
Other (DO NOT USE)	14
Examinations DO NOT USE	2

Availability Periods

Occurrence	Location/Period
BDA	University of Bradford / Academic Year (Sept - May)

Module Aims

To develop knowledge and understanding of the influence of material structure (from atomic through to microstructural) on the chemical and physical properties of materials.

Outline Syllabus

States of matter, Gas Laws & Avogadro constant, atom and electronic structure, primary and secondary bonding, polymorphism & carbon hybridisation, hard sphere modelling & crystal lattices & defects, mechanical properties, mechanisms for enhancing properties, thermal properties.

Enthalpy: heats of formation & combustion, Hess' Law, catalysts and activation energy, equilibrium, constant (Kc), Le Chateliers Principle, organic reaction mechanisms, simple reactions of alcohols, carboxylic acids & amines.

Module Learning Outcomes

On successful completion of this module, students will be able to...

- 1
 - 1.1 Confidently explain and discuss the nature of different properties of materials in relation to their structure.
 - 1.2 Demonstrate a basic understanding of the chemical nature of materials and reaction kinetics.
- 2
 - 2.1 Apply principles of theory to recommend suitable materials, based on their structure and properties, for engineering problems.
 - 2.2 Perform elementary calculations using material properties
 - 2.3 Apply the principles of chemical reactions to solve problems set in an engineering context.
- 3
 - 3.1 Manage and interpret data.
 - 3.2 Present technical data and analysis in formal reports.
 - 3.3 Solve problems systematically using the scientific principles and theory.
 - 3.4 Communicate technical information in a concise, confident, manner.
 - 3.5 Work as part of a team.

Learning, Teaching and Assessment Strategy

Lectures, tutorials, laboratories.

Mode of Assessment

Type	Method	Description	Length	Weighting	Final Assess'
Summative	Presentation	Group presentation. Mid Semester 2		15%	No
Referral	Examination - closed book	Supplementary	2 hours	100%	Yes
Summative	Examination - closed book	Semester 2	90 minutes	35%	Yes
Summative	Coursework	Semester 1 week 11. Report based upon use of Software package and observation of testing methods		20%	No
Summative	Classroom	Class test during		30%	No

test

January
assessment
period

Legacy Code (if applicable)

ENG0304L

Reading List

To view Reading List, please go to [rebus:list](#).