

MODULE DESCRIPTION FORM

DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING

ME403 (ME406 sem1 / ME418 sem2) ENGINEERING MATERIALS SELECTION

Module Registrar: Prof A M Galloway alex.galloway@strath.ac.uk	Taught To (Course): Cohorts for whom class is compulsory		
Other Lecturers Involved: Dr A I Toumpis athanasios.toumpis@strath.ac.uk	Credit Weighting: 10	Semester: 1 & 2	
Assumed Prerequisites: ME212 Materials Engineering and Design	Compulsory	Academic Level: 4	Suitable for Exchange: Y

Alternative codes and credit values for those taking only one semester:

Semester 1: ME406 Engineering Materials Selection – Sem1 (10 Cr/ECTS 5)

Semester 2: ME418 Engineering Materials Selection – Sem2 (10 Cr/ECTS 5)

Module Format and Delivery (HOURS i.e. 1 credit = 10hrs of study):

Lecture	Tutorial	Laboratory	Groupwork	External	Online	Project	Assignments	Private Study	Total
20	5							75	100

Educational Aim

It is necessary for engineers to be aware of the importance of materials selection in the design process. This module aims to review the classes of available engineering materials, with some background to the underlying factors that determine their general properties, and deliver an introduction to the philosophy of materials selection in design.

Learning Outcomes

On completion of the module the student is expected to be able to:

LO1 understand the role of engineering material properties in selection

LO2 know how materials selection is achieved within the context of engineering design

LO3 apply selection strategies to optimize material choice based on design constraints

LO4 develop a deeper understanding of the science and application of engineering materials

Syllabus

This module will introduce an alternative approach to the traditional teaching methods of materials selection, which, in the past, developed an understanding of the physical and chemical nature of materials as a means of providing an understanding of their usefulness in Engineering Design.

In contrast, this new approach considers the classification of materials, provides an overview of their general or specific properties and provides an insight into their uses and selection criteria. This allows for the development of a more progressive understanding of the importance of materials selection in the design process.

Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements

LO1 understand the role of engineering material properties in selection

C1 tests understanding of the development of basic material properties

C2 tests the use of material properties for satisfying design-led application requirements

C3 tests knowledge on the interaction of function, shape, process, material in selection guidelines

LO2 know how materials selection is achieved within the context of engineering design
 C1 demonstrate understanding and application of basic material selection principles
 C2 demonstrate knowledge and application of material and process property charts
 C3 demonstrate knowledge of selection using screening and ranking

LO3 apply selection strategies to optimize material choice based on design constraints
 C1 demonstrate competence in applying more advanced strategies for material selection
 C2 demonstrate competence in selecting materials for shape optimisation
 C3 demonstrate competence in material life cycle analysis

LO4 develop a deeper understanding of the science and application of engineering materials
 C1 demonstrate understanding of fundamental materials science over a range of common engineering alloys
 C2 demonstrate understanding of phase diagram and how they are used to predict material properties
 C3 demonstrate understanding of heat treatment, corrosion and welding engineering

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback

(within Assessment and Feedback Policy at: <https://www.strath.ac.uk/staff/policies/academic/>)

Formal, summative feedback will be provided by the return of examination marks to students at the end of the module (after the summer exam board) [note: exam scripts will not be returned to students and no individual or collective discussion of exam performance will be facilitated].

Informal feedback will be provided at regular tutorial sessions primarily through verbal discussion with individuals or groups on tutorial exercises attempted in advance by students (note: to receive this feedback, students should participate in these tutorials but attendance is not mandatory).

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

Examination				Coursework		Practical		Project	
Number	Month(s)	Duration	Weighting	Number	Weighting	Number	Weighting	Number	Weighting
2	Dec Apr/May	1 hour 1 hour	50% 50%						
* LO1, LO2, LO3, LO4									

* **L/Os:** Indicate which Learning Outcomes (L01, L02, etc) are to be assessed by exam/coursework/practical/project as required.

Coursework / Submissions deadlines (academic weeks): n/a

Resit Assessment Procedures:
 2 hour examination in August diet.

PLEASE NOTE:

Students must gain a summative mark of 40% to pass the module. Students who fail the module at the first attempt will be re-assessed during the August diet. This re-assessment will consist entirely of exam. No marks from any previous attempts will be transferred to a new resit attempt.

Recommended Reading

*****Purchase recommended **Highly recommended reading *For reference (do NOT purchase)**

*** Ashby M.F., *Materials Selection in Mechanical Design*, 3rd edition or later, Butterworth-Heinemann

*** Callister W.D. & Rethwisch D.G., *Materials Science and Engineering: An Introduction*, any edition, Wiley

Additional Student Feedback

(Please specify details of when additional feedback will be provided)

Informal individual and general feedback will be provided during lectures and at regular tutorial sessions.

Formal, summative feedback will be provided by the return of examination marks to students at the end of the module (after the summer exam board).

Date	Time	Room No
		Check timetable webpages for details

Session: 2019/20

Approved:

Course Director Signature: Dr Stuart Grey

Date of Last Modifications: 04/09/19

(Updated June 2019)

