

MODULE TITLE	Materials	CREDIT VALUE	15
MODULE CODE	ECM1204	MODULE CONVENER	Dr Mi Tian (Coordinator)
DURATION: TERM	1	2	3
DURATION: WEEKS	0	4	0
Number of Students Taking Module (anticipated)	25		

DESCRIPTION - summary of the module content

The material components of a product determine how efficiently it works. If the manufacturers of a railway carriage wheel use the incorrect combination of material components, this can cause it to break and spell disaster for passengers.

You will learn how to relate basic theory to current technology such as state of the art materials and rapid manufacture techniques. Furthermore, the module will introduce you to the fundamental material solids that engineers use, such as metals, polymers, composites, glasses and ceramics. You will also have the chance to explore why materials behave the way they do, how they differ and what we can do to manipulate them to create products. Moreover, you will take part in lab work to make and test different kinds of materials, and study common manufacturing techniques by practically trying and testing them.

Prerequisite module: ECM1200 Core Engineering or equivalent

AIMS - intentions of the module

This module is designed to help you develop an awareness of principal engineering materials, their fabrication and technical/economic/environmental considerations. By the end of it, you will be able to explain how to manufacture any single component, the cheapest and best method of making it, what the properties of that material are, how they behave and how they arise. The knowledge you acquire in this module will stand you in good stead in future study.

INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed)

On successful completion of this module *you should be able to*:

Module Specific Skills and Knowledge: SM1p, EA1p, D5p, ET2p, EP2p

- 1 understand the properties of materials relevant to their use in engineering applications and manufacturing methods
- 2 comprehend economic and sustainability issues in materials and their different manufacturing processes
- 3 identify and choose the most appropriate manufacturing techniques for specific components

Discipline Specific Skills and Knowledge EP1p, EP3p

- 4 use laboratory equipment, correctly and safely, to make measurements
- 5 record and interpret the results of observed practical experiments and demonstrations
- 6 gain first-hand experience of facilities for materials property testing and manufacturing

Personal and Key Transferable / Employment Skills and Knowledge D6p, G1p, G4p

- 7 write clear accounts (of laboratory experiments and demonstrations)
- 8 demonstrate an awareness of health and safety issues applicable to working in a supervised laboratory
- 9 work as a group member to share and explore practical problems

SYLLABUS PLAN - summary of the structure and academic content of the module

- materials: mechanical properties of materials and how they arise;
- lifecycle issues: manufacture, use and disposal/reuse/recycling of materials;
- manufacturing: microstructure of materials, how microstructure is changed during manufacture and how this affects properties;
- economics and sustainability in materials and manufacturing;
- polymers;
- properties and processes;
- metals;
- properties and processes;
- composites;
- properties and processes;
- ceramics, glass and new materials;
- properties and processes.

LEARNING AND TEACHING

LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)

Scheduled Learning & Teaching Activities	30.00	Guided Independent Study	50.00	Placement / Study Abroad	70.00
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DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS

Category	Hours of study time	Description
Scheduled learning and teaching activities	25	Lectures
Scheduled learning and teaching activities	5	Laboratories
Guided independent study	50	Guided independent study
Placement	70	Learning at work

ASSESSMENT

FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade

Form of Assessment	Size of Assessment (e.g. duration/length)	ILOs Assessed	Feedback Method
Feedback provided during tutorials			

SUMMATIVE ASSESSMENT (% of credit)

Coursework	40	Written Exams	60	Practical Exams	0
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DETAILS OF SUMMATIVE ASSESSMENT

Form of Assessment	% of Credit	Size of Assessment (e.g. duration/length)	ILOs Assessed	Feedback Method
Written exam - Closed book	60	2 hours	1,2,3	Students can request feedback after exam
Coursework - laboratory report 1 Mechanical	20	5 pages	4,5,6,7,8,9	Written
Coursework - laboratory report 2 Injection Moulding	20	5 pages	4,5,6,7,8,9	Written

DETAILS OF RE-ASSESSMENT (where required by referral or deferral)

Original Form of Assessment	Form of Re-assessment	ILOs Re-assessed	Time Scale for Re-assessment
All Above	Written Exam (100%)	All	August Ref/Def period

RE-ASSESSMENT NOTES

If a module is normally assessed entirely by coursework, all referred/deferred assessments will normally be by assignment.

If a module is normally assessed by examination or examination plus coursework, referred and deferred assessment will normally be by examination. For referrals, only the examination will count, a mark of 40% being awarded if the examination is passed. For deferrals, candidates will be awarded the higher of the deferred examination mark or the deferred examination mark combined with the original coursework mark.

RESOURCES

INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type & level of information that you are expected to consult. Further guidance will be provided by the Module Convener

Basic reading:

ELE: <http://vle.exeter.ac.uk/>

Web based and Electronic Resources:

Other Resources:

Reading list for this module:

Type	Author	Title	Edition	Publisher	Year	ISBN	Search
Set	Callister, WD	Materials Science and Engineering: an introduction	8th	John Wiley & Sons	2007	978-0470505861	[Library]
Set	Kalpakjian S	Manufacturing Processes for Engineering Materials	5th	Prentice Hall	2008	9780132272711	[Library]
Set	Ashby & Jones	Engineering materials 1 : an introduction to their properties, applications and design	Electronic		2012	0750663812	[Library]

CREDIT VALUE 15

ECTS VALUE 7.5

PRE-REQUISITE MODULES None

CO-REQUISITE MODULES None

NQF LEVEL (FHEQ) 4

AVAILABLE AS DISTANCE LEARNING No

ORIGIN DATE Tuesday 10 July 2018

LAST REVISION DATE Thursday 06 May 2021

KEY WORDS SEARCH Solid mechanics; beam theory; fluid mechanics; incompressible flow.