

MODULE DESCRIPTION FORM

DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING

ME931 INDUSTRIAL METALLURGY

Module Registrar: Prof A M Galloway alex.galloway@strath.ac.uk	Taught To (Course): MSc Advanced Mechanical Engineering		
Other Lecturers Involved: Dr A I Toumpis athanasios.toumpis@strath.ac.uk	Credit Weighting: 10	Semester: 2	
Assumed Prerequisites: n/a	Compulsory(MSc AME with Materials) /Optional	Academic Level: 5	Suitable for Exchange: N

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

Lecture	Tutorial	Laboratory	Groupwork	External	Online	Project	Assignments	Private Study	Total
10	3				2		5	80	100

Educational Aim

This module aims to develop an understanding of applied industrial metallurgy, to include Materials Selection, Properties of Metals and Alloys, Characterisation Methods, Welding Engineering, Heat Treatments and Degradation Mechanisms.

Learning Outcomes

On completion of the module the student is expected to:

- LO1 Gain knowledge and understanding of applied metallurgy (structure, properties, application, etc.)
- LO2 Develop skills in material selection and processes used for physical property manipulation
- LO3 Be able to apply knowledge gained across several industry sectors

Syllabus

The module will teach the following:

- Application of metallurgical principles in the extraction and processing of steel and aluminium
- Theory of diffusion and the phenomenon of mass transport for heat treatments
- Phase diagrams (equilibrium and non-equilibrium conditions), focusing on steel phase transformations
- Heat treatments primarily for steel alloys: hardening, softening and conditioning
- Welding engineering
- Corrosion theory and practice, corrosion protection

Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

- LO1 Gain knowledge and understanding of applied metallurgy
 - C1 Exhibit knowledge of fundamental materials science over a range of common engineering alloys
 - C2 Demonstrate understanding of heat treatments, corrosion and welding engineering
- LO2 Develop skills in material selection and processes used for physical property manipulation
 - C1 Demonstrate understanding and application of material selection principles
 - C2 Evidence competence in applying advanced strategies for material and process selection

- LO3 Be able to apply knowledge across several industry sectors
- C1 Manifest understanding of diverse heat treatment processes within an industrial context
- C2 Exhibit knowledge of the degradation phenomena influencing a variety of engineering materials

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 after assessment. 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 during the assignment presentations sessions and 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
1	Apr/May	2 hours	80%	4	20%				
*LO1, LO2, LO3									

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

Coursework Assignments:	Search of research paper/case study	5%
	Summary of research paper	5%
	Peer-assessment	5%
	Presentation (approx. 20 min)	5%

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

Resit Assessment Procedures:

2hour examination in August diet

PLEASE NOTE:

Students must gain a summative mark of 50% 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

- *** Callister W.D. & Rethwisch D.G., *Materials Science and Engineering: An Introduction*, any edition, Wiley
- ** Any textbook on Applied Metallurgy

Additional Student Feedback

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

Date	Time	Room No
		Check timetable webpages for details

Session: 2019/20

Approved:

Course Director Signature: E Henderson

Date of Last Modifications: 27/08/2019

MODULE TIMETABLE

Module Code:

ME931

Module Title:

Industrial Metallurgy

Brief Description of Assessment:

- Assignment: selection, analysis, report and presentation of a research journal paper
- Regular diet (covering all lectures & tutorials plus information provided in the presentations)

Assessment Timing

Indicate on the table below the start/submission dates for each assignment/project and the timing of each exam/assessment using the dropdowns provided. Dropdowns can be left blank. Add extra notes below the dropdowns.

Please note: Timings can and will change, this should only be used as a guide.

Semester One	W&D Wk	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9	WK10	WK11	Exam Period
	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.

Semester Two	C&D Wk	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9	WK10	WK11	Exam Period
					Course work Set			Presentation	Presentation	Presentation		Presentation	Presentation