UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title	Materials And Manufacturing Technologies
Module Code	ENG5059-B
Academic Year	2024/5
Credits	20
School	School of Engineering
FHEQ Level	FHEQ Level 5

Contact Hours	
Type	Hours
Independent Study	155
Laboratories	10
Lectures	35

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Academic Year

Module Aims

To provide core technical knowledge of engineering materials and their associated manufacturing processes and technologies for conversion into engineering products.
To provide knowledge of pertinent material properties and their selection for manufacturing.
To provide knowledge on the influence of thermal and mechanical manufacturing parameters on material structure.
To build analytical skills and knowledge for the enhancement of material structure for engineering applications.

Outline Syllabus

Engineering Materials: Material selection, processing and performance, effect of processing on materials, structure and mechanical properties in polymers, elastomers, ceramics, composite materials, metals and alloys, annealing, heat treatment, Time-Temperature-Transformation (TTT) diagrams (TTT), Continuous Cooling Transformation (CCT) Diagrams, Failure.

Manufacturing Technologies: Metal manufacturing processes, polymer processing, additive manufacturing fundamentals, polymer processing, manufacture of ceramics, Computer Aided Manufacture, Flexible Manufacturing Systems, Manufacturing Cells, Industrial Robots, Lean Manufacturing Principles, Process Improvement, Sustainable Manufacturing, Computer Simulation of Manufacturing Operations, and the concept of Industry 4.0.

Learning Outcomes	
Outcome Number	Description
01	Define and evaluate physical processes underpinning the development of micro and macrostructures in metal, polymer and composite materials.
02	Interpret constitutive materials data, evaluate processes and provide solutions to defined manufacturing problems.
03	Critically evaluate processing steps required to engineer, and process, materials with advanced structures and properties.
04	Demonstrate analytical skills, problem solving skills, design skills and practical skills in materials processing and manufacturing.

Learning, Teaching and Assessment Strategy

Lectures are used to introduce theoretical concepts which are then applied in tutorials and laboratory practical sessions for deeper and better understanding. Formative feedback is given during tutorials and laboratory practical sessions (small groups).

LO1,LO2,LO3 will be assessed via closed book examination 40% (Semester 1).
LO2, LO3, LO4 will be assessed via coursework (laboratory practical report) 20% (Semester 1).
LO3, LO4 will be assessed via coursework (Semester 2) 40%.

This module satisfies the below Learning Outcomes as specified by the Accreditation of Higher Education Programmes: Fourth Edition (AHEP4) as published by the Engineering Council in-line with the UK Standard for Professional Engineering Competence (UK-SPEC). These outcomes specify five key areas of learning which partially (C) or fully (M) meet the academic requirement for CEng registration: Science and Mathematics (1), Engineering Analysis (2-4), Design and Innovation (5-6), The Engineer and Society (7-11), and Engineering Practice (12-18). Further details of these learning outcomes can be found at https://www.engc.org.uk/ahep/

M1, C1, M2, C2, M3, C3, M4, C4, M5, C5, M7, C7, M8, C8, M9, C9, M11, C11, M12, C12, M13, C13, M14, C14, M15, C15, M17, C17,

Mode of Assessment			
Type	Method	Description	Weighting
Summative	Laboratory Report	Report based on lab work (Sem 1) 1000 words	20%
Summative	Examination - Closed Book	Based on materials and manufacturing processes (Sem 1) (2 Hrs)	40%
Summative	Coursework - Written	Based on manufacturing technologies (Sem 2) 2500 words	40%

Reading List

To access the reading list for this module, please visit https://bradford.rl.talis.com/index.html

Please note:
This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.

https://bradford.ac.uk