

Polymer and Materials Engineering

Module Code:	CPE7012-B
Academic Year:	2018-19
Credit Rating:	20
School:	Department of Chemical Engineering
Subject Area:	Chemical and Process Engineering
FHEQ Level:	FHEQ Level 7 (Masters)

Pre-requisites:

Co-requisites:

Contact Hours

Type	Hours
Lectures	20
Seminar	2
Practical classes and	6
Supervised time in	4
Tutorials	8
Directed Study	160

Availability Periods

Occurrence	Location/Period
BDA	University of Bradford / Semester 2 (Feb - May)

Module Aims

To provide specialist knowledge on the structure and mechanical behaviour of polymers, metals, ceramics and composites.

Outline Syllabus

Polymer structure, morphology and polymerisation. Mechanical and viscoelastic properties, consideration in design. Thermal characterisation; DSC, DMA, spectroscopy.

Polymer melt processing; melt rheology, injection moulding, extrusion forming, reactive

extrusion (REX); design of process equipment such as screws, dies and moulds.

Leading edge technologies: Polymer composites and nanocomposites, biomedical and pharmaceutical polymer applications, solid state processing, micro and nano fabrication methods.

Module Learning Outcomes

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

- 1 Demonstrate knowledge on effect of processing parameters of several on microstructure and morphology development [P2m, P9m, P10m, P12M].
- 2 Interpret data, evaluate processes and generate solutions to well defined or abstract problems [SM1b, SM1m, SM3b, SM3m, EA1m, EA3m, EA4m, EA6m].
- 3 Critically evaluate process induced defects and provide engineering design solutions for their elimination. [D2, D3b, D3m, D4, D7m, D8m]
- 4 Analyze, specify and design suitable processing parameters/geometries for polymer melt processing operations. [EL1m, EL3b, EL4, EL11M, EA4m, EA6m, D7m, D8m, D11M,]
- 5 Demonstrate analytical skills, problem solving skills, design skills and practical skills in polymer processing. [EA4m, EA5m, D2, D3m, D4, D7m, P9m, G3m, P12M]

Learning, Teaching and Assessment Strategy

Lectures:

Concepts, principles and theory are developed in formal, interactive lectures. Concepts are applied and explored further in set tutorials. The tutorials and solution are provided for formative feedback to allow student to assess and calibrate their understanding of the topics covered.

Laboratories:

Presented theory is reinforced by laboratory sessions. Laboratories provide hands-on experience in REX and characterisation techniques. Leading edge developments covered by invited specialists and staff engaged in research.

Coursework assessment examines the wider learning outcomes (LO3, LO4, LO5) and a student's ability to apply the principles and knowledge learnt to practical engineering tasks. Knowledge and understanding of the specific LO 1, LO2, LO3 and LO4 will be assessed by formal closed book written examination.

Mode of Assessment

Type	Method	Description	Length	Weighting	Final Assess'
Summative	Examination - closed book	Examination of taught material	1.5 hours	50%	Yes

Summative	Coursework	Individual coursework based on lab research project to investigate reactive extrusion and its effect on polymer properties	50%	No
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Legacy Code (if applicable)

Reading List

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