

Module Details	
Module Title:	Manufacturing Systems Engineering
Module Code:	MAE6011-B
Academic Year:	2019-20
Credit Rating:	20
School:	Department of Mechanical and Energy Systems Engineering
Subject Area:	Mechanical and Automotive Engineering
FHEQ Level:	FHEQ Level 6
Pre-requisites:	
Co-requisites:	

Contact Hours	
Type	Hours
Lectures	24
Tutorials	20
Directed Study	156

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

Module Aims
To study the concepts of manufacturing systems, engineering and current challenges, including PUSH/ PULL (JIT/lean manufacturing) methods of planning & control of manufacturing systems. Thereafter, to study the concepts of discrete-event modelling and simulation in the context of these manufacturing systems. To develop modelling approaches and simulation models that address a wide variety of manufacturing environments such as FMS, Cellular and Job Shop systems, Flow and Assembly lines.

Outline Syllabus
Concepts of Manufacturing Systems. Just-In-Time (JIT/lean) PULL Manufacturing and its elements: waste elimination, Lean manufacturing, value chain, set-up time and batch reduction,

levelled/mixed scheduling, cellular and flexible manufacturing systems, flow-line and assembly lines, job shops, kanban control, continuous improvement, and supplier management. Study of Manufacturing Resource Planning (MRP) PUSH systems: Bill of Materials (BOM), Master Production Schedule (MPS), Materials Requirements Planning (MRP), Rough Cut Capacity Planning (RCCP), Capacity Requirements Planning (CRP), Order Release and Scheduling (OR/OS). Concept of modelling and simulation. Types of simulation models, definitions of event, activity, entity, process, attributes/etc used in discrete event simulation. Introduction to statistics, probabilities, confidence intervals/confidence levels, probability distributions. Basic modelling concepts and techniques, through building simulation models in classroom lecture/tutorial. The use of statistical techniques as part of the simulation process.

Learning Outcomes

1	Analyse current challenges for manufacturing systems engineers.
2	Analyse PULL (JIT/LEAN) and PUSH (MRP) manufacturing systems.
3	Apply simulation approaches by creating simulation models for a variety of manufacturing environments and applying statistical analysis.
4	Demonstrate teamwork, leadership and change management skills through a simulation group project.

Learning, Teaching and Assessment Strategy

The module is taught through a series of lectures supported by reading materials and videos. The learning of modelling and simulation is delivered through tutorial sessions with hands on experience building simulation models in the classroom.

Mode of Assessment

Type	Method	Description	Length	Weighting
Summative	Coursework	Group coursework to analyse and simulate a manufacturing simulation	-2000 words	50%
Summative	Coursework	Analysing a current manufacturing challenge	-2000 words	50%

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.