

Module Code:	ENG6AC
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Module Title:	Machine & Production System
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Level:	6	Credit Value:	20
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Cost Centre(s):	GAME	JACS3 code:	H300
		HECoS code:	100148

Faculty	FAST	Module Leader:	O. Durieux
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Scheduled learning and teaching hours	30 hrs
Guided independent study	170 hrs
Placement	0 hrs
Module duration (total hours)	200 hrs

Programme(s) in which to be offered (not including exit awards)	Core	Option
BEng (Hons) Production Engineering	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Pre-requisites
None

Office use only

Initial approval: 11/09/19

Version no:1

With effect from:11/09/19

Date and details of revision:

Version no:4

30/01/20 admin update of derogation

12/8/20 Temporary change to assessment for 2020/21 post Covid.

22/9/21 Temporary change to assessment extended for 21/22

Module Aims

The aims of the modules are:

- To develop a modern framework for the evaluation and selection of the best manufacturing processes utilised within the mechanical and manufacturing industry in terms of both the management and the technical aspect of the operations.
- To understand the main aspects (and rationale) for decision making in an industrial production environment.

Intended Learning Outcomes

Key skills for employability

KS1	Written, oral and media communication skills
KS2	Leadership, team working and networking skills
KS3	Opportunity, creativity and problem solving skills
KS4	Information technology skills and digital literacy
KS5	Information management skills
KS6	Research skills
KS7	Intercultural and sustainability skills
KS8	Career management skills
KS9	Learning to learn (managing personal and professional development, self-management)
KS10	Numeracy

At the end of this module, students will be able to

Key Skills

At the end of this module, students will be able to		Key Skills	
1	Critically evaluate and select appropriate design solutions, materials and manufacturing processes for various engineering problems.	KS1	KS3
		KS6	KS7
2	Systematically understand the factors that affect machining operations, the various control strategies and principles used to mitigate the sources of errors in machining processes	KS1	KS3
		KS6	KS7
3	Critically analyse how manufacturing operations are managed and integrated with other aspects of the business and how operations are managed across supply networks;	KS1	KS4
		KS6	KS8
		KS7	
4	Formulate a thorough understanding of the complexity/need of management in order to achieve the right quality of product that meet the customer requirements, delivered on time, while making the most efficient use of the resources available.	KS1	KS2
		KS3	KS6
		KS8	KS9

Transferable skills and other attributes

Reflective practice skills and problem solving
 Management and organisation
 Information handling
 Communication

Derogations

A derogation from regulations has been approved for this module which means that whilst the pass mark is 40% overall, each element of assessment (where there is more than one assessment) requires a minimum mark of 30%.

Assessment:

Indicative Assessment Tasks:

Assessment 1: A time limited examination covering manufacturing design choices and factors affecting machining operations

Assessment 2: A case study type investigation based on an improvement of a manufacturing technique used within the workplace including costing, supply chain implication analysis in a business case style layout.

Post Covid-19 Temporary modification valid for 20/21 and 21/22:

Assessment 1: A portfolio of work covering assignment based tasks covering learning outcomes 1 and 2. Examples of assessment may include practical based laboratory work, case study investigation, electrical engineering design calculations and multiple choice quizzes via the module VLE site.

Assessment 2: As above

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)	Duration or Word count (or equivalent if appropriate)
1	1, 2	Examination	50%	3 Hrs
2	3, 4	Case Study	50%	2500
<u>Post Covid-19 Temporary modification valid for 20/21 and 21/22:</u>				
1	1, 2	Portfolio	50%	3 Hrs
2	3, 4	Case Study	50%	2500

Learning and Teaching Strategies:

The module will be delivered through detailed presentations combined with intermittent interactive sessions to enhance students' learning.

The learning experience will be further supported by tutorials and self-study work.

Case studies will be the backbone of the learning experience: Wherever possible real industrial problems will be used as an analysis subject.

Presentations and reports are designed to develop the involvement of the students in the module and develop their sense of inquisition.

Syllabus outline:

Mechanical design principles:

Materials and manufacturing processes selection.

Manufacturing systems engineering:

Operational aspects of the main categories of machining processes knowledge, interaction between component/process tooling interaction understanding including factors affecting accuracy and precision of machining/grinding operations.

Control strategies of machining processes (errors shifting), machining cells integration, production machines management and planning. place/transition (PT) net (petri net) systems.

Process / production control:

Operational aspects of the main categories of machining processes, manufacturing processes management, on time and resources management, inventory in manufacturing systems and forecasting techniques of stock.

Efficiency flow of work through a factory description, MRP techniques to scheduling description, implications of different co-ordination structures on job design. manufacturing operations integration with other aspects of the business.

Supply networks/chain and IT systems support.

Bibliography:**Essential reading**

Kalpakhian, S. and Schmid, S. (2016), *Manufacturing Processes for Engineering Materials*. 6th ed. Harlow: Pearson Education.

Other indicative reading

Dickersbach, J.T. and Keller, G. (2010) *Production Planning and Control with SAP ERP*, 2nd Edn., SAP Press/Galileo Press.

Miltenburg, J. (2005) *Manufacturing Strategy: How to Formulate and Implement a Winning Plan*, 2nd Edn., Productivity Press.

Slack, N. and Brandon-Jones, A. (2019), *Operations Management*. 9th ed. Harlow: Pearson Education.