

Module specification

Module Code	ENG6AC
Module Title	Machine and Production System
Level	6
Credit value	20
Faculty	FAST
HECoS Code	100209
Cost Code	GAME

Programmes in which module to be offered

Programme title	Is the module core or option for this programme
MEng Mechanical Engineering	Core
BEng (Hons) Mechanical Engineering	Core
BEng (Hons) Industrial Engineering (Manufacturing and Production)	Core
BEng (Hons) Production Engineering	Core

Pre-requisites

No

Breakdown of module hours

Learning and teaching hours	24 hrs
Placement tutor support	0 hrs
Supervised learning e.g. practical classes, workshops	0 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
Total active learning and teaching hours	24 hrs
Placement / work based learning	0 hrs
Guided independent study	176 hrs
Module duration (total hours)	200 hrs

For office use only	
Initial approval date	Sept 19
With effect from date	Sept 22

For office use only	
Date and details of revision	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 22/08/22 update of programme list in Engineering re-validation
Version number	5

Module aims

- 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.

Module Learning Outcomes - at the end of this module, students will be able to:

1	Critically evaluate and select appropriate design solutions, materials and manufacturing processes for various engineering problems.
2	Systematically assess the factors that affect machining operations, the various control strategies and principles used to mitigate the sources of errors in machining processes.
3	Critically analyse how manufacturing operations are managed and integrated with other aspects of the business and how operations are managed across supply networks.
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.

In addition, to the module learning outcomes, student will also cover the following accreditation of higher education programme (AHEP) fourth edition learning outcomes: B4 & B6 for BEng Industrial Engineering (Manufacturing and Production) Level 6 top-up and C6 for BEng (Hons) Mechanical Engineering and BEng (Hons) Production Engineering.

Assessment

Indicative Assessment Tasks:

Assessment 1: A time limited examination covering manufacturing design choices and factors affecting machining operations. Indicative exam time 2 hours.

Assessment 2: A case study type investigation based on an improvement of a manufacturing technique including costing, supply chain implication analysis in a business case style layout. Indicative word count 2000 words.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1, 2	Examination	50%
2	3.4	Case Study	50%

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%.

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.

The module is taught through a combination of lectures and workshops. An active and inclusive approach is used to engage learners in the topics and will involve individual, group work and flipped learning experiences aligned to the university's Active Learning Framework (ALF). The approach offers students a flexible and adaptive learning experience that can accommodate a range of options that includes both on campus learning and remote learning where appropriate.

The Moodle VLE and other on-line materials and resources will be available to support learning. ALF offers a balance between the classroom elements and digitally enabled activity incorporating flexible and accessible resources and flexible and accessible feedback to support learning.

Indicative Syllabus Outline

Mechanical design principles:

Materials and manufacturing processes selection. Range of materials, technologies and processes involved in current best practice manufacturing. Selection and optimization methods in manufacturing processes. Design for manufacturing. Product design improvement.

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.

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.

Production systems:

Job Shop production system. Batch flow production system. Flexible manufacturing system. Operator-placed line flow production system. Just-in-time production system. Equipment-placed line flow production system. Continuous flow production system.

Indicative Bibliography:

Essential Reads

S. Kalpakchian and S. Schmid, *Manufacturing Engineering and Technology*, 8th ed. Harlow: Pearson Education. 2019

Other indicative reading

M. Miltenburg, *Manufacturing Strategy: How to Formulate and Implement a Winning Plan*, Productivity Press, 2010.

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

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

Employability skills – the Glyndŵr Graduate

Each module and programme is designed to cover core Glyndŵr Graduate Attributes with the aim that each Graduate will leave Glyndŵr having achieved key employability skills as part of their study. The following attributes will be covered within this module either through the content or as part of the assessment. The programme is designed to cover all attributes and each module may cover different areas.

Core Attributes

Enterprising

Ethical

Key Attitudes

Commitment

Confidence

Practical Skillsets

Organisation

Critical Thinking