

Module specification

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Module Code	ENG6A1
Module Title	Continuous Improvement and Lean
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
BEng Industrial Engineering (Mechanical)	Core
BEng Industrial Engineering (Manufacturing and Production)	Core
BEng Industrial Engineering (Engineering Management)	Core

Pre-requisites

None

Breakdown of module hours

Learning and teaching hours	36 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	36 hrs
Placement / work based learning	0 hrs
Guided independent study	164 hrs
Module duration (total hours)	200 hrs

For office use only	
Initial approval date	22 nd Aug 2022
With effect from date	Sept 2022
Date and details of revision	
Version number	1

Module aims

This module aims to discuss lean methodologies and strategies into manufacturing processes and also management systems. Utilising the Toyota Production system, students will use case studies and real world problems to select the most appropriate procedures to implement. Continuous improvement will be a thread through the module with reference to efficiency, sustainability and environmental impact.

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

1	Critically analyse production and manufacturing processes to implement lean methodologies
2	Discuss in detail the key principles of the Toyota Production System
3	Critically evaluate the design of products for recycling, investigate sustainability and how a product's life cycle can be extended.
4	Select and implement problem solving methodologies, such as FMEA, Six Sigma and Triz

In addition to the module learning outcomes, students will also cover the following accreditation of higher education programme (AHEP) fourth edition learning outcomes: B1, B2, B4 & B6

Assessment

Indicative Assessment Tasks:

Assessment One: A report into how the TPS is implemented into a particular industry, with reference to the students workplace if applicable.

Assessment Two: A 2 hour examination, possibly including a case study to review, testing the students ability to discuss recycling, investigate sustainability and how a product's life cycle can be extended and also problem-solving methodologies.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1, 2,	Coursework	50
2	3, 4	Examination	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 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

- History and Modern Applications of Lean Manufacturing.
- Managing the Lean Manufacturing Line.
- The Toyota Production System, Building a Culture to Support Excellence and Relentless Improvement.
- Problem Solving methods and processes
- Eliminating Waste in the Product Development Value Stream
- Case study to incorporate how lean manufacture into a traditional manufacturing setup is implemented.

Indicative Bibliography:

Please note the essential reads and other indicative reading are subject to annual review and update.

Essential Reads

M. L. George, *The LEAN Six Sigma Pocket Toolbook*. New York: McGraw-Hill, 2004.

Other indicative reading

N. Patel, *“Practical Project Management for Engineers”*, 2019, Artech House, Boston.

Inc BarCharts, *“Lean Six Sigma – Quick Study”*, BarCharts Inc., 2016.

J. K. Liker, *The Toyota Way: 14 management principles form the world's greatest manufacturer*. New York: McGraw-Hill, 2004.

S. Klaus, *The fourth industrial revolution*. 4th ed. Portfolio Penguin, UK, 2017.

B. David, *Practical SCADA for industry*. Oxford: Elsevier Science & Technology, 2003.

C. Deborah, *The deadly life of logistics: mapping violence in global trade*. Minneapolis: University of Minnesota Press, 2014.

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

Engaged
Enterprising
Creative
Ethical

Key Attitudes

Commitment
Curiosity
Resilience
Confidence
Adaptability

Practical Skillsets

Digital Fluency
Organisation
Leadership and Team working
Critical Thinking
Emotional Intelligence
Communication