ES3A7-15 Design and Management of Lean Operations

22/23

Department
School of Engineering
Level
Undergraduate Level 3
Module leader
Neil Davis
Credit value
15
Module duration
15 weeks
Assessment
40% coursework, 60% exam
Study location
University of Warwick main campus, Coventry

Description

Introductory description

Design and Management of Lean Operations

Module web page

Module aims

To develop understanding of the principles of lean operations and where and how they can be applied and sustained.

To describe the limits of lean operation: what factors are constraining application and how various industries have sought to relieve these constraints.

To help prepare the future technology manager to exploit recent thinking and overcome resistance to change by giving them an opportunity to explore the subject from various perspectives.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be

covered. Actual sessions held may differ.

Introduction: The module explains the techniques available for the effective management of lean production operations. The Toyota Production System (TPS) is used as the exemplar of Lean principles and forms a backbone around which industrial engineering, quality (through variability and waste reduction) and other technical subjects are organised. Value Stream Mapping (VSM) is introduced and used subsequently in laboratory sessions and/or assignments.

Alternative policies for the control of physical resources throughout the production system are compared, primarily Pull vs. Push (JIT and MRP/ERP). Industrial Engineering: Techniques for work measurement. Time and Method study. Human factors including job design and ergonomics. Flexibility of facilities and equipment. Cell design principles, single piece work flow, setup reduction and work standardisation.

Waste elimination: Inventory Management techniques for lean operation.

Organisation and management of distribution: linkages with manufacturing control system.

Learning outcomes

By the end of the module, students should be able to:

- Appraise where and how Lean Operations can be applied and sustained
- Calculate and recommend key resource requirements and identify resource constraints using analytical techniques.
- Develop a basic layout for implementing lean manufacturing including methods for managing the human – equipment interface.
- Analyse a manufacturing process using Value Stream Mapping critique and propose lean solutions using the map as foundation.

Indicative reading list

Lean Thinking, Womack and Jones, 2nd edition, 2003
The Toyota Way, Jeffrey Liker, 2004.
Toyota Kata, Mike Rother, 2010.
Lean Production Simplified, Pascal Dennis, 3rd edition, 2015.
The Machine That Changed the World, Womack & Jones, 1991
Learning To See, Rother and Shook, Lean Enterprise Institute, 1999
Seeing The Whole, Womack & Jones, Lean Enterprise Institute, 2002
The Toyota Production System. Monden, Yosuhiro. 2d ed. Atlanta: Institute of Industrial Engineers, 1993.

View reading list on Talis Aspire

Subject specific skills

Ability to conceive, make and realise a component, product, system or process.
Ability to be pragmatic, taking a systematic approach and the logical and practical steps necessary for, often complex, concepts to become reality

Transferable skills

Numeracy: apply mathematical and computational methods to communicate parameters, model and optimize solutions
Apply problem solving skills, information retrieval, and the effective use of general IT facilities
Communicate (written and oral; to technical and non-technical audiences) and work with others
Plan self-learning and improve performance, as the foundation for lifelong learning/CPD
Exercise initiative and personal responsibility, including time management, which may be as a team member or leader
Awareness of the nature of business and enterprise in the creation of economic and social value
Overcome difficulties by employing skills, knowledge and understanding in a flexible manner
Appreciation of the global dimensions of engineering, commerce and communication

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Study

Study time

Type	Required
Lectures	25 sessions of 1 hour (31%)
Seminars	5 sessions of 1 hour (6%)
Other activity	2 hours (2%)
Private study	48 hours (60%)
Total	80 hours

Private study description

48 hrs self-study including engagement with online learning

Other activity description

2x1h revision class

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

Assessment group D4

	Weighting	Study time
Individual Assignment	40%	

Apply value stream mapping to a given scenario to identify Muda and issues with Mura, setting these in the context of the published theory and prioritising areas for improvement.
Word limit 2,000 words + 1 page for VSM

Online Examination	60%	

Appraise where and how lean operations can be applied by selecting appropriate solutions and valid arguments from the set of options provided AND calculate key resource requirements and constraints using analytical techniques to select from a set of candidate answers.

~Platforms - QMP

- Online examination: No Answerbook required
- Engineering Data Book 8th Edition

Feedback on assessment

Individual written comments on coursework using a combination of marked up rubric and narrative
Cohort feedback on examinations

Past exam papers for ES3A7

Availability

Courses

This module is Core for:

- Year 3 of UESA-HH73 BEng Manufacturing and Mechanical Engineering
- Year 3 of UESA-HH75 BEng Manufacturing and Mechanical Engineering
- Year 4 of UESA-HH74 BEng Manufacturing and Mechanical Engineering with Intercalated Year
- Year 3 of UESA-HH76 MEng Manufacturing and Mechanical Engineering
- UESA-HH38 MEng Manufacturing and Mechanical Engineering with Intercalated Year
    - Year 3 of HH38 Manufacturing and Mechanical Engineering with Intercalated Year MEng
    - Year 4 of HH38 Manufacturing and Mechanical Engineering with Intercalated Year MEng

This module is Core optional for:

- Year 3 of UESA-H115 MEng Engineering with Intercalated Year
- UESA-HH38 MEng Manufacturing and Mechanical Engineering with Intercalated Year
    - Year 3 of HH38 Manufacturing and Mechanical Engineering with Intercalated Year MEng
    - Year 4 of HH38 Manufacturing and Mechanical Engineering with Intercalated Year MEng
- UESA-HH77 MEng Manufacturing and Mechanical Engineering with Intercalated Year
    - Year 3 of HH77 Manufacturing and Mechanical Engineering MEng with Intercalated Year
    - Year 4 of HH77 Manufacturing and Mechanical Engineering MEng with Intercalated Year

This module is Optional for:

- Year 3 of UESA-H113 BEng Engineering
- Year 3 of UESA-H114 MEng Engineering
- Year 4 of UESA-H115 MEng Engineering with Intercalated Year
- UESA-H11L Undergradaute Engineering (with Intercalated Year)
    - Year 3 of H11L Engineering (with Intercalated Year)
    - Year 4 of H11L Engineering (with Intercalated Year)

This module is Option list A for:

- Year 4 of UESA-H111 BEng Engineering with Intercalated Year
- UESA-H112 BSc Engineering
    - Year 3 of H112 Engineering
    - Year 3 of H112 Engineering

This module is Option list B for:

- Year 3 of UESA-HN12 BEng Engineering Business Management
- Year 3 of UESA-HN15 BEng Engineering Business Management
- Year 4 of UESA-HN13 BEng Engineering Business Management with Intercalated Year