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|----------------------|--|---------------|---|----------------------|----|
| <b>Module Title:</b> | <b>Production and Manufacturing Strategy</b> | <b>Level:</b> | 5 | <b>Credit Value:</b> | 20 |
|----------------------|--|---------------|---|----------------------|----|

|                     |        |                              |    |                                       |  |
|---------------------|--------|------------------------------|----|---------------------------------------|--|
| <b>Module code:</b> | ENG554 | <b>Is this a new module?</b> | No | <b>Code of module being replaced:</b> |  |
|---------------------|--------|------------------------------|----|---------------------------------------|--|

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|---------------------|------|--------------------|------|
| <b>Cost Centre:</b> | GAME | <b>JACS3 code:</b> | H700 |
|---------------------|------|--------------------|------|

|   |      |                          |              |
|---|------|--------------------------|--------------|
| <b>Trimester(s) in which to be offered:</b> | 1, 2 | <b>With effect from:</b> | September 17 |
|---|------|--------------------------|--------------|

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| <b>School:</b> | Applied Science, Computing & Engineering | <b>Module Leader:</b> | N.Vidmer |
|----------------|--|-----------------------|----------|

|                                       |                |
|---------------------------------------|----------------|
| Scheduled learning and teaching hours | 60 hrs         |
| Guided independent study              | 140 hrs        |
| Placement                             | 0 hrs          |
| <b>Module duration (total hours)</b>  | <b>200 hrs</b> |

| <b>Programme(s) in which to be offered</b> | Core                                | Option                   |
|--|-------------------------------------|--------------------------|
| BEng (Hons) Mechanical Manufacturing       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| BEng (Hons) Applied Product Design         | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

|                       |
|-----------------------|
| <b>Pre-requisites</b> |
| None                  |

Office use only

Initial approval February 17

APSC approval of modification

Have any derogations received Academic Board approval?

Version 1

Yes  No

**Module Aims**

To develop the principles of Production Planning and to further develop this into a study of the philosophy and applications of Manufacturing Strategy.

**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   | Demonstrate the principles of project management and production planning   | KS1        | KS3  |
|   |  | KS2        | KS5  |
| 2   | Select, plan and programme a manufacturing process to suit a given product design  | KS3        | KS6  |
|   |  | KS4        | KS9  |
| 3   | Investigate any current manufacturing system and analyse the interaction between the various elements of the manufacturing process | KS3        | KS9  |
|   |  | KS4        | KS10 |
|   |  | KS6        |      |
| 4   | Predict future trends and their effects on manufacturing planning  | KS2        | KS6  |
|   |  | KS3        | KS7  |
|   |  | KS4        |      |

Transferable/key skills and other attributes

1. Planning and evaluation;
2. Team work;
3. Data presentation; data interpretation; communication.

**Derogations**

A derogation from regulations has been approved for this programme 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:**

The module is assessed in two parts: Production Planning and Manufacturing Strategy.

Assessment One (Production Planning): is by means of a portfolio of individual and group activities culminating in an individual report and a group presentation covering outcomes 1 and 2.

Assessment Two (Manufacturing Strategy): is by means of an examination covering outcomes 3 and 4. It is an unseen time-constrained.

| Assessment number | Learning Outcomes to be met | Type of assessment | Weighting (%) | Duration (if exam) | Word count (or equivalent if appropriate) |
|-------------------|-----------------------------|--------------------|---------------|--------------------|---|
| 1                 | 1, 2                        | Portfolio          | 40%           |                    | 2,000                                     |
| 2                 | 3, 4                        | Examination        | 60%           | 2hrs               |   |

**Learning and Teaching Strategies:**

The module will use a combination of lectures and workshops. The use of appropriate computer software, the Internet and the library facilities will be encouraged. Discussion groups, seminars, tutorials and industrial visits are used. The 'Production Planning' element will develop students by means of both an individual project and a group project. The 'Manufacturing Strategy' element will be more lecture and discussion based.

**Syllabus outline:**

**Production Planning**

**Project Management:** definition, project control, organisational structures.

**Planning and Programming:** an examination of the techniques available for resource management such as PERT, CPA and line of balance. Limitations of these techniques.

**Product Design and Process Selection:** designing for the customer, designing products for manufacture and assembly, process selection, process flow design, process analysis.

**Management Strategy**

**Business policy and manufacturing:** Nature of manufacturing systems. Manufacturing system structure, feasible structure, effect of mode of manufacture. Business policy and manufacture, effect of nature of product. Nature of market and manner in which market is served. Formulation of manufacturing objectives and strategies for capacity management, activity scheduling and inventory management. Methods of activity scheduling and inventory management.

**Application of Technology:** Reasons for poor inventory management, understanding the problem, independent versus dependant demand, development of material requirements planning (MRP I). Data files used by MRP (master schedule, bill of materials, routing and work centre file, inventory file). Regenerative and net change systems, pegging, 'what if' analysis. Capacity requirements planning. Closing the loop with MRP II. Master production scheduling, rough-cut capacity planning using load profiles. Use of rough cutting for management decision making. Freezing the master schedule and time fences in marketing, manufacture and finance. MRP problem areas, analysis of case studies.

**Application of Philosophy:** JIT concept, push v pull systems, components of JIT, layout and methods, simplifying the process, river of inventories analogy, lead times, setups, kanban, maintenance, total quality management (TQM), suppliers. Strategic planning in JIT, implementation of JIT, case studies. Synchronous Manufacturing (OPT etc). Lean Manufacturing.

**Future directions for manufacturing:** Shorter lead times, increased flexibility, reduced costs, understanding interrelationships. Use of automation, increased communication and teamwork, further integration of marketing and manufacturing.

**Bibliography:**

**Essential reading**

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

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

**Other indicative reading**

Slack, N. et al. (2009) *Operations Management*, 6<sup>th</sup> Edn., Financial Times/Prentice-Hall.

Hill, A. and Hill, T. (2009) *Manufacturing Operations Strategy: Texts and Cases*; Palgrave McMillan.

Goldrat, E.M. and Cox, J. (2004) *The Goal: The Process of Ongoing Improvement*, 3<sup>rd</sup> Edn., Gower Publishing Ltd.

Chase, R.B. et al. (1998) *Production and Operations Management: Manufacturing and Services*, 8<sup>th</sup> Edn., McGraw-Hill Inc.

Harrison, M. (1996) *Principles of Operations Management*, Financial Times/Prentice-Hall.

Gerwyn, D. and Kolodny, H. (1992) *Management of Advanced Manufacturing Technology: Strategy, Organisation and Innovation*; John Wiley and Sons.