

320017 - OP - Production Organisation

Coordinating unit:	205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit:	732 - OE - Department of Management
Academic year:	2019
Degree:	BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Compulsory) BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Compulsory) BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Compulsory) BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Compulsory) BACHELOR'S DEGREE IN TEXTILE TECHNOLOGY AND DESIGN ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
ECTS credits:	6
Teaching languages:	Catalan, Spanish

Teaching staff

Coordinator:	Martí Badía, M ^a Elena
Others:	Martí Badía, M ^a Elena Arcusa Postils, Ignasi

Prior skills

Students must have passed the subject Economics and Business Management.

Degree competences to which the subject contributes

Specific:

4. IND_COMMON: Applied knowledge of business organisation.
5. IND_COMMON: Basic understanding of industrial production systems.

Transversal:

01 EIN N3. ENTREPRENEURSHIP AND INNOVATION - Level 3. Using knowledge and strategic skills to set up and manage projects. Applying systemic solutions to complex problems. Devising and managing innovation in organizations.

Learning objectives of the subject

The subject is divided into two parts. The aim of the first part is to give students and introduction to strategic aspects of the management of operations.

The aim of the second part is to give students an introduction to the tactical aspects of the management of operations. The syllabus covers the principles and concepts used in the management of operations, which may also apply in other professional areas or the personal lives of students.

All topics begin with an introduction to other areas of business and a brief history of the management of operations and the introduction of innovation as a strategy to be followed.

Within the framework of this strategy, the topic of product and process design, location and layout, as well as the design

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of work systems will be covered.

In the second part, the topics of the management and control of stock and aspects of planning will be explained in terms of how to effectively manage resources and match demand based on the production process used.

Lastly, in the field of quality assurance, the concepts of quality management, quality costs, new trends in the study of the concept, certifications and common quality assurance tools will be developed. Students will then go on to tackle the concepts of quality control, inspections, sampling and control diagrams of the capacity of processes.

Study load

Total learning time: 150h	Hours large group:	45h	30.00%
	Hours medium group:	15h	10.00%
	Hours small group:	0h	0.00%
	Guided activities:	0h	0.00%
	Self study:	90h	60.00%

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Content

TOPIC 1: INTRODUCTION TO OPERATIONS MANAGEMENT

Learning time: 10h

Theory classes: 3h

Practical classes: 1h

Self study : 6h

Description:

- 1.1. The function of operations as a business subsystem
- 1.2. Problems of the function of operations
- 1.3. Innovation as a strategic process
- 1.4. Innovative organisation
- 1.5. The management of innovation in businesses
- 1.6. Technological innovation: the key to the future?

Related activities:

Test

Specific objectives:

Upon completion of this subject, students will be able to:

- Put a production subsystem in place in a business.
- Tackle the complex problem of the function of operations today, its importance and basic characteristics.
- Understand the concept of innovation as a catalyst for change.

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<p>TOPIC 2: PRODUCT SELECTION AND DESIGN</p>	<p>Learning time: 12h 30m Theory classes: 4h Practical classes: 1h Self study : 7h 30m</p>
<p>Description:</p> <ol style="list-style-type: none"> 2.1. The selection of products and services 2.2. The design stage and product development 2.3. Production documents 2.4. Models for the development of new products <p>Related activities:</p> <ol style="list-style-type: none"> 1. Test 2. Applied exercises <p>Specific objectives:</p> <p>Upon completion of this subject, students will be able to:</p> <ul style="list-style-type: none"> - Identify the main objectives in the design of products and services. - Discuss the importance of standardisation, regulations, ethics and the environment in the design of products and services. - Describe the design and development stages of a product and of a service. - List a number of sources on which ideas for designs were based. - Describe various key factors in manufacturing and service design. - Identify challenges in the design of products and services. 	

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TOPIC 3: PROCESS SELECTION AND DESIGN	Learning time: 10h Theory classes: 3h Practical classes: 1h Self study : 6h
<p>Description:</p> <ol style="list-style-type: none">3.1. Different types of processes3.2. Process strategies3.3. The selection of processes3.4. Constraints in process design <p>Related activities:</p> <ol style="list-style-type: none">1. Test2. Applied exercises <p>Specific objectives:</p> <p>Upon completion of this subject, students will be able to:</p> <ul style="list-style-type: none">- Give reasons for the strategic importance of selecting a process.- Understand the influence that the selection of a process has on organisation.- Be able to explain the various types of processes.- Discuss and tackle possible ways of automating processes.- Recognise the need to manage technology.	

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TOPIC 4: LOCATION DECISIONS

Learning time: 10h

Theory classes: 3h
Practical classes: 1h
Self study : 6h

Description:

- 4.1. Location decision-making procedures
- 4.2. Factors that affect location
- 4.3. Assessment methods in the location of facilities
- 4.4. Location of services facilities
- 4.5. Future trends and strategies in location

Related activities:

1. Test
2. Applied exercises
3. Structure and analysis test

Specific objectives:

Upon completion of this subject, students will be able to:

- Describe some of the main reasons on which organisations base their location decisions.
- Explain why location decisions are important.
- Assess the location options available for taking decisions.
- Discuss the decisive factors in decision-making.
- Sum up the decision-making process in the choice of locations.
- Use the techniques in the field for solving standard problems.

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TOPIC 5: LAYOUT	Learning time: 10h Theory classes: 3h Practical classes: 1h Self study : 6h
<p>Description:</p> <ol style="list-style-type: none">5.1. Goals and factors that influence the selection of a layout5.2. Types of layout5.3. Distribution by products5.4. Distribution by processes5.5. Distribution by workcells5.6. Other distributions <p>Related activities:</p> <ol style="list-style-type: none">1. Test2. Applied exercises3. Structure and analysis test <p>Specific objectives:</p> <p>Upon completion of this subject, students will be able to:</p> <ul style="list-style-type: none">- Discuss reasons for redesigning the layout of processes.- Describe the different types of layouts by processes.- Describe the main advantages and disadvantages of layouts by product and by process.- Solve simple line balancing problems.- Develop simple layout processes.	

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TOPIC 6: DESIGN, MEASUREMENT AND COMPENSATION

Learning time: 12h 30m

Theory classes: 3h
Practical classes: 2h
Self study : 7h 30m

Description:

- 6.1. Considerations in job design
- 6.2. Method study phases
- 6.3. Work measurement
- 6.4. Compensation methods

Related activities:

1. Test
2. Applied exercises
3. Structure and analysis test

Specific objectives:

Upon completion of this subject, students will be able to:

- Explain the importance of job design.
- Expound on the advantages and disadvantages of specialisation.
- Discuss the aim of analysis methods and describe how they are applied in method studies.
- Describe four common techniques in the study of movements.
- Discuss the impact of working conditions on job design.
- Define standard time
- Describe and compare time study methods and perform calculations.
- Discuss payroll systems.

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TOPIC 7: INTRODUCTION TO PLANNING. CAPACITY CONTROL

Learning time: 10h

Theory classes: 3h
Practical classes: 1h
Self study : 6h

Description:

- 7.1. Introductory notions
- 7.2. Basic planning concepts
- 7.3. The design of a planning system
- 7.4. The determination of available capacity
- 7.5. The determination of capacity needs
- 7.6. Alternatives for adjusting available and necessary capacity in the short- and mid-term.

Related activities:

1. Test
2. Applied exercises
3. Structure and analysis test

Specific objectives:

Upon completion of this subject, students will be able to:

- Explain the importance of planning capacity.
- Discuss the ways in which capacity can be defined and measured.
- Describe the components of effective capacity.
- Discuss the main considerations related to the alternatives to the development of capacity.
- Sum up the approaches that are useful in the assessment of alternative capacities.

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<p>TOPIC 8: PRODUCTION PLANNING AND SCHEDULING</p>	<p>Learning time: 10h Theory classes: 3h Practical classes: 1h Self study : 6h</p>
<p>Description:</p> <ul style="list-style-type: none"> 8.1. Drawing up an aggregate plan: possible actions and factors to be considered 8.2. Aggregate planning techniques 8.3. The master production schedule 8.4. Rough-cut capacity planning <p>Related activities:</p> <ul style="list-style-type: none"> 1. Test 2. Applied exercises 3. Structure and analysis test <p>Specific objectives:</p> <p>Upon completion of this subject, students will be able to:</p> <ul style="list-style-type: none"> - Explain what aggregate planning is and its use. - Identify the decision variables that manufactures must take into account in aggregate planning and some of the possible strategies to use. - Describe some of the quantitative planning techniques used. - Draw up aggregate plans and estimate their cost. 	

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TOPIC 9: STOCK MANAGEMENT	Learning time: 10h Theory classes: 3h Practical classes: 1h Self study : 6h
<p>Description:</p> <ul style="list-style-type: none">9.1. The concept and functions of stock9.2. Factors involved in stock management9.3. Item classification systems9.4. Stock management models <p>Related activities:</p> <ul style="list-style-type: none">1. Test2. Applied exercises3. Structure and analysis test <p>Specific objectives:</p> <p>Upon completion of this subject, students will be able to:</p> <ul style="list-style-type: none">- Define the term inventory and list the requirements for efficient stock management.- Discuss the nature of stocktaking, and periodic and perpetual inventory systems.- Describe the ABC systems and their use.- Describe the economic lot size model for purchases and solve standard problems.- Describe the economic lot production model and solve standard problems.- Describe the quantity discount model and solve standard problems.- Describe order point models and solve standard problems.- Describe situations in which the single period model is most suitable and solve standard problems.	

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TOPIC 10: INTRODUCTION TO PLANNING. CAPACITY CONTROL

Learning time: 12h 30m

Theory classes: 4h
Practical classes: 1h
Self study : 7h 30m

Description:

- 10.1. Meaning and application
- 10.2. The master production schedule (MPS)
- 10.3. The system and structure of material requirements planning (MRP)
- 10.4. Improvements in MRP
- 10.5. Lot quantification
- 10.6. Relationship between just-in-time (JIT) and MRP

Related activities:

1. Test
2. Applied exercises
3. Structure and analysis test
4. Review and assessment of coursework

Specific objectives:

Upon completion of this subject, students will be able to:

- Describe under which conditions the use of MRP is most suited.
- Describe the input, output and characteristics required to implement MRP.
- Explain how MPS requirements translate into material purchase requirements.
- Discuss the benefits and requirements of MRP.
- Explain in which ways the MRP system is useful in planning capacity requirements.
- Describe the potential benefits and difficulties users encounter in setting up an MRP system.
- Describe manufacturing resource planning (MRP II) and its benefits.

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TOPIC 11: JUST-IN-TIME (JIT) PRODUCTION	Learning time: 10h Theory classes: 3h Practical classes: 1h Self study : 6h
<p>Description:</p> <ul style="list-style-type: none">11.1. Philosophy of the just-in-time concept11.2. The Toyota production system11.3. Requirements for applying JIT11.4. JIT in services <p>Related activities:</p> <ul style="list-style-type: none">1. Test2. Applied exercises3. Structure and analysis test4. Review and assessment of coursework <p>Specific objectives:</p> <p>Upon completion of this subject, students will be able to:</p> <ul style="list-style-type: none">- Explain the importance of JIT and its aims.- List and describe the basic elements of JIT.- Discuss the benefits of JIT.- Describe the considerations to be taken into account for turning a traditional production system into a JIT-based system.- Explain the obstacles that may be encountered in implementing a JIT system.	

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<p>TOPIC 12: OPTIMISED PRODUCTION TECHNOLOGY (OPT) AND THE THEORY OF CONSTRAINTS (TOC)</p>	<p>Learning time: 10h Theory classes: 3h Practical classes: 1h Self study : 6h</p>
<p>Description:</p> <ul style="list-style-type: none"> 12.1. Business targets based on a TOC approach 12.2. The theory of constraints 12.3. TOC applied to the management of an operations subsystem: OPT 12.4. Rules for applying OPT 12.5. Comparison between OPT, MRP and JIT systems <p>Related activities:</p> <ul style="list-style-type: none"> 1. Test 2. Applied exercises 3. Structure and analysis test 4. Review and assessment of coursework <p>Specific objectives:</p> <p>Upon completion of this subject, students will be able to:</p> <ul style="list-style-type: none"> - Discuss business targets. - Explain why results should be measured. - Give reasons for capacity imbalances. - Control methods in synchronous manufacturing. - Contrast synchronous manufacturing, MRP and JIT systems. - Identify relationships with other departments in a company. 	

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TOPIC 13: PROJECT PLANNING, PROGRAMMING AND MONITORING

Learning time: 10h

Theory classes: 3h
Practical classes: 1h
Self study : 6h

Description:

- 13.1. Basic principles of the project evaluation and review technique (PERT)
- 13.2. Constructing a PERT chart
- 13.3. Project management using PERT
- 13.4. Monitoring projects using PERT charts
- 13.5. The ROY project control method

Related activities:

1. Test
2. Applied exercises
3. Structure and analysis test
4. Review and assessment of coursework

Specific objectives:

Upon completion of this subject, students will be able to:

- Discuss the nature and importance of the work breakdown structure in project management.
- Give a general description of the PERT and the critical path method (CPM).
- Draw simple project network diagrams.
- Describe the type of information a PERT or CPM analysis can give.
- Analyse networks using deterministic times.
- Analyse networks using probabilistic times.
- Explain the costs of reducing activities and solve standard problems.

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<p>TOPIC 14: QUALITY MANAGEMENT. QUALITY CONTROL</p>	<p>Learning time: 12h 30m Theory classes: 4h Practical classes: 1h Self study : 7h 30m</p>
<p>Description:</p> <ul style="list-style-type: none"> 14.1. Definition of quality 14.2. Total quality management (TQM) 14.3. Quality control 14.4. Quality control tools 14.5. Quality standards <p>Related activities:</p> <ul style="list-style-type: none"> 1. Test 2. Applied exercises 3. Structure and analysis test 4. Review and assessment of coursework <p>Specific objectives:</p> <p>Upon completion of this subject, students will be able to:</p> <ul style="list-style-type: none"> - Define the term quality and explain its importance. - Identify the components of quality and its associated costs. - Discuss the premises of quality and the philosophies of quality experts. - Describe TQM. - Give an overview of problem solving and process improvement. - Describe how various quality tools work. - Explain the elements that make up process control. - Discuss and interpret how control diagrams are used to control processes. - Use and interpret control diagrams. - Use sequential tests of randomness to control processes. - Assess the capacity of processes. 	

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Planning of activities

APPLICATION EXERCISES.	Hours: 0h 45m Theory classes: 0h 45m
PROJECT.	Hours: 1h Theory classes: 1h
PRESENTATION OF THE PROJECT.	Hours: 0h 15m Theory classes: 0h 15m

Qualification system

For those students who meet the requirements and submit to the reevaluation examination, the grade of the reevaluation exam will replace the grades of all the on-site written evaluation acts (tests, midterm and final exams) and the grades obtained during the course for lab practices, works, projects and presentations will be kept.

If the final grade after reevaluation is lower than 5.0, it will replace the initial one only if it is higher. If the final grade after reevaluation is greater or equal to 5.0, the final grade of the subject will be pass 5.0.

Bibliography

Basic:

Ponti, F.; Ferràs, X. Passió per innovar: de la idea al resultat. Barcelona: Granica, 2006. ISBN 9788475779188.

Chase, R. B.; Jacobs, F. R.; Aquilano, N. J. Administración de operaciones: producción y cadena de suministros. 12a ed. México: McGraw-Hill, 2009. ISBN 9789701070277.

Stevenson, William J. Operations management. 10th ed. New York: McGraw-Hill Irwin, 2009. ISBN 9780070091771.

Cuatrecasas Arbós, Ll. Organización de la producción y dirección de operaciones: sistemas actuales de gestión eficiente y competitiva. Madrid: Díaz de Santos, 2011. ISBN 9788479789978.

Complementary:

Domínguez Machuca, J. A. [et al.]. Dirección de operaciones: aspectos tácticos y operativos en la producción y los servicios. Madrid: McGraw-Hill, 1995. ISBN 8448118030.

Heizer, J. H.; Render, B. Dirección de la producción: decisiones estratégicas. 6a ed. Madrid: Prentice Hall, 2001. ISBN 8420529249.

Gaither, N.; Fraizer, G. Administración de producción y operaciones. 4a ed. México: International Thomson, 2000. ISBN 9706860312.

Others resources: