UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH

Course guide
820014 - OP - Production Organisation

Last modified: 25/01/2024

Unit in charge:	Barcelona East School of Engineering
Teaching unit:	732 - OE - Department of Management.

Degree:
BACHELOR'S DEGREE IN BIOMEDICAL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN ENERGY ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN MATERIALS ENGINEERING (Syllabus 2010). (Compulsory subject).

Academic year: 2023   **ECTS Credits:** 6.0   **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer:	Doménech Léga, Bruno
Others:	DAVID AGUSTIN RIPOLL
	BRUNO DOMÉNECH LÉGA
	ERNESTO GARRIDO GODES
	XAVIER GRÈBOL NOGUERAS
	RUBÉN MARTÍN TORT
	RAFAEL PASTOR MORENO
	GEMMA ROS ESCODA

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
4. Understand the applications of business organisation.
5. Understand the basics of production and manufacturing systems.

Transversal:
2. ENTREPRENEURSHIP AND INNOVATION - Level 2. Taking initiatives that give rise to opportunities and to new products and solutions, doing so with a vision of process implementation and market understanding, and involving others in projects that have to be carried out.

TEACHING METHODOLOGY

The course has 4 different typologies of sessions along the semester:
- Theory: explanation of the theoretical concepts and resolution of small practical examples (20% of the time)
- Problems: resolution in group of practical exercices to deepen on the theoretical concepts (10% of the time)
- Laboratory: resolution of mathematical models using specialised software (10% of the time)
- Selflearning: guided actrivities as well as personal and non-in-person study (60% of the time)

LEARNING OBJECTIVES OF THE SUBJECT

Show the main ideas of production, its relationship with the logistics area and other management elements of the enterprise
Give to the students the idea of the importance of decision making when managing logistic and production systems.
Prepare the student to different techniques to schedule and control activites.
Prepare the student to solve fuzzy problems.
Teach the student quatitative techniques applicable to the solution of management problems

STUDY LOAD

Type	Hours	Percentage
Self study	90,0	60.00
Hours small group	15,0	10.00
Hours large group	45,0	30.00

Total learning time: 150 h

CONTENTS

Introduction

Description:
Concept of production and productive system. Typologies of productive systems. Typology of decisions in production management. Concept and classifications of costs. Criteria for the evaluation and selection of investments.

Related competencies :
CEI-17. Understand the applications of business organisation.

Full-or-part-time: 10h
Theory classes: 4h
Self study : 6h

Location and distribution

Description:
Location problems and their relationship with the system production-distribution. Multicriteria nature of location problems. Classifications. Models for costs optimisation under continuous assumptions. Models for costs optimisation of several facilities under discrete assumptions. Design of distribution routes, formulation, constraints and objectives.

Related competencies :
CEI-15. Understand the basics of production and manufacturing systems.

Full-or-part-time: 15h
Theory classes: 6h
Self study : 9h

Scheduling

Description:
Characteristics and elements of programming problems. Typologies of bounds: potential, cumulative and disjunctive. Joshop and flowshop problems.

Related competencies :
CEI-15. Understand the basics of production and manufacturing systems.

Full-or-part-time: 30h
Theory classes: 12h
Self study : 18h

Production Planning

Description:
Concept of operations planning. Characteristics of a plan, horizon, frequency, robustness, degree of detail. Master plan, intuitive methods, Bowman model, linear models, models based on graphs theory.

Related competencies :
CEI-15. Understand the basics of production and manufacturing systems.

Full-or-part-time: 25h
Theory classes: 10h
Self study : 15h

Inventory manament for independent demand

Related competencies :
CEI-15. Understand the basics of production and manufacturing systems.

Full-or-part-time: 35h
Theory classes: 14h
Self study : 21h

Inventory Management for Dependent Demand

Description:
Structure of the product, list of materials, matrix-based and iteratuve procedures. MRP I. Planning of production resources.

Related competencies :
CEI-15. Understand the basics of production and manufacturing systems.

Full-or-part-time: 10h
Theory classes: 4h
Self study : 6h

Mathematical modelling

Description:
System modelling using mathematical programming. Establishment of variables, constraints and objective. Differences between modelling and solving. Linear Programming and Integer Linear Programming.

Specific objectives:
To provide students with tools for modelling and solving problems. To provide students with the skills to differenciate between data and variables, costs and solutiuons, objective functions and constraints. To provide the tools to allow a student to obtain linear equivalences to nonlinear problems.

Related competencies :
01 EIN N2. ENTREPRENEURSHIP AND INNOVATION - Level 2. Taking initiatives that give rise to opportunities and to new products and solutions, doing so with a vision of process implementation and market understanding, and involving others in projects that have to be carried out.

Full-or-part-time: 20h
Practical classes: 10h
Self study : 10h

GRADING SYSTEM

The final mark of the course is calculated as follows:

$NF = \max\{NF1; NF2\}$

$NF1 = 0{,}45 \cdot EF + 0{,}25 \cdot EP + 0{,}15 \cdot EL + 0{,}1 \cdot ACT + 0{,}05 \cdot ACL$
$NF2 = 0{,}45 \cdot EF + 0{,}35 \cdot EP + 0{,}2 \cdot EL$

EF = mark of the final examen
EP = mark of the mid-term exam
EL = mark of the laboratory exam
ACT = mark of the activities of continuous evaluation of theory
ACL = mark of the activities of continuous evaluation of laboratory

In case of failing, a reevaluation exam can be carried out, which allows recovering 80% of the course (the mark of the laboratory exam, EL and ACL, is excluded). Students can attend the reevaluation exam if they accomplish the requirements defined by the EEBE in the Assessment and Permanence Regulations.

BIBLIOGRAPHY

Basic:
- Companys Pascual, Ramón; Corominas Subias, Albert. Organización de la producción I : diseño de sistemas productivos. Barcelona: Edicions UPC, 1993-1994. ISBN 8476533632.
- Companys Pascual, Ramón; Corominas Subias, Albert. Organización de la producción II : dirección de operaciones. Barcelona: Edicions UPC, 1995-1996. ISBN 8476534515.

Complementary:
- Chase, Richard B.; Jacobs, F. Robert; Aquilano, Nicholas J. Administración de la producción y operaciones para una ventaja competitiva. 10ª ed. México [etc.]: McGraw Hill, 2005. ISBN 0072845074.
- Heizer, Jay H.; Render, Barry. Dirección de la producción y de operaciones : decisiones tácticas [on line]. 8ª ed. Madrid [etc.]: Prentice Hall, cop. 2007 [Consultation: 29/04/2020]. Available on: http://www.ingebook.com/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=1431. ISBN 9788483225363.
- Heizer, Jay H. [et al.]. Dirección de la producción y de operaciones : decisiones estratégicas [on line]. Madrid [etc.]: Prentice Hall, cop. 2007 [Consultation: 29/04/2020]. Available on: http://www.ingebook.com/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=4484. ISBN 9788483225332.
- Eilon, Samuel; Watson-Gandy, Carl Donald Tyndale; Christofides, Nicos. Distribution management : mathematical modelling and practical analysis. London: Griffin, 1971. ISBN 0852641915.
- Hillier, Frederick S.; Lieberman, Gerald J. Introducción a la investigación de operaciones. 9ª ed. México, D.F: McGraw-Hill, cop. 2010. ISBN 9786071503084.