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820014 - OP - Production Organisation

Coordinating unit: 295 - EEBE - Barcelona East School of Engineering

Teaching unit: 732 - OE - Department of Management

Academic year: 2019

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

ECTS credits: 6 Teaching languages: Catalan, Spanish

Teaching staff

Coordinator: BRUNO DOMÉNECH LÉGA

Others: Primer quadrimestre:
BRUNO DOMÉNECH LÉGA - M11, M12
ERNESTO GARRIDO GODES - M12, M22, M32
XAVIER GRÈBOL NOGUERAS - T11, T12
RUBÉN MARTÍN TORT - T12
RAFAEL PASTOR MORENO - M21, M22, M31, M32
GEMMA ROS ESCODA - M11, M12, M21, M22, M31, M32

Opening hours

Timetable: To be arranged by email.

Prior skills

None.

Requirements

None.

Degree competences to which the subject contributes

Specific:

4. Understand the applications of business organisation.

5. Understand the basics of production and manufacturing systems.

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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

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

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Content

Introduction

Learning time: 10h
Theory classes: 4h
Self study : 6h

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.

Location and distribution

Learning time: 15h
Theory classes: 6h
Self study : 9h

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.

Scheduling

Learning time: 30h
Theory classes: 12h
Self study : 18h

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

Inventory manament for independent demand

Learning time: 35h
Theory classes: 14h
Self study : 21h

Production Planning

Learning time: 25h
Theory classes: 10h
Self study : 15h

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.

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Inventory Management for Dependent Demand	Learning time: 10h Theory classes: 4h Self study : 6h

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

Mathematical modelling	Learning time: 20h Practical classes: 10h Self study : 10h

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.

Qualification system

The final mark of the course is calculated as follows:

NF = max{NF1; NF2}

NF1 = 0,5·EF + 0,2·EP + 0,2·PL + 0,1·AC
NF2 = 0,6·EF + 0,2·EP + 0,2·PL

EF = mark of the final examen
EP = mark of the mid-term exam
PL = mark of the laboratory evaluation
AC = mark of the activities of continuous evaluation

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, is excluded). In order to be allowed to do such an exam, the global mark on the recored part must not be lower than 3.
The students will be able to access the re-assessment test that meets the requirements set by the EEBE in its Assessment and Permanence Regulations (https://eebe.upc.edu/ca/estudis/normatives-academiques/documents/eebe-normativa-avaluacio-i-permanencia-18-19-aprovat-je-2018-06-13.pdf)

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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. 8ª ed. Madrid [etc.]: Prentice Hall, cop. 2007. ISBN 9788483223611.

Heizer, Jay H. [et al.]. Dirección de la producción y de operaciones : decisiones estratégicas. Madrid [etc.]: Prentice Hall, cop. 2007. ISBN 9788483223604.

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.