



Course guide

240AR016 - 240AR016 - Industrial Scheduling

Last modified: 26/05/2023

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

Degree: MASTER'S DEGREE IN AUTOMATIC CONTROL AND ROBOTICS (Syllabus 2012). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 4.5 **Languages:** English

LECTURER

Coordinating lecturer: Panadero Martínez, Javier

Others: Garrido Godes, Ernesto
Panadero Martínez, Javier

PRIOR SKILLS

- Numerical ability.
- Reflective, analytical and synthesis attitudes.
- Proactivity and responsibility.
- Basic and applied statistics (probability, distribution laws and forecasting techniques).
- Calculus and algebra.
- Concepts of engineering.

REQUIREMENTS

Fundamentals of Operations Management, at undergraduate level, is advisable.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

CEAR4. The student will be able to use analysis tools and computer-aided design of control systems in the tasks usual analysis, simulation and controller design.

CEAR8. The student will acquire a set of knowledge and skills to basic and advanced level of mobile robotics, putting special emphasis on probabilistic models applied to mobile robotics.

CEAR14. The student will be able to direct and organize enterprises and production systems and services, applying knowledge and skills in industrial organization, business strategy, planning and logistics, commercial and labor law, financial and cost accounting.

CEAR15. The student will be able to lead and manage the organization of work and human resources applying criteria of industrial safety, quality management, risk prevention, sustainability, and environmental management

Transversal:

2. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.

TEACHING METHODOLOGY

Lectures: the lecturer presents the contents of the subject but the active participation of students is requested.

Practical sessions: students solve problems related to the theoretical contents of the course and work on their projects.

Projects: students, in groups, have to solve practical situations related to the contents of industrial organization within a business plan. Groups are expected to solve each step of the project and make a final public presentation.



LEARNING OBJECTIVES OF THE SUBJECT

At the end of the course, students must know several concepts and they must be able of using several procedures about productive and logistic systems. They are going to provide the students with a broad conceptual view with some instrumental aspects, which is going to allow them undertake design tasks and managing tasks as well.

STUDY LOAD

Type	Hours	Percentage
Hours large group	27,0	24.00
Self study	72,0	64.00
Hours small group	13,5	12.00

Total learning time: 112.5 h

CONTENTS

Introduction

Description:

Course overview and introduction to productive systems.

Related activities:

Students have to make groups for the project and decide the subject of their work.

Full-or-part-time: 1h 30m

Self study : 1h 30m

Lesson 1. Demand forecasting

Description:

Statistical techniques to forecast demand at short, medium and long term.

Related activities:

These concepts will have to be used in the development of the project.

1 practical exercise will be done about this subject.

Full-or-part-time: 17h 30m

Theory classes: 13h

Practical classes: 3h

Self study : 1h 30m



Lesson 2. Stocks management

Description:

Stocks management under a deterministic context.

Stocks management under a random demand and achieve quality standards.

Related activities:

These concepts will have to be used in the development of the project.

2 practical exercises will be done about this subject.

Full-or-part-time: 26h 40m

Theory classes: 19h 10m

Practical classes: 3h

Self study : 4h 30m

Lesson 3. Production planning

Description:

Optimisation algorithms for planning the distribution/supply chain.

Optimisation models for planning the production.

Optimisation models for planning worker timetables.

Related activities:

These concepts will have to be used in the development of the project.

2 practical exercises will be done about this subject.

Full-or-part-time: 26h 40m

Theory classes: 19h 10m

Practical classes: 4h 30m

Self study : 3h

Lesson 4. Operations programming

Description:

Programming operations to improve the production efficiency.

Balancing assembly lines to improve the production efficiency.

Assigning machines to people in order to improve the production efficiency.

Related activities:

These concepts will have to be used in the development of the project.

3 practical exercises will be done about this subject.

Full-or-part-time: 28h 10m

Theory classes: 4h 30m

Practical classes: 4h 30m

Self study : 19h 10m

GRADING SYSTEM

Final grade = $0.25 \times \text{Mid-term exam} + 0.25 \times \text{Final exam} + 0.30 \times \text{Project} + 0.20 \times \text{Exercises}$

The project grading takes into account the intermediate and final deliveries.

The exercises grading takes into account the deliveries of exercises along the course and the practices exam.

If a student does not do one of the evaluation items, the course will be qualified as failed.

The course includes a reevaluation exam that allows recovering the mid-term and final exams.



EXAMINATION RULES.

The practices, mid-term and final exams are individual. You can bring all the course materials to the exams and the use of calculator is allowed (but you cannot use mobile, tablet, computer nor any other electric tool).

The deliveries of exercises and the project are in group (the size will depend on the number of students enrolled). The group members will have to show their involvement in the development of the project.

BIBLIOGRAPHY

Basic:

- Chopra, Sunil. Supply chain management : strategy, planning, and operation. 7th ed. Harlow, United Kingdom: Pearson Education Limited, 2019. ISBN 9781292257891.
- Salvendy, G.. Handbook of industrial engineering. 3rd. New York: John Wiley & Sons, 2001. ISBN 9780470241820.
- Shapiro, J.F.. Modeling the supply chain. 2nd. Belmont: Thomson Brooks/Cole, 2007. ISBN 049512611X.
- Silver, E.A.; Pyke, D.F.; Peterson, R.. Inventory management and production planning and scheduling. 3rd. New York: John Wiley & sons, 1998. ISBN 0471119474.
- Fitzsimmons, J.A.. Service management : operations, strategy, information technology. 8th ed.. New York: McGraw-Hill, 2014. ISBN 9781259010651.

RESOURCES

Other resources:

Course slides.

Wordings of the practical exercises.