



# Course guide

## 330069 - OP - Operations Management

Last modified: 28/06/2023

**Unit in charge:** Manresa School of Engineering  
**Teaching unit:** 732 - OE - Department of Management.

**Degree:** BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Compulsory subject).  
BACHELOR'S DEGREE IN ELECTRICAL 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).

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

### LECTURER

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**Coordinating lecturer:** Fortuny Santos, Jordi

**Others:** Lujan Blanco, Itziar  
Vintró Sánchez, Carla

### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**Specific:**

1. Adequate knowledge of the concept of company, its institutional and legal framework. Organization and management of companies.

**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.
3. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.
4. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

### TEACHING METHODOLOGY

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In the classroom, the method of instruction combines lectures (with or without multimedia support) with the realization of practical exercises by the students (with or without computer support).

### LEARNING OBJECTIVES OF THE SUBJECT

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The aim of this subject is to provide students with the tools necessary to take on professional tasks in the field of process engineering, methods and time studies, production management or logistics. In short, everything related to the design, implementation and day-to-day running of production processes from the point of view of management, but not the technical content of the process. These tools are operational but also methodological.

At the end of the course, the student must be able to:

- Design, analyze and control a process using tools such as charts for method study, Gantt charts and Pert networks, productivity, sales forecasting, manufacturing forecasting, time study, statistical quality control charts.
- Argue the convenience or not of implementing aspects such as lean production, a certain layout, etc.
- Argue the convenience or not of certain strategies on inventory management, demand forecast or production scheduling.



## STUDY LOAD

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Type	Hours	Percentage
Hours large group	30,0	20.00
Hours small group	30,0	20.00
Self study	90,0	60.00

**Total learning time:** 150 h

## CONTENTS

### Title of content # 1: Design of operations

#### Description:

The importance of the production function and its management is presented, with the aim to empower the future graduates so as they can understand, evaluate and make decisions regarding the design of operations.

1. Operations and productivity
2. Process Management
3. Design and measurement of work
4. Quality management

#### Specific objectives:

1. To define previous concepts: production, process, production management, production system, etc.
2. To define and calculate productivity. List the sources for its improvement.
3. To explain what is meant by operations management, its origins and main authors and related tasks, linking production to the environment and corporate social responsibility.
4. To be able to identify the generic strategies of a company based on production.
5. To be able to identify or define strategies on products and processes and their characteristics. List different types of layouts and their features.
6. To make and read different types of process diagrams.
7. To define and calculate capacity, utilization and efficiency of a process.
8. To draw Gantt charts.
9. To define and calculate cycle time and process time.
10. To calculate the takt time of a cell.
11. To calculate the number of workstations and balance small lines and cells.
12. To list the points of the theory of constraints and DBR logic.
13. To make the economic assessment of a processes. Compute break-even point.
14. To identify relevant aspects of job design.
15. To carry out computations with data from different systems of work measurement and several implications for work (such as the number of workers or incentive pay).
16. To explain the concepts associated with methods and time study (steps of improvement, performance rating , standard and normal time, performance rating scales, predefined MTM times ...).
17. To explain the aspects associated with quality management and the main authors: concept of quality and its importance, the cost of quality, total quality and its instruments (Pareto chart, Ishikawa chart...), ISO 9000, EFQM, six sigma, continuous improvement, empowerment, kaizen, benchmarking, advanced APQP systems such as QFD and the house of quality.
18. To perform calculations and charts on statistical process control (SPC) and process capacity.
19. To be able to argue on the application of different tools for the design of operations.
20. To prepare professional reports on different matters.
21. To understand and produce messages in English (on topic related to this subject).

#### Related activities:

Selected readings and answering questions. Productivity calculation exercises.

Exercises about definition and measurement of processes. Exercises on methods and time studies.

Exercises on statistical process control

Practical activities of written comprehension, oral comprehension, written expression and oral expression in English. Coursework essays and reports.

Written exams.

#### Full-or-part-time: 75h

Theory classes: 15h

Laboratory classes: 15h

Self study : 45h



## Title of content # 2: Managing operations

### Description:

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The future graduate is empowered to understand, evaluate and make decisions regarding production management tools

5. Project scheduling
6. Demand forecast
7. Inventory management
8. Aggregate planning
9. MRP
10. Lean manufacturing

### Specific objectives:

1. To explain the concepts associated with demand forecasting: seasonality, moving average, trend, exponential smoothing, forecasting errors, bias.
2. To compute a demand forecast using tools in cases where horizontality, trend or seasonality are present. Calculate errors.
3. To carry out calculations of the units to be purchased / manufactured using the expressions of the economic order quantity (EOQ) model, with discounts if applicable, and determining the number of orders and the associated costs (H and S).
4. To perform a continuous review inventory management system determining the reorder point, safety stock if applicable, stock coverage.
5. To distinguish between available (on hand), pipeline inventory, backorders and total inventory (Inventory position).
6. To perform an ABC inventory management analysis and to apply a cyclical count.
7. To make proposals for production planning, using graphic tools, a spreadsheet and the transport tableau algorithm.
8. To explain the advantages of MRP and ERP programs and apply the logic of MRP programs.
9. To explain the history, foundations, tools and techniques of lean manufacturing. To know how to identify its application in the company.
10. To draw PERT, CPMR, Roy charts (in their AOA and AON modalities), whether deterministic or stochastic, and to perform calculations on time, slack and critical path on the diagram.
11. To be able to argue on the application of different tools for production management
12. To prepare professional reports on different matters.
13. To understand and produce messages in English (on topic related to this subject).

### Related activities:

Selected readings and answer to questions. Demand forecasting exercises.

Inventory management exercises. Production planning exercises. MRP exercises.

Activities to identify losses and improvements in lean manufacturing. Exercises on PERT / CPM or Roy Charts

Written comprehension, oral comprehension, written expression and oral expression exercises in English.

Coursework essays and reports.

Written exam.

### Full-or-part-time: 75h

Theory classes: 15h

Laboratory classes: 15h

Self study : 45h



## ACTIVITIES

### Title of activity #1: Practical exercises

**Description:**

To consolidate learning, students will perform practical exercises both in the classroom and at home. These practices will also allow the achievement of related skills.

Throughout the course, the students will have to work on three practices of the subject, which will be graded. See the Rules for carrying out these activities.

In addition to the compulsory practices, each week several exercises will be proposed for the students to work on the subject, to complete the workload of 6 ECTS.

**Specific objectives:**

Those corresponding to blocks 1 and 2 of the subject

**Material:**

Statements of questions delivered by teachers.

**Delivery:**

All compulsory practices together account for a 20 % of the final grade (see qualification system section). These practices allow assessing course content and generic skills.

**Full-or-part-time:** 60h

Laboratory classes: 30h

Self study: 30h

### Title of activity #2: Written exams

**Description:**

Students must answer in writing theoretical and / or practical questions

**Specific objectives:**

Those corresponding to blocks 1, 2 of the subject

**Material:**

Bibliography

**Delivery:**

Two written midterm exams (EP), during class time, corresponding to each half of the course.

A final written exam (EF), on a date scheduled by EPSEM, which includes all course content. See section "Qualification System"

**Full-or-part-time:** 32h

Theory classes: 6h

Self study: 26h

## GRADING SYSTEM

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Assessment will be carried out by means of:

- The global grading of the practices (P) solved during the course. They are made up of three cases and each one is related to, at least, one skill.
  - Two written midterm exams (M), during the class schedule, corresponding to each half course.
- A final written exam (F), on a date scheduled by EPSEM, which includes all course content.

The final grade of the course will be obtained: Maximum  $\{0.4M1 + 0.4M2 + 0.2P, 0.8F + 0.2P, F\}$

No minimum grade is required on any test. Failure to present a practical activity on the set date implies a grade of zero points and loss of the grade of the associated skill. Instructors will give timely notice so that everyone knows when a practice needs to be delivered so students can act accordingly.

Assessment of entrepreneurship and innovation level 2. For its assessment, the rubrics approved by EPSEM will be taken into account. The qualitative evaluation is carried out mainly through a practice linked to the contents of the subject. The final evaluation will include the performance of the student throughout the course in all the activities where this skill is included.

Assessment of a third language (English). For assessment purposes, the rubrics approved by EPSEM will be taken into account. At least one practice will be solved in English. In addition, it will be taken into account that students also practice with the reading of exercises, slides, reference books in English and while attending oral presentations and watching videos throughout the course.

Assessment of autonomous learning level 2. For its assessment, the rubrics approved by EPSEM will be taken into account. The qualitative evaluation is carried out through a practice linked to the contents of the subject and the entire volume of work done by the students throughout the course, so a systematic observation will be made.

## EXAMINATION RULES.

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Written exams are conducted individually and without notes. The only electronic media allowed are calculators. Mobile phones cannot be used, they must be switched off and stored. Exams include theoretical questions and numerical exercises.

The different practices are done in groups, according to the statement of each one. They must be written using a computer word processor. Care must be taken with spelling, syntax and presentation in general, numbering the pages and, where appropriate, including a table of contents and proper references (books, papers or web pages), according to a standard system.

The timing of the teaching-learning activities of the semester will be provided to students on the first day of the course, as well as the present guide of the subject.

## BIBLIOGRAPHY

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### Basic:

- Heizer, Jay; Render, Barry. Principles of operations management [on line]. Global ed. 9th ed. Upper Saddle River: Pearson education, 2014 [Consultation: 31/05/2022]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?docID=6265315>. ISBN 9780273787082.

### Complementary:

- Jacobs, F. R.; Chase R. B. Operations and supply chain management. Global ed. 14th ed. New York: McGraw-Hill Irwin, 2014. ISBN 9780077151621.

- Monks, Joseph G. Schaum's outline of theory and problems of operations management. 2nd ed. New York: McGraw-Hill, 1996. ISBN 9780070427648.

## RESOURCES

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**Audiovisual material:**

- Vídeos incorporats en el llibre de text o procedents de YouTube. Resource

**Computer material:**

- Full de càlcul

**Other resources:**

PowerPoint slides for each lesson, taken from the text book or prepared by the instructor.

Written documents from the lecturer (handouts): throughout the course.