



# Course guide

## 240ST1131 - 240ST1131 - Operations Management in the Supply Chain

Last modified: 16/05/2023

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

**Degree:** **Academic year:** 2023 **ECTS Credits:** 10.0  
**Languages:** Spanish

### LECTURER

---

**Coordinating lecturer:** Manel Mateo Doll

**Others:** Joan Ignasi Moliné Boixareu, José Antonio Sánchez Diosdado

### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

---

**Specific:**

CESCTM1. Designing supply chains, or parts thereof, by applying the methods, techniques and tools that are appropriate for each specific function and purpose.

CESCTM4. Know and apply the modeling techniques and simulation optimization to solve the problems of design, operation and management of transportation systems.

### TEACHING METHODOLOGY

---

The course consists of the following training activities:

- \* Theoretical sessions. A part of these sessions corresponds to a master class (lectures). And the rest is devoted to participatory-guided classes.
- \* Practical sessions. They correspond to a laboratory class where the students apply quantitative tools in order to understand how to apply the procedures introduced in lectures.
- \* This is complemented by self study, two applied tasks and a business game, all these types of activities are distance learning.
- \* Finally, we consider the evaluation activities (practical exam and final exam).

### LEARNING OBJECTIVES OF THE SUBJECT

---

The main objective is to introduce a set of decisions related to the management of manufacturing and logistics systems and supply chain, focussed on the operations management, and provide a basic conceptual view and some elementary management tools.

At the end of the course, the student is expected to be able to:

- \* Identify the types of problems in management of the manufacturing and logistics systems and developing the appropriate procedures of resolution to provide feasible and reasonable solutions.
- \* Identify which decisions to take in the short-term and medium-term in the behaviour of industrial engineering (Operations Management) and the most common criteria.
- \* Use the appropriate quantitative techniques to support the decision making.
- \* Develop the ability of reasoning in real situations of management.
- \* Manage several kinds of manufacturing and logistics systems (goods or services, product-focused or process-focused ...).



## STUDY LOAD

Type	Hours	Percentage
Hours small group	30,0	12.00
Hours large group	60,0	24.00
Self study	160,0	64.00

**Total learning time:** 250 h

## CONTENTS

### 1. Introduction

**Description:**

Definition of production, manufacturing and logistic system, supply chain management. Production and business. Subsystems in the business. Management decisions: design decisions and operations management decisions.

**Specific objectives:**

Identify the managerial characteristics for different organizations and in particular for manufacturing and logistics systems.

Determine the best investment options from one or more criteria.

**Related activities:**

Theoretical lecture.

A short-duration activity in theory class to reinforce the concepts.

Exercise.

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

Practical classes: 4h

Laboratory classes: 2h

Self study : 26h

### 2. Purchasing

**Description:**

Procurement Function. Strategic Purchasing function. Activities in a Purchasing department. Buyer-supplier relationships. Typology. Formal aspects on purchases. Procurement policies. Purchasing procedures. Centralization and decentralization. Optimization of suppliers. Evaluation of purchasing management. Information systems support purchasing.

**Specific objectives:**

Determine the best purchasing policy for a certain business.

**Related activities:**

Theoretical lecture.

A short-duration activity in theory class to reinforce the concepts.

Exercise.

**Full-or-part-time:** 30h

Theory classes: 12h

Practical classes: 4h

Self study : 14h



### 3. Inventory management

**Description:**

Definition of inventory, classification and costs. Inventory management. Deterministic models: EOQ formula; simultaneous supply and usage; quantity discounts; case of managing jointly several items; non-homogeneous demand. Introduction to the variable demand.

**Specific objectives:**

Identify the different types of costs and elements to be considered in inventory management.  
Solve a situation of inventory management in a deterministic context, using the appropriate model.

**Related activities:**

Theoretical lecture.  
A short-duration activity in theory class to reinforce the concepts and its application.  
Exercises.

**Full-or-part-time:** 52h

Practical classes: 12h

Laboratory classes: 6h

Self study : 34h

### 4. Operations planning

**Description:**

Concept and levels of planning. Characteristics of a production plan. The Master Production Schedule (MPS). Determination of a MPS: graphical analysis, intuitive analysis, analytical models (method of Bowman). Distribution planning. Aggregation and disaggregation.

**Specific objectives:**

Identify the elements to be considered in planning (demand, capacity and costs).  
Develop a Master Production Schedule intuitively or optimally.

**Related activities:**

Theoretical lecture.  
A short-duration activity in theory class to reinforce the concepts.  
Exercises.

**Full-or-part-time:** 46h

Practical classes: 8h

Laboratory classes: 4h

Self study : 34h



## 5. Requirements planning

### Description:

General considerations in requirements planning. Product structure: bill of materials. Material Requirements Planning (MRP) and Capacity Requirements Planning (CRP). MRP-II. ERPs and implementation. Distribution Requirements Planning (DRP).

### Specific objectives:

Understand the BOM of a product.  
Determine the supply and manufacturing orders to meet a plan.  
Determine the amount of resources required for manufacturing and distribution.

### Related activities:

Theoretical lecture.  
A short-duration activity in theory class to reinforce the concepts.  
Exercise.

### Full-or-part-time: 24h

Theory classes: 8h  
Laboratory classes: 4h  
Self study : 12h

## 6. Operations scheduling

### Description:

Assignment, sequencing, timing. Classification of problems. Notation. One single machine. Criteria for sequencing. The flow-shop problem: procedures. The job-shop. The dispatching methods. Assembly line balancing. Concepts and algorithms.

### Specific objectives:

Determine the type of flow in a given production system.  
Determine a schedule for manufacturing operations, using the appropriate procedure.  
Design of an assembly line.

### Related activities:

Theoretical lecture.  
A short-duration activity in theory class to reinforce the concepts.  
Exercises (they referred to manufacturing and logistic operations).

### Full-or-part-time: 50h

Practical classes: 12h  
Laboratory classes: 8h  
Self study : 30h



## 7. Global management in the organizations

### Description:

Release and control: KPIs. Approaches to operations management. Lean Management and TOC. Evolution: continuous improvement and reengineering.

### Specific objectives:

Identify areas of improvement in methods of work.  
Acquire a vocabulary of concepts used in management.

### Related activities:

Theoretical lecture.  
A short-duration activity in theory class to reinforce the concepts.  
Practical exam.

### Full-or-part-time: 16h

Practical classes: 4h  
Laboratory classes: 2h  
Self study : 10h

## GRADING SYSTEM

The evaluation is done by several methods:

- (1) a final exam (EF) with a maximum of three hours duration, consisting of several theoretical and practical exercises in which the student must demonstrate the ability to apply learned knowledge and to develop specific procedures of resolution;
- (2) a mid-term exam (PP) with a maximum of 1h15 'duration, in which the student is basically faced to intellectual agility questions and short exercises;
- (3) an exam about exercises (EP) with a maximum of 1 hour duration, in which the student must demonstrate that he/she is able to solve situations slightly different from those worked out in class;
- (4) evaluation during practical sessions (TP), in which the student must demonstrate his/her progressive learning during practical sessions.
- (4) a business game (BG) in which the student must apply concepts in the simulation of a real case and learn the group work;
- (5) works (TR), to develop solutions to complex real situations.

The final grade for the course  $N_{final}$  will be obtained:

$$N_{final} = 0.6 \cdot N_{af} + 0.2 \cdot N_{ep} + 0.2 \cdot N_{ac}$$

$N_{af}$ : final exam evaluation

$$N_{af} = EF$$

$N_{ep}$ : practical sessions evaluation

$$N_{ep} = \max \{ EP ; 0.5 TP + 0.5 EP \}$$

$N_{ac}$ : progressive learning evaluation

$$N_{ac} = \max \{ TR ; 0,5 TR + 0,5 BG \}$$

## EXAMINATION RULES.

The final exam (EF) and the exam about exercises (PE) are open books. Electronic devices are not allowed, except pocket calculator (mobile phone or any other devices are not allowed).

The evaluation during practical sessions (TP) will be held answering the requested questions, during each session.

The business game BG and the works TR will be made following the specific rules published in the electronic campus. The solution to works TR must be send before the deadline stated in the beginning of the course.

## BIBLIOGRAPHY

---

### Basic:

- Chase, Richard B; Jacobs, F. Robert. Administración de operaciones : producción y cadena de suministros. 13a ed. México [etc.]: McGraw Hill, 2013. ISBN 9786071510044.
- Heizer, Jay H. Dirección de la producción y de operaciones : decisiones tácticas. 11a ed. Madrid [etc.]: Pearson Educación, 2015. ISBN 9788490352854.
- Heizer, Jay H. Dirección de la producción y de operaciones : decisiones estratégicas. 11a ed. Madrid [etc.]: Pearson Educación, 2015. ISBN 9788490352878.
- Vollmann, Thomas E. Manufacturing planning and control for supply chain management. 5a. New York: McGraw-Hill, 2005. ISBN 0072299908.

### Complementary:

- Fitzsimmons, James A. Service management : operations, strategy, and information technology. 8th ed. New York: McGraw-Hill Irwin, 2014. ISBN 9781259010651.
- Dominguez Machuca, J.A. et al. Dirección de operaciones: aspectos tácticos y operativos en la producción y los servicios. Madrid: McGraw-Hill, 1995. ISBN 8448118030.
- Nahmias, Steven. Análisis de la producción y las operaciones [on line]. México: Compañía Editorial Continental, 2007 [Consultation: 27/04/2020]. Available on: [http://www.ingebook.com/recursos.biblioteca.upc.edu/ib/NPcd/IB\\_Escritorio\\_Visualizar?cod\\_primaria=1000193&libro=5696](http://www.ingebook.com/recursos.biblioteca.upc.edu/ib/NPcd/IB_Escritorio_Visualizar?cod_primaria=1000193&libro=5696). ISBN 9789701062395.
- Domínguez Machuca, J.A. et al. Dirección de operaciones: aspectos estratégicos en la producción y los servicios. Madrid: McGraw-Hill, 1995. ISBN 8448118480.
- Waller, D. L. Operations Management : A Supply Chain Approach. 2nd ed. London: Cengage Learning EMEA, 2003. ISBN 9781861528032.
- Krajewski, L. J.; Ritzman, L. P.; Malhotra, M. K. Operations management : processes and value chains. 10th ed. Harlow: Prentice Hall, 2013. ISBN 9780273766834.
- Chapman, Stephen N. Planificación y control de la producción. México: Pearson Educación, 2006. ISBN 970260771X.

## RESOURCES

---

### Other resources:

- \* Slides for lectures.
- \* Description of the exercises.