Course guide
240IOI21 - 240IOI21 - Operations Management

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

Degree:	MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2014). (Optional subject).

Academic year: 2023   **ECTS Credits:** 4.5   **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer:	Manel Mateo Doll
Others:	Iñaki Gras Basañez Òscar Gil Sola

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEMEI09. Knowledge and abilities to organise and manage companies.
CEMEI13. Knowledge in information systems for the management, industrial organization, production systems and logistics and quality management 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 in groups of 3 or 4 apply quantitative tools in order to understand how to apply the procedures introduced in lectures.
* This is complemented by self study and a business case; both are distance learning.
* Finally, we consider the evaluation activities (mid-term exam, exam on practical exercises and final exam).

LEARNING OBJECTIVES OF THE SUBJECT

We study the decisions associated with the management of manufacturing and logistic systems (short-term management). It presents the conceptual framework, the basic principles and some specific elements in depth: planning, finite capacity scheduling, inventory management, etc. We will analyse the major problems that occur in the management of a production and logistic system, as well as methods and tools to solve them.
After completing the course, students must:
* Know the basic scheme of decision making in the short term (operations management) and place the problems there.
* Address some common choices on management systems (inventory, planning and scheduling, among others).
* Determine the policy of inventory management, according to internal and external conditions.
* Perform aggregation and disaggregation and apply models for planning to real cases.
* Develop operations scheduling in complex systems of production and distribution.
* Use tools to extract quantitative conclusions in planning, scheduling ...

STUDY LOAD

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

Total learning time: 112.5 h

CONTENTS

1. Introduction

Description:
Integrated logistics system. Reference model of Operations Management. Views of operations management in production.

Specific objectives:
Place each of the decisions related to operations management in production and logistics systems.
Classify the elements and the costs involved in a management decision.

Related activities:
Theoretical lecture.
Short-duration activities.

Full-or-part-time: 3h
Practical classes: 1h 30m
Laboratory classes: 1h 30m

2. Inventory management

Description:
Review of models of deterministic demand, both homogeneous. Economic Order Quantity, and with production. Multiple products in a single delivery. Random demand. Models for inventory management: fixed order quantity model or fixed time period model, considering stockout cost, with and without service quality. Application to different demand distributions: discrete, normal, exponential. Supply chian management.

Specific objectives:
Understand the information given in a situation of random inventory management.
Determine the values of the variables used in the considered management model: fixed order quantity or fixed time period.
Manage the inventory policies according to the given indicators of service quality.

Related activities:
Theoretical lecture.
Short-duration activities.
Exercises.

Full-or-part-time: 12h
Practical classes: 7h 30m
Laboratory classes: 4h 30m

3. Operations planning

Description:
Review the basics of planning. Aggregation and disaggregation. Modularity, constraints and inhibitions. Classification for linear models in planning. Models for agregate planning based on the Bowman's model. Mathematical models with hiring and firing, distribution, several levels of production ...

Specific objectives:
Use a basic planning model to face a real or inspired by the reality situation.
Determine the Detailed Master Plan from the Aggregate Master Plan following a formalized procedure.

Related activities:
Theoretical lecture.
Short-duration activities.
Exercises.

Full-or-part-time: 7h 30m
Practical classes: 4h 30m
Laboratory classes: 3h

4. Scheduling

Description:
Review of the basis of the scheduling problem: the single machine and the flow-shop models. Priority rules. Flow-shop with setups. Optimal solution for a flow-shop problem. Parallel machines. Introduction to elegibility and release and queue times. Cases of a single machine and several machines per level. Hybrid flow-shop.

Specific objectives:
Determine the kind/s of flow in a given production system.
Get a solution for a hybrid flow-shop, parallel machines or similar problems.

Related activities:
Theoretical lecture.
Short-duration activities.
Exercises.

Full-or-part-time: 18h
Practical classes: 7h 30m
Laboratory classes: 4h 30m
Guided activities: 6h

5. Distribution management

Description:
The distribution problem. Travelling Salesperson Problem (TSP) and Vehicle Routing Problem (VRP). Inventory Routing Problem (IRP).

Specific objectives:
Get a solution for a distribution problem, considering inventory or not.

Related activities:
Theoretical lecture.
Short-duration activities.
Exercises.

Related competencies :
CEMEI09. Knowledge and abilities to organise and manage companies.
CEMEI13. Knowledge in information systems for the management, industrial organization, production systems and logistics and quality management systems.

Full-or-part-time: 4h 30m
Practical classes: 3h
Laboratory classes: 1h 30m

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;
(5) a business case (BC), in which the student must show how concepts are applied in the simulation of a real case and learn teamwork;
(6) activities in theory lessons (AT), which are a maximum of 4 activities that may add 1 additional point totally to the final exam evaluation.
The final grade for the course Nfinal will be obtained:
Nfinal = 0.6 · Naf + 0.2 Nep + 0.2 · Nac
Naf: final exam evaluation
Naf = min { EF + AT ; 10}
Nep: practical sessions evaluation
Nep = max {EP ; 0.5 TP + 0.5 EP }
Nac: progressive learning evaluation
Nac = max { PP ; 0,5 PP + 0,5 BC ; EF }

EXAMINATION RULES.

The final exam (EF), the mid-term exam (PP) and the exam about exercises (EP) 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.
Business case (BC) will begin mandatorily in a practical session and the requested decisions will be given on-line, according to the dates given at the beginning of the course.
For the activities in theory lessons (AT), their dates will not be given in advance and the asked questions will be answered in the corresonding theoretical sessions.

If the student attends the re-evaluation exam of the subject (REA), this mark will replace that in the final examination (EF). The re-evaluation exam may be a multiple-choice test.

BIBLIOGRAPHY

Basic:
- Silver, Edward A ; Pyke, D. F ; Peterson, Rein. Inventory management and production planning and scheduling. 3rd ed. New York , etc.: John Wiley & sons, cop. 1998. ISBN 0471119474.
- Lopez, ; Roubellat, François. Production scheduling. London : Hoboken: ISTE ; John Wiley & Sons, 2008. ISBN 9781848210172.

Complementary:
- Heizer, Jay H ; Render, Barry. Dirección de la producción y de operaciones : decisiones tácticas [on line]. 11a ed. Madrid [etc.]: Pearson Educación, 2015 [Consultation: 19/10/2020]. Available on: http://www.ingebook.com/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=5776a. ISBN 9788490352854.
- Domínguez Machuca, J. A. Dirección de operaciones : aspectos tácticos y operativos en la producción y los servicios. Madrid [etc.]: McGraw-Hill, cop. 1995. ISBN 8448118030.
- Chase, Richard B. ; Jacobs, F. Robert ; Aquilano, Nicholas J. Administración de operaciones : producción y cadena de suministros [on line]. 15ª ed. México [etc.]: McGraw Hill, 2019 [Consultation: 08/07/2022]. Available on: https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=5611013. ISBN 9781456261412.

RESOURCES

Audiovisual material:
- Transparències de teoria. Slides for lectures
- Enunciats de pràctiques. Description of the exercises