



Academic Year 11/12	24704	INDUSTRIAL ORGANIZATION	
Department:	732 Business Administration		
Coordinator:	José M. Ibáñez		
Typology:	Block 1. Engineering Courses	Language: English	
ECTS: 5	Offered in other degrees: Industrial Engineering	Year 1; Semester 2 Spring Semester ¹	

OBJECTIVES

General objective

Provide students with basic knowledge in the organization of manufacturing and logistics systems, the focus of which will be operations design and management. Students will gain a conceptual understanding of the basic principles and they will also deal with instrumental examples.

Specific objectives

- Introduce the concept, types and problems on the organizational and managerial characteristics of the different types of production and logistics systems.
- Introduce the basic decision-making scheme for the short-medium term (operations management).
- Describe the key elements for planning and programming of unique projects.
- Introduce the basic model for inventory management in a deterministic context, as well as some of its variants.
- The use of elementary techniques for demand forecasting having seasonality.
- Provide aggregate and detailed planning and the subsequent materials management with analytical tools including techniques such as MRP.
- Addressing some of the most usual decisions in the design of production systems (location, layout, work analysis).
- Provide procedures for solving location problems in a one or two dimensions space, with or without constraints; location of products in a warehouse; set-covering problems.
- Analyze layout alternatives considering distances, flows and other additional elements.
- Provide several tools for work method analysis (flow process chart, multiple activity chart, ...)
- Provide tools of work measurement (time study, activity sampling, predetermined motion time systems).

COURSE DESCRIPTION

TOPIC 1. INTRODUCTION

Industrial engineering: definition of production and productive and logistical systems. Productive systems and logistical systems: classification. Design decisions and operations management decisions. Quantitative basis for decision making (costs, investments and criteria). Classification of costs. Even point. Investments: cash-flows; intertemporal factor (updating, capitalization). Evaluation of investments: NPV, IRT, pay-back, dimension, qualitative aspects.

TOPIC 2: PROJECT PLANNING

Planning and scheduling of projects. Characteristics of ordering problems. Type of constraints: potential, cumulative, disjunctive. Representations: Gantt, Roy and PERT; resource loading charts. Potential problems: schedule calculation. Cumulative problems: limitation in the availability of resources. Disjunctive problems: procedure of resolution.

TOPIC 3: FORECASTING

Forecasting and operations management. Forecasting vs. prediction. Components of demand: trend, cycle, seasonality and random. Adjustment of parameters. Treatment of the additive and multiplicative seasonality.

¹ Also available during the Autumn Semester

TOPIC 4: OPERATIONS PLANNING

Concept and levels of planning. Characteristics of a production plan. The Master Production Scheduling (MPS). Determination of a PMS: graphical analysis, intuitive, through models (method of Bowman).

TOPIC 5. MATERIAL AND CAPACITY REQUIREMENTS PLANNING

General considerations of the requirements. Structure of product: bill of materials. Material Requirements Planning (MRP) and Capacity Requirements Planning (CRP).

TOPIC 6. INVENTORY MANAGEMENT

introduction: definition of stocks, costs, classification. ABC analysis. Stock management. Deterministic models: EOQ formula; simultaneous supply and usage; uniform sales; case of several items; manufacturing several articles in a single machine; non-homogeneous demand.

TOPIC 7. LOCATION

Location: quantitative and qualitative features. Type of distances: rectangular, quadratic, Euclidean. Location of a single facility (one dimension, two dimensions, constraints and isocost lines). Several facilities and products location problems and models: assignment of products; covering problems.

TOPIC 8. HUMAN FACTOR AND TIME MEASUREMENT

Historical references. Work methods analysis and improvement. Work measurement: timing, sampling. Predetermined times. Machine assignment: interferences.

TOPIC 9. LAYOUT

Introduction: classification, problems and goals. SLP. Determination of a layout. Multiproduct analysis of flows and distances. Evaluation and optimization.

TOPIC 10. MANAGEMENT AND CONTROL OF PRODUCTIVE SYSTEMS

Systems for operations control. Reliability of systems. Evolution: continuous improvement and re-engineering.

METHODOLOGY

Theoretical teaching take place primarily through lectures using slides, short exercises on the board, complementary schemes, etc.

The teaching labs are mainly in computer rooms, in sessions of 2 hours. In them, the student (alone or in pairs) plays a more active role to solve, with the assistance of the teacher, a given situation.

Additionally, students can perform (alone or in pairs) two applied works, which consist of developing more complex situations than those proposed in the practice sessions. Students must propose a solution and the result is reflected in a series of questions to answer.

COURSE EVALUATION

The evaluation is done by various methods:

- (1) A final exam (about 3 hours) consisting on several theoretical and practical exercises in which the student must show his/her ability to apply what he/she learned, also his/her skills in developing approaches and resolution procedures;
- (2) A partial test (an hour and a half), in which the student solves agility exercises and exercises that demonstrate what he/she learned,
- (3) A practical exam (one hour), with which the students must show their ability to apply what they learned to situations slightly different from those taught during the course,
- (4) Evaluation of works developed during practical classes in which students must demonstrate their progressive learning,
- (5) Evaluation of applied studies in which the student has to expand his/her knowledge and mastery on the subject and develop skills in teamwork.

FACULTY

Josep M. Ibáñez Giner

<http://directori.upc.edu/directori/dadesPersona.jsp?id=1000162>