COURSE DATA

Data Subject	
Code	44867
Name	Production
Cycle	Master's degree
ECTS Credits	6.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
2237 - Master's Degree in Business Process Planning and Management	Faculty of Economics	1	Second term

Subject-matter

Degree	Subject-matter	Character
2237 - Master's Degree in Business Process Planning and Management	5 - Production	Obligatory

Coordination

Name	Department
PLANA ANDANI, ISAAC	257 - Business Mathematics

SUMMARY

For most companies, whether or not they have physical production activities, the topic of production planning and scheduling management is of utmost importance. We could consider that manufacturing products and providing services are two sides of the same coin.

The fundamental and advanced aspects of production management, planning, scheduling, and control have been covered in two topics:

- Production Planning

- Production Scheduling and Control

Both topics have been designed to be taught consecutively, sharing objectives, methodology, and evaluation.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

2237 - Master's Degree in Business Process Planning and Management

- Be able to integrate knowledge and handle the complexity of formulating judgments based on information that, while being incomplete or limited, includes reflection on social and ethical responsibilities linked to the application of knowledge and judgments.
- Know how to communicate conclusions and the knowledge and rationale underpinning these, to specialist and non-specialist audiences, clearly and unambiguously.
- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Know how to work in multidisciplinary teams reproducing real contexts and contributing and coordinating their own knowledge with that of other branches and participants.
- Participate in, lead and coordinate debates and discussions, be able to summarize them and extract the most relevant conclusions accepted by the majority.
- Use different presentation formats (oral, written, slide presentations, boards, etc.) to communicate knowledge, proposals and positions.
- Have a proactive attitude towards possible changes that may occur in their professional and/or investigative work.

- Be able to integrate into teams, both as managers or coordinators and for specific and limited functions and in support of the team or of others.
- To know how to apply acquired knowledge and solve problems in new or unfamiliar situations within wider contexts (or multidisciplinary) related with their field of study.
- Develop and apply knowledge and technologies in the context of business management.
- Analyse and solve management problems by creating and validating models appropriate to the various fields of the company's activity, such as production planning and control, inventory management, distribution and logistics or project management. Work with available or possible data.
- Develop the ability to manage information, with special emphasis on quantitative information. Adequately design the process of data collection and processing.
- Carry out and coordinate projects for technological improvement and innovation in management.
- Be able to model real situations as mathematical formulations, especially those involving decision making in complex scenarios.
- Be familiar with the optimisation and simulation tools available in the market and their possible adaptation to business problems. Consider the development of new applications.
- Be able to synthesise and communicate the results, the conclusions of models and the solutions proposed in a rigorous and clear manner.
- Show creativity when facing the resolution of complex problems and be able to evaluate the implications that the alternatives designed may have on the different agents involved.
- Know the different production problems and their relationships with other company processes.
- Know the production management tools at different levels.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

At the end of the teaching-learning process, the student will have learned to:

1: Understand the Production Management tools for developing Aggregate Planning, Master Planning, CRP, OPT, and Lean Manufacturing.

2: Develop spreadsheet tools to solve management problems.

3: Understand various production problems.

4: Understand production control methodologies.

5: React to different unforeseen events in the plant with appropriate tools and solutions.

DESCRIPTION OF CONTENTS

1. Production Planning and Management

1.1. Introduction to production systems and methods for Production Management.
1.2. Measurement of operations. Definition of standard times.
1.3. Definition of Capacity in complex production systems.
1.4. Aggregate planning. Disaggregation of decisions and aggregation of information.
1.5. Master Production Schedule. Approximate Capacity Analysis
1.6. Material and Capacity Requirements Planning
1.7. Production Planning and Lean manufacturing

2. Production Scheduling and Control

2.1. Introduction to production scheduling
2.2. Heuristic Mmethods for production problems
2.3. Exact methods for production problems
2.4. Metaheuristic methods for production problems
2.5. Solving production problems in practice

WORKLOAD

ACTIVITY	Hours	% To be attended
Computer classroom practice	48,00	100
Seminars	9,00	100
Development of individual work	48,00	0
Preparation of evaluation activities	29,00	0
Resolution of case studies	16,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

The teaching methodology will consist of face-to-face classes, both theoretical and practical, and a series of assignments to be completed by the student. The face-to-face classes will be divided into:

- Theoretical classes, where the basic concepts of each topic will be presented.

- Practical classes, where practical exercises related to the topics covered in the theoretical classes will be carried out to reinforce understanding. These classes will also provide opportunities to generate new perspectives and approaches not covered in the theoretical classes, as well as to assess the students' level of theoretical knowledge acquisition.

Additionally, the student will be required to complete a series of assignments with the guidance of the teacher, which will involve project development. These assignments will allow the student to assess their level of assimilation of the concepts covered in the subject. These assignments should be primarily practical in nature, although they may also cover theoretical aspects discussed in the subject.

EVALUATION

The main form of assessment for the subject will consist of assignments and exercises that the teachers will assign to the students throughout the course. In order to pass the subject in this manner, it is essential to attend at least 50% of the classes in each of the two parts into which the course is divided. The evaluation of each part will be conducted as follows:

Evaluation of Part 1 (Planning):

- Assignments and exercises assigned by the teacher, which must be submitted by the specified deadline, up to a maximum of one week after the completion of the taught material. Any possible extensions for submitting assignments must be duly justified and agreed upon in advance with the teacher. This assessment component accounts for 80% of the grade for this part.

- The remaining 20% will be calculated based on the percentage of class attendance.

Evaluation of Part 2 (Production Scheduling):

- A project corresponding to the material, accompanied by an oral defense. This assessment component accounts for 80% of the grade for this part.

- In-class activities and tasks, which will constitute the remaining 20% of the grade for this part.

It is mandatory to achieve a minimum grade of 4 out of 10 in both parts to pass the subject. If this condition is met, the final grade will be calculated as the average of the grades for both parts, with a minimum grade of 5 required to pass.
If the subject is not passed (either due to not achieving a 4 in any of the parts or if the average grade is below 5), or if attendance in the classes is below 50% in either of the two parts, a final exam for the entire course will be taken. This exam will account for 80% of the final grade if the minimum attendance requirement is met, while the remaining 20% will correspond to attendance and/or in-class activities. If the minimum attendance requirement is not met, the final exam will account for 100% of the final grade for the course.

REFERENCES

Basic

- Michael Pinedo (2016) Scheduling: Theory, Algorithms, and Systems Springer, quinta edición.
  Michael Pinedo (2009) Planning and Scheduling in Manufacturing and Services Springer, segunda edición
  Peter Brucker (2007) Scheduling Algorithms Springer, quinta edición.
  Stephen N. Chapman (2005) Fundamentals of Production Planning and Control Prentice Hall.
  Kenneth N. McKay y Vincent C. S. Wiers (2004) Practical Production Control. A Survival Guide for Planners and Schedulers J. Ross Publishing.
- Chase, R. y Jakobs F.R. (2014) Administración de operaciones : producción y cadena de suministros. McGraw-Hill/Interamericana
  Krajewski, L. J. y Larry P. (2000)Administración de operaciones : estrategia y análisis Pearson Educación
  Silver, E. A., Peterson y R. Pyke, D. F. (1998) Inventory management and production planning and scheduling John Wiley & Sons
  Framinan, J. M., Leisten, R. y Ruiz, R. (2014) Manufacturing Scheduling Systems. An Integrated View on Models, Methods and Tools Springer.
  Pochet, Y. y Wolsey, L. A. (2006) Production Planning by Mixed Integer Programming Springer

Additional

- Jay Heizer, Barry Render, Yago Moreno López y José Luis Martínez Parra (2007) Dirección de la Producción y de Operaciones. Decisiones Estratégicas. Pearson Educación, octava edición.
  Jay Heizer y Barry Render (2008) Dirección de la Producción y de Operaciones. Decisiones Tácticas. Pearson Educación, octava edición.
  José Antonio Domínguez Machuca, Antonio Álvarez Gil. Miguel Ángel Domínguez Macuca y Santiago García González (1995) Dirección de operaciones. Aspectos estratégicos en la producción y los servicios. McGraw-Hill.
  José Antonio Domínguez Machuca, Antonio Álvarez Gil. Miguel Ángel Domínguez Macuca y Santiago García González (1995) Dirección de operaciones. Aspectos tácticos y operativos en la producción y los servicios. McGraw-Hill.
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  Vincent T'kindt y Jean-Charles Billaut (2014) Multicriteria Scheduling: Theory, Models and Algorithms. Springer, segunda edición.
  Richard W. Conway, William L. Maxwell y Louis W. Miller (2003) Theory of Scheduling. Dover publications.
  Joseph Y-T. Leung, editor (2004) Handbook of Scheduling: Algorithms, Models, and Performance Analysis. Chapman & Hall.