Course Unit	Production Management II			Field of study	Manangement	
Bachelor in	Industrial Management and Engineering			School	School of Technology and Management	
Academic Year	2022/2023	Year of study	2	Level	1-2	ECTS credits 6.0
Type	Semestral	Semester	2	Code	9104-754-2203-00-22	

Workload (hours)	162	Contact hours	T	-	TP	60	PL	-	TC	-	S	-	E	-	OT	-	O	-

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s)	Maria Clara Rodrigues Bento Vaz Fernandes

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Formulate problems of production management;
2. Know and evaluate investments in industrial equipment resulting from resource planning;
3. Know and apply the techniques to perform the aggregated and detailed planning of production capacity;
4. Apply the criteria for lot sizing production in the case of dynamic demand;
5. Obtain the manufacturing plan for scheduling and allocation of manufacturing orders to several production resources taking into account the constraints of the system;
6. Critically analyze case studies production management by suggesting improvements.

Prerequisites

Before the course unit the learner is expected to be able to:
1. Dominate knowledge in the area of Operational Research;
2. Dominate knowledge of Statistics (descriptive, deductive and inductive);
3. Dominate knowledge in the area of forcasting;
4. Dominate basic competences in the area of social sciences and human resources;
5. Use the computer and working with electronic spreadsheets.

Course contents

Formulation of production management problems. Resource planning, aggregate and detailed production capacity. Appraisal of investments in industrial equipment. Planning of materials with capacity constraints. Production blending criteria. Programming and assignment of manufacturing orders. Performance measures of manufacturing plans. Optimization methods. Heuristic methods: priority rules. Gantt Maps.

Course contents (extended version)

1. Formulation of production management problems
    - Identifying the objective function
    - Definition of decision variables
    - Identification and definition of restrictions
2. Planning Techniques
    - Resource Planning Techniques
    - Aggregate Planning Techniques
    - Detailed Production Capacity Planning Techniques
3. Appraisal of investments in industrial equipments
4. Planning of materials with capacity constraints
5. Criteria for lot sizing production in the case of dynamic demand
    - Silver-Meal heuristic
    - Algorithm of Wagner Whitin
6. Programming and allocation of manufacturing orders
7. Definition, objectives and complexity of the problem
8. Performance measures of manufacturing plans
9. Optimization Methods
10. Heuristic methods (priority rules)
    - FIFO (first in first out)
    - EDD (earliest due date)
    - MDD (modified due date)
    - LWKR (least work remaining)
    - MWKR (most work remaining)
    - SPT (shortest processing time)
    - Min. Slack
    - Slack/RPT (slack per remaining processing time)
    - WINK (work in next queue)
    - NINQ (number of jobs in next queue)
11. Gantt charts.

Recommended reading

1. Ballou, R. (2003), Business Logistics/Supply Chain Management, 5th Edition, Prentice-Hall International, Inc.
2. Jacobs, F. , & Chase, R. (2018). Operations and Supply Chain Management (15th edition). New York: McGraw-Hill Education.
3. Heizer, J. , Render, B. , & Munson, C. (2017). Operations Management: Sustainability and Supply Chain Management (12th edition). London: Pearson Education Limited.
4. Whybark, D. C. & Jacobs, F. R. , William, L. B. , Whybark, D. C. , & Vollmann, T. E. (2018), Manufacturing Planning and Control for Supply Chain Management, 5th ed. , McGraw-Hill.

Teaching and learning methods

The lectures are devoted to present the theorical concepts and analysis of some examples. Practical classes are devoted to solve exercises under supervision or the performance of proposed practical work under supervision. Non-presential hours are devoted to study real problems where the studied models can be applied taking into account the specificities and interests of students.

Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Supplementary, Special)
    - Final Written Exam - 100%
2. Alternative 2 - (Regular, Student Worker) (Final, Supplementary)
    - Practical Work - 50% (At least 3 practical works should be performed.)
    - Presentations - 10% (Classroom participation.)
    - Final Written Exam - 40%

Language of instruction

Portuguese

Electronic validation

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01-03-2023	17-03-2023	17-03-2023