INSTITUTO POLITÉCNICO DE BRAGANÇA

Course Unit	Manufacturing and General Industrial Management			Field of study	Management		
Bachelor in	Electrical and Computers Engineering			School	School of Technology and Management		
Academic Year	2023/2024	Year of study	3	Level	1-3	ECTS credits	6.0
Type	Semestral	Semester	2	Code	9112-742-3202-00-23		

Workload (hours)	162	Contact hours	T	TP	PL	TC	S	E	OT	O
			30	-	30	-	-	-	-	-

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): Carla Alexandra Soares Geraldes, José Mário Escudeiro de Aguiar

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Forecasting methods: choose and apply the forecasting method best suited to the handling of chronological batches.
2. Stocks' management: determine the reorder parameters for the deterministic and stochastic models.
3. Production planning: identify the different types of productive systems and associated layouts; application of the MRP and JIT methods at production planning.
4. Quality control: handle a set of tools regarding statistical processes control (control charts and samplings plans).
5. Maintenance and replacement of equipment: determining the optimum number and the optimal periodicity of reserve equipment.

Prerequisites

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

Course contents

Forecasting methods. Stocks' management. Production planning. Quality control. Maintenance and replacement of equipment.

Course contents (extended version)

1. Forecasting methods
   - Introduction (the role of forecasting at the enterprise environment);
   - Classification of the forecasting methods and work methodology in forecasting;
   - The basic forecasting tools for chronological series and other types of data;
   - Basic tools for exploring data and appraisal and comparison of forecasting methods;
   - Times series decomposition methods (additive and multiplicative) and calculation of moving averages;
   - Exponential smoothing (AES and AEL), Holt's method and Holt-Winters' method.
2. Management of stocks
   - Stock cost and economic quantity (integral deliveries and production and put upon deliveries);
   - Norms of replenishment (continuous review method, periodic review method);
   - Quantity discounts and rationalization of the replenishment;
   - Stochastics models of continuous revision and of periodic revision;
   - The ABC classification. Select of the management model.
3. Production Planning
   - Planning Function (tasks, analysis of cargoes and capacity);
   - Production structures (productive structures, product cycle, etc.);
   - Planning of production from order (planning of the industrial capacity, production dosssier, etc);
   - Production planning by lots (MRP – material requirements planning method, and the JIT–Just in time);
   - Continuous production planning (assembly lines, methods of balancing and losses within the system).
4. Quality control
   - Inspection, reception control by sampling (sampling plans and average resulting quality);
   - Control charts by variables and attributes (variations, control limits, etc).
5. Maintenance and replacement of equipment
   - Organization of the maintenance cabinet (technical file and structure);
   - Preventive maintenance (inspection and lubrication plans);
   - Efficiency of the conservation (evaluation of costs and productivity indexes);
   - The economic and useful life of equipment and the optimum number of reserve equipments;
   - Replacement in group or individually of equipment with depreciation or sudden damage.

Recommended reading

1. Makridakis, S. , Wheelwright, S. and Hyndman, R. J. "Forecasting: Methods and Applications", Wiley, ISBN: 978-0-471-53233-0.
2. Heijer, J. , Render, B. , Munson, C. , "Principles of Operations Management: Sustainability and Supply Chain Management", Pearson Educ, ISBN: 978-0134183978.
3. Chase, R. B. , Jacobs, F. R, and Aquilano, N. J. , "Operations Management for Competitive Advantage", McGraw-Hill/Irwin, ISBN: 978-0071260480.
4. Gryna, F. M. "Quality Planning and Analysis: From Product Development through Use", Mc-Graw-Hill Science, ISBN: 978-0070393684
5. Vasconcelos, Bernardo C. , "Gestão de Empresas II", Textos didácticos, Faculdade de Engenharia da Universidade do Porto.

Teaching and learning methods

The program will be taught essentially in presence sessions-PS. The subsequent work to deepen the program will be developed either in SP or in non presence sessions-NPS. The PS include the resolution of problems and clarification of doubts. In the NPS it will be given particular relevance to the applied problems which take into account the needs and interests of students.

Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final, Supplementary, Special)
   - Final Written Exam - 100%
2. Alternative 2 - (Regular, Student Worker) (Final, Supplementary)
   - Practical Work - 25% (Chapter 1)
   - Intermediate Written Test - 25% (Chapter 2)
   - Final Written Exam - 50% (Chapters 3, 4 and 5)

Assessment methods

3. OM-1 (Mobility students attending english classes) - (Regular, Student Worker) (Final)
   - Practical Work - 40% (Held in classes for students who are attending in the current academic year.)
   - Presentations - 10% (Presentation and discussion of the practical assignments.)
   - Intermediate Written Test - 50% (Held on the regular exam day.)
4. OM-2 (Mobility students attending english classes) - (Regular) (Supplementary, Special)
   - Final Written Exam - 100%
5. OM-3 (Mobility students attending english classes) - (Student Worker) (Final, Supplementary, Special)
   - Final Written Exam - 100%

Language of instruction

1. Portuguese
2. English

Electronic validation

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04-03-2024	06-03-2024	09-03-2024