Supply chain management I

Academic Year: (2024 / 2025) **Review date: 30-04-2024**

Department assigned to the subject: Mechanical Engineering Department

Coordinating teacher: REINA SANCHEZ, KAREN

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

SKILLS AND LEARNING OUTCOMES

CB1. Students have demonstrated possession and understanding of knowledge in an area of study that builds on the foundation of general secondary education, and is usually at a level that, while relying on advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study
CB2. Students are able to apply their knowledge to their work or vocation in a professional manner and possess the competences usually demonstrated through the development and defence of arguments and problem solving within their field of study.
CB3. Students have the ability to gather and interpret relevant data (usually within their field of study) in order to make judgements which include reflection on relevant social, scientific or ethical issues.
CB5. Students will have developed the learning skills necessary to undertake further study with a high degree of autonomy.
CG1. Ability to solve problems with initiative, decision-making, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of Industrial Engineering.
CG3. Ability to design a system, component or process in the field of Industrial Technologies to meet the required specifications
CG4. Knowledge and ability to apply current legislation as well as the specifications, regulations and mandatory standards in the field of Industrial Engineering.
CG5. Adequate knowledge of the concept of company, institutional and legal framework of the company. Organisation and management of companies.
CG6. Applied knowledge of company organisation.
CG8. Knowledge and ability to apply quality principles and methods.
CG9. Knowledge and ability to apply computational and experimental tools for the analysis and quantification of Industrial Engineering problems.
RA2. Engineering Analysis: To be able to identify engineering problems within the industrial field, recognise specifications, establish different resolution methods and select the most appropriate one for their solution
RA3. Engineering Design: To be able to design industrial products that comply with the required specifications, collaborating with professionals in related technologies within multidisciplinary teams.
RA5. Engineering Applications: To be able to apply their knowledge and understanding to solve problems and design devices or processes in the field of industrial engineering in accordance with criteria of cost, quality, safety, efficiency and respect for the environment.
RA6. Transversal Skills: To have the necessary skills for the practice of engineering in today's society.

OBJECTIVES

Students completing this course should develop capabilities in order to:

* Describe the main challenges and opportunities (including geopolitical ones) in Supply Chain Management (SCM)
* Select the most appropriate logistical network topology according to the specific traits of a Supply Chain (SC)
* Propose effective strategies to limit the amplification of perturbances in the SC
* Choose the appropriate transport modes (or multimodal strategies) for a given business situation
* Attain an integrated perspective of the SC, including the interdependence among its constituent subsystems

DESCRIPTION OF CONTENTS: PROGRAMME

IMPORTANT NOTICE: In the academic year 2024/25 (as since 21/22) this subject will be taught online

Subjects SCM I and SCM II have been selected in the "1ª Convocatoria de Aprendizaje Activo en Docencia Digital (Active Learning in Digital Education)", thus they will be taught entirely online (except the midterm tests and the final exam, and eventually lab sessions), through platforms such as CLASS and/or Engageli. Thus, students enrolling in any of these elective courses must regularly attend the sessions (online; activating camera and microphone), and adhere to an active methodology, involving continuous individual and group work, as preparation and complement of the online sessions. Session recording is not currently planned; individual recording is forbidden unless explicitly authorized.
Given the innovative and exploratory nature of this call ("Convocatoria"), by enrolling in these elective courses students accept that the (anonymized) results of these courses (academic results, surveys, experiences...) might be used for research and/or learning methodology development purposes, and eventually disseminated (e.g. in Education conferences, journals,...)

* Introduction to Supply Chain Management (SCM)
  ** Challenges
  ** Representation
 * Design of the logistic network
  ** Logistic network topologies. Implications
* Disruption propagation in the SC
  ** Bullwhip effect
  ** Attenuation strategies
* Inventory Management. Safety stocks.
* Transportation in the SC
  ** Transport modes. Costs, implications
  ** Interdependency with both network design and inventories
* Integrated view of the SC. Key GCS functions. Relationships among:
  ** Demand forecasting and management. Product design
  ** Supplier selection
  ** SC operation. Orders, stocks
* Digital transformation of the SC
* Introduction to production and lean production. Product/process matrix.

LEARNING ACTIVITIES AND METHODOLOGY

Learning activities include:
- Lectures, tutoring sessions, student presentations, individual and group work by the students, including information retrieval and analysis, study, exams, and tests aimed at the acquisition of theoretical knowledge.
 - Practical sessions, case discussions and problem solving, tutoring, and individual work by the students, including study, exams, and tests aimed at the acquisition of applied practical knowledge within the course's domain. Practical sessions might encompass:
* Simulations
* Case analysis
* Group work

Please see "Important Notice" in "Program": In the academic year 2024/25 they will take place online (except the midterm and the exam, and eventually specific practical activities)

ASSESSMENT SYSTEM

% end-of-term-examination:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

THE CONTINUOUS ASSESMENT (40%)
See "Important Notice" in the "Program" section, regarding active online methodology

FINAL ASSESMENT (60%) (MIN. 4 POINTS TO PASS THE SUBJECT)
(Notice: optionally for the students, the instructor might offer voluntary continuous evaluation alternatives involving a weight above 40%)

BASIC BIBLIOGRAPHY

- Bozarth, C; Handfield, R Introduction to Operations and Supply Chain Management, Pearson, 2019

- Chopra, S. Supply Chain Management: Strategy, Planning, and Operation, Pearson, 2019

- Simchi-Levi, D., P. Kaminsky, E. Simchi-Levi Designing and Managing the Supply Chain: Concepts, Strategies and Case Studies, McGraw-Hill, 2021 (4th Edition)

ADDITIONAL BIBLIOGRAPHY

- Jacobs, F.R.; Chase, R.B.; Aquilano, N.J. Operations and supply chain management, McGraw-Hill, 2023

- Schroeder, R.; Goldstein, S.M. Operations management in the supply chain. Decisions and cases, McGraw-Hill, 2019