Introduction to engineering management

Academic Year: (2023 / 2024) **Review date: 26-04-2023**

Department assigned to the subject: Mechanical Engineering Department

Coordinating teacher: MORCILLO BELLIDO, JESUS

Type: Basic Core ECTS Credits : 6.0

Year : 2 Semester :

Branch of knowledge: Engineering and Architecture

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

No prerequisites

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.
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.
CG2. Knowledge and skills to organise and manage projects. Knowledge of the organisational structure and functions of a project office.
CG5. Adequate knowledge of the concept of company, institutional and legal framework of the company. Organisation and management of companies.
ECRT12. Knowledge and skills adequate to organise and manage companies.
RA1. Knowledge and understanding: Have basic knowledge and understanding of science, mathematics and engineering within the industrial field, as well as knowledge and understanding of Mechanics, Solid and Structural Mechanics, Thermal Engineering, Fluid Mechanics, Production Systems, Electronics and Automation, Industrial Organisation and Electrical Engineering.
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

By the end of this subject, students will be able to have:
1. knowledge and understanding of the scientific and mathematical principles underlying the branch of industrial engineering;
2. awareness of the wider multidisciplinary context of engineering, applying knowledge of mathematics, statistics, economics and other scientific fields to the analysis of business situations.
3. the ability to apply their knowledge and understanding to analyse engineering products, processes and methods;
4. an understanding of methodologies, and an ability to use them in the analysis of business situations;
5. the ability to select and use appropriate methods in the management of the companies;
6. an awareness of the non-technical implications of engineering practice within the management of the companies;
7. function effectively as an individual and as a member of a team;
8. demonstrate awareness of the health, safety and legal issues and responsibilities of engineering practice, the impact of engineering solutions in a societal and environmental context, and commit to

professional ethics, responsibilities and norms of engineering practice;
9. demonstrate an awareness of project management and business practices, such as risk and change management, and understand their limitations.

DESCRIPTION OF CONTENTS: PROGRAMME

1. The Firm: management and organization
1.1. Concept and nature of the firm. The entrepreneur and the firm
1.2. The management function. Business functions
1.3. Types of companies and legal forms
1.4. Corporate governance
1.5. The role of engineering and engineers in Business Administration

2. Strategic analysis and value creation
2.1. Strategic analysis. Objectives and strategies of the firm
2.2. Analysis of the business environment, competition and externalities
2.3. Firm¿s internal analysis and value chain
2.4. Value creation. Competitive strategy and business models

3. Financial management: firm´s economic-financial analysis
3.1. Accounting and financial statements
3.2. Accounting principles. Auditing
3.3. Preparation of the financial statements
3.4. Analysis of economic and financial performance

4. Financial management: investment and financing
4.1. Investment decisions
4.2. Time value of money
4.3. Evaluation of investment projects
4.4. Financing decisions. Internal and external sources of financing

5. Marketing and sales management
5.1. The marketing Plan
5.2. Segmentation and positioning
5.3. Sales objectives. Demand estimation
5.4. Marketing-mix decisions

6. People and team management
6.1. The management role. Leadership and motivation
6.2. People management
6.3. Projects and teams management

7. Innovation and business growth. Tech companies
7.1. Concept and types of innovation
7.2. Innovation Management. Strategies for the protection and exploitation of technology
7.3. Tech companies. Tech ecosystems

LEARNING ACTIVITIES AND METHODOLOGY

Lectures, exercises, practical sessions, cases and assignments to be carried out by the students and discussed during the sessions, readings assigned by the instructor or identified by the students.

ASSESSMENT SYSTEM

60% Final written exam.
40 % Continuous evaluation. Partial exams will be held, approximately in the tentative weeks indicated in the schedule. Optionally, complementary evaluation system. May apply sampling based grading.

Minimimum grade required in the final exam: 4

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

BASIC BIBLIOGRAPHY

- Navas López, J.E. y Guerras Martín, L.A. Fundamentals of strategic management. , Thomson. , 2018

- Professor Professor materials, Aula Global UC3M, 2022

ADDITIONAL BIBLIOGRAPHY

- B Erasmus, S Rudansky-Kloppers, J Strydom, JA Badenhorst-Weiss, y otros (eds.). Introduction to Business Management., Oxford University Press. , 2019
- Professor Professor materials, Aula Global UC3M, 2022
- Richard A. Brealey, Stewart C. Myers y Alan J. Marcus Fundamental of Corporate Finances, McGraw-Hill, 2007
- Schilling, M. Strategic Management of Technological Innovation,, McGraw Hill, 2017

BASIC ELECTRONIC RESOURCES

- Navas López, J.E. y Guerras Martín, L.A. (2018) . Fundamentals of strategic management.: https://bibliotecas.uc3m.es/permalink/f/63b8kq/34UC3M_ALMA51302368630004213
- Profesores · Aula Global . Profesor materiales: http://aulaglobal.uc3m.es