Thermal engines

Academic Year: (2023 / 2024) **Review date: 10-05-2023**

Department assigned to the subject: Thermal and Fluids Engineering Department

Coordinating teacher: CANO PLEITE, EDUARDO

Type: Electives ECTS Credits : 6.0

Year : Semester : 2

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.
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
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.

OBJECTIVES

Skills:
- Thermal engine processes and relation to polutants emissions, design parameters
- Thermal turbomachinery design

Learning results:
- Internal combustion thermal engines components, processes, trends
- Engine use, technical information management.

DESCRIPTION OF CONTENTS: PROGRAMME

Reciprocicating engines: processes and polutants generation and control
Gas turbines: engine design
Thermal engines future trends

ASSESSMENT SYSTEM

Partial exam: around 30 % depending on teaching hours involved
Final exam: around 15 % depending on teaching hours involved
Lab sessions/deliverables: 55 %

% end-of-term-examination:	45
% of continuous assessment (assigments, laboratory, practicals…):	55

BASIC BIBLIOGRAPHY

- D.G. Wilson, T. Korakianitis The design of high-efficiency turbomachinery and gas turbines, MIT press, 2014
- F. Payri y J.M. Desantes Motores de Combustión Interna Alternativos, Universidad Politécnica de Valencia, 2011
- H.I.H. Saravanamuttoo, G.F.C. Rogers, H. Cohen, P.V. Straznicky, A.C. Nix Gas turbine theory, Pearson, 2017
- J.B. Heywood Internal Combustion Engines, McGraw Hill, 2018
- M.J. Moran & H.N. Shapiro Fundamentos de Termodinámica Técnica, Wiley, 2010