SUBJECT TEACHING GUIDE

G1090 - Steam and Gas Turbines II

Degree in Marine Engineering

Academic year 2026-2027

1. IDENTIFYING DATA					
Degree	Degree in Marine Engineering			Type and Year	Compulsory. Year 3
Faculty	School of Maritime Engineering				
Discipline	Topic				
Course unit title and code	G1090 - Steam and Gas Turbines II				
Number of ECTS credits allocated	6	Term		Semester based (2)	
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. CIENCIAS Y TECNICAS DE LA NAVEGACION Y DE LA CONSTRUCCION NAVAL
Name of lecturer	SERGIO GARCIA GOMEZ
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Office	E.T.S. de Náutica. Planta: + 2. DESPACHO (210)
Other lecturers	

3.1 LEARNING OUTCOMES
- Knowing solve the main, auxiliary and propulsion systems and ship refrigeration and air conditioning Legislation
- Knowing solve problems fluidomecánicas systems and machines. in internal combustion engines, in steam turbines. in gas turbines. in steam generators, heat transfer, regulation and control machinery and marine systems. in electric propulsion systems. power electronics. in the calculation, selection, installation and maintenance of marine propellers and knowledge of classification societies and know how to solve problems inspection
- Operate the main and auxiliary machinery and the corresponding control systems.
- Management of the operation of the machinery of the Propulsion installation.
- Plan and schedule operations.

4. OBJECTIVES
Capacity for the management, operation, and exploitation of facilities in the field of Marine Technologies, which are intended for the renovation, repair, maintenance, installation, assembly, or operation of: energy installations, electrical and electronic installations, mechanical equipment, and automation processes of ships.
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6. SUBJECT PROGRAM	
CONTENTS	
1	Main propulsion and auxiliary systems of the ship.
2	Analysis of Losses in Marine Machinery. Introduction. Internal Losses. External Losses. Efficiency and Power of Multiple TMTs. Thermal Balance and Heat Losses in 2-Stroke and 4-Stroke Engines.
3	Thermal turbomachinery: Introduction. Materials used. Blades. Rotors. Diaphragms. Bodies. Bearings. Seals. Labyrinth seals/packings. Combustion chambers. Injectors. Marine turbines.
4	Engine Blocks and Organization Marine Engines. Introduction. Materials used. Pistons. Cylinder liners. Main bearings. Bearings. Lubrication. Combustion chambers. Injectors. 2-stroke and 4-stroke engines. Marine engines.
5	Transformation of mechanical and fluid energy in the moving blade rings (Impeller). Introduction. Velocity triangles. Fundamental equation of turbomachinery. Second form of the Euler equation. Third form of the Euler equation. Study of action and reaction blades.
6	Energy determination and utilization. Rankine cycle improvements. Brayton cycle improvements. Diesel cycle improvements. Systems used, constituent elements.
7	Condensers/Heat Exchangers of Marine Machinery. Calculation of Heat Exchange Surface Area. Control of Biofouling Growth. Biofouling Removal.
8	Combined Cycles. Introduction. Thermodynamic principles. Components. Efficiency of a combined cycle. Combined cycle design. COGAS/COGES naval systems.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Description Theory and exercises exam	Written exam	No	Yes	60,00
Description Classroom Practices	Others	Yes	Yes	20,00
Description Group work	Laboratory evaluation	Yes	No	20,00
TOTAL				100,00

Observations

Continuous assessment through partial exams requires a minimum attendance of 80% of the in-person hours for each part of the course (theory, classroom sessions, and laboratory sessions). Students must be actively engaged and attentive throughout the class; the use of mobile phones is expressly prohibited.

Students who do not choose the continuous assessment option, or who have not met the minimum attendance requirement for continuous assessment, will be assessed on their knowledge acquired throughout the course in the regular exam session.

- JANUARY SESSION:
1. Written Assessment (60%)
1st Partial Exam: Problems and Theory - topics and date to be arranged.
2nd Partial Exam: Problems and Theory - topics and date to be arranged.
Recoverable in the final exam.
Final Exam: Covering the material not passed in the partial exams, on the date set in the exam schedule approved by the Faculty Board. Passing the theory/problems section is a prerequisite for the remaining parts of the course to be included in the final grade.

2. Assessment of Assignments (20%)
Solving and submitting assigned problems (in person at the beginning of class / any exceptions must be justified and agreed upon with the professor): 20%
Classroom practicals can be retaken in the final exam.
Final Exam: for those students who do not pass the final exam, on the date set in the exam schedule approved by the Faculty Board.
Passing the classroom practicals section is a prerequisite for the remaining parts of the course to be included in the final grade.

3. Practical Assessment (20%)
Minimum attendance of 80% of the practical hours is mandatory. Positive evaluation of the practical report and the assigned group work. Not retaken in the final exam.

- FEBRUARY EXTRAORDINARY SESSION: Exam covering the entire course syllabus on the date set in the exam schedule approved by the Faculty Board. Partial grades and classroom practice grades are not saved for this exam session.

Observations for part-time students

Students who are enrolled part-time will not be able to perform the continuous assessment and will present the final exam, enough to obtain a maximum grade of 8.

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
- Kostyuk A. &Frolov V. Steam and Gas Turbines. MIR, Moscú. 1988.
- Mataix C. Turbomáquinas Térmicas: Turbinas de Vapor, Turbinas de Gas y Turbocompresores. Editorial Dossat 2000. 3ª Edición. Madrid. 2000.
- Schegliaev A.V. Turbinas de Vapor. Editorial Mir. Moscú. 1985.
- Troyanovsky B.M., Filippov G.A., Bulkin A.E. Turbinas de Vapor y de Gas de las Centrales Nucleoeléctricas . MIR, Moscú. 1987.
- Pérez del Rio J. Tratado General de Máquinas Marinas. Máquinas de Vapor. Editorial Planeta. Volumen VII. Madrid. 1972.
- Mattingly J.D. Elements of propulsión. Gas turbines and Rockets. American Institute of Aeronautic and Astronautics. 2006.