<table>
<thead>
<tr>
<th>Course Title</th>
<th>Ship machinery and systems</th>
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<tbody>
<tr>
<td>Course Code</td>
<td>MAEN502</td>
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<tr>
<td>Course Type</td>
<td>Required</td>
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<tr>
<td>Level</td>
<td>Master's Level</td>
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<tr>
<td>Year / Semester</td>
<td>1 / 1</td>
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<tr>
<td>Teacher's Name</td>
<td>Dr. Charalambos Chasos, C/Eng. Rod Beams, Dr. Antonios Lontos, Dr. Marios Mastrokalos</td>
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<tr>
<td>ECTS</td>
<td>9</td>
</tr>
<tr>
<td>Lectures / week</td>
<td>3</td>
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<tr>
<td>Laboratories / week</td>
<td>0</td>
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<tr>
<td>Course Purpose and Objectives</td>
<td>The aim of this course is to provide special engineering knowledge of common traditional and alternative fuels systems and machinery, focused on their structural analysis, categorization, relation and discrimination.</td>
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<td>Learning Outcomes</td>
<td>By the end of the course students will be able to:</td>
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<td>• Categorize and compare ship engines and marine auxiliary machines, analyzing their construction, use and maintenance procedures.</td>
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<td>• Design and construct procedures plan, analyzing the ship machinery and systems maintenance demands (traditional and alternative), based on International Maritime Regulations.</td>
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<td>Prerequisites</td>
<td>MAEN500 pass, only for those not holding a degree in marine related fields (no background in shipping). Required</td>
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<td>Course Content</td>
<td>• Ship engines. Safe preparation and shutdown of main propulsion and auxiliary engines. Starting, stopping and control of main propulsion and auxiliary engines. Procedures for emergency situations activities required to maintain operation of main propulsion and auxiliary machinery and associated systems.</td>
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<td>• Mechanical Power Transmission. Transmission system clutches and main reduction gearboxes. Transmission, types and applications. Control of temperatures, pressures, viscosity associated with main propulsion and auxiliary machinery.</td>
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<td>• Noise and vibration analysis, noise &amp; vibration sources, low-noise design, global and local vibration prediction and measurements, problems including: singing propeller, propeller vibration problems, noise control in engine rooms, accommodation sound insulation and others</td>
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<td>• LNG fueled ships and dual fuel technology, special considerations regarding marine engines, safety, storage, fueling, regulatory framework (IMO pollution prevention treaty)</td>
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<td></td>
<td>• Renewable sources for ship propulsion, solar and wind energy,</td>
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<td>Teaching Methodology</td>
<td>The course will be delivered through lectures, discussions, and presentations augmented by consultations with staff during office hours, home and library study.</td>
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| Educational activities encourage the active participation of students in the learning process | During the course attending, the students will be encouraged to construct and present written semester assignments concerning aspects like:  
• analysis, design and comparison of real ship machinery and systems for different ship types, assessing their affecting technical parameters  
• design and construct procedures plan, analyzing the ship machinery and systems maintenance demands (traditional and alternative), based on International Maritime Regulations |
| Recommended software packages | The educational activities and the laboratory exercises could be conducted using the software:  
• AutoCAD and Solidworks for mechanical component and systems designs  
• Labview and Matlab for gathering and assessing the affecting technical parameters of the ship’s machinery and systems performance, during related experiments |
| Recommended laboratory exercises/tests that students could attend in FU laboratories and/or in collaborating ship companies | Parallel with the course attending, the students will be recommended to attend seminars, educational visits to the ship’s engine room and experiments conducted in the FU Mechanical Engineering Department laboratories, co-organized by the FU and the collaborating ship company, concerning aspects like:  
• technical parameters affecting the ship’s engine performance  
• technical parameters affecting the ship’s power transmission and steering systems performance  
• technical parameters affecting the ship’s auxiliary machinery systems performance |
| Recommended synergies between teaching and research that could provide the students engagement in research activities | The students will be encouraged to create and present papers in marine focused conferences, based on their semester assignments, in order to produce the base of their MSc Dissertation, concerning aspects like:  
• comparing the factors affecting the ship’s machinery and systems performance  
• evaluating ship’s maintenance procedures plans, concerning traditional and alternative ship machinery and systems. |
| Bibliography | **Textbooks:**  
• Prof. Detlef Stolten, Dr. Remzi C. Samsun, Dr. Nancy Garland, (2016) Fuel Cells : Data, Facts and Figures, Wiley  
• Marco Giuffrida, (2016), Electrical Plants and Electric Propulsion on Ships  
• Veritek (1985), Vibration Control in Ships, Veritek |
Other Reading:

Journals:
- IMechE Journal of Engineering for the Maritime Environment (JEME)
- IMarEST Journal of Marine Engineering and Technology (JMET)
- Journal of Marine Science and Technology
- Ocean Engineering
- SNAME and RINA journals
- Marine Structures, Elsevier
- Canadian Shipping and Marine Engineering, ProQuest
- International Journal of Marine Science; Richmond
- Journal of Marine Research; New Haven
- Marine Technology Society Journal; Washington
- Maritime Studies; Canberra
- Naval Engineers Journal. Wiley

Assessment
- Final Exam: 60%
- Course Work/Assignment: 40%

Language
- English
Course Title: Ship machinery and systems
Course Code: ΜΑΕ502
Course Type: Required
Level: Master's Level
Year / Semester: 1/1
Teacher’s Name: Dr. Charalambos Chasos, C/Eng.
ECTS: 5

Course Purpose and Objectives:
The aim of this course is to provide special engineering knowledge of common traditional and alternative fuels systems and machinery, focused on their structural analysis, categorization, relation and discrimination. By the end of the course students will be able to: • Categorize and compare ship engines and marine auxiliary machines, analyzing their construction, use and maintenance procedures. The course requires satisfactory completion of 100 credit points from subjects available in the Melbourne Law Masters. Students who have a law degree that is not from a common law jurisdiction are required to complete Fundamentals of the Common Law. Students may take up to 25 credit points online from the Global Competition and Consumer Law program. Note: Most subjects in the MLM program are 12.5 credit points each. Check individual subject handbook entries for confirmation.

Minor Thesis Option:
The Master of Laws includes a Minor Thesis option. To undertake this option students complete 50 cr This master's course includes a pre-master's year before your master's to develop your study skills, subject knowledge and academic language level. You will only need to make one application and you can apply for one visa to cover the whole two years of study. This course will be suitable for you if: you wish to take a master's in a subject that is different from your undergraduate degree. you wish to improve your study skills and academic language level before starting your master's course. you want to better understand the academic demands for studying at master's level.