1. GENERAL INFORMATION				
1.1. Course teacher	Assistant professor Luka Perković, PhD		1.6. Year of the study	II.
1.2. Name of the course	Energy conversion		1.7. ECTS credits	4
1.3. Associate teachers	Teaching assistent Amalia Lekić Brettschneider, MSc		1.8. Type of instruction (number of hours L + E + S + e-learning)	30L+20E+0S+10e-learning
1.4. Study programme (undergraduate, graduate, integrated)	graduate		1.9. Expected enrolment in the course	15
1.5. Status of the course	☐ mandatory	☒ elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	level 3, 16,67% online
2. COUSE DESCRIPTION				
2.1. Course objectives	The course Energy conversion is set in graduate study as a part of an elective module, and it's goal is to learn students how to make energy and mass balance of different energy conversions found in Today's energy systems. The course is also oriented to finding the most effective solution to a given problem of energy supply, usually constrained by physical, environmental or cost limits. The special emphasis is given to the energy storage as integral part of present and future energy systems.			
2.2. Enrolment requirements and/or entry competences required for the course				
2.3. Learning outcomes at the level of the programme to which the course contributes	Independently solve complex engineering problems in petroleum engineering and geoenergy engineering; Appraise the process and a facility's efficiency in petroleum engineering and geoenergy engineering; Assess the environmental impact of petroleum engineering and geoenergy engineering; Plan the methods and procedures for avoiding or minimizing environmental impact of petroleum engineering and geoenergy engineering activities; Supervise projects in petroleum engineering and geoenergy engineering.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Understand the difference between primary, transformed, and final forms of energy and the relationships between them; Analyse the mass-energy balance of the most common energy conversion systems; Understand the role of energy storage for the needs of balancing energy systems; Make an exergy analysis of the energy system; Analyse final consumption by sectors; Analyse the role of natural gas in energy systems flexibility; Create a mathematical model of optimization for a problem in the field of energy transformations.			

This document was prepared in the framework of the project InterRGN – Internationalization of the Faculty of Mining, Geology and Petroleum Engineering, funded by the European Union from the European Social Fund. The content of this document is the sole responsibility of the University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering.

<table>
<tr><td>2.5. Course content (syllabus)</td><td colspan="10">Provide basic and professional knowledge in the field of energy transformations in obtaining useful work / power with emphasis on thermohydraulic plants; Analyse mass, energy, and emission balance of all major energy conversion plants. Introducing students to exergy analysis of energy conversion on different examples (thermal power plant, exchanger network / central heating system, wind power plant, transport) and the importance of high and low-temperature energy in exergy analysis; Introducing students to the methods of optimizing economically viable energy consumption. Introducing students to the basics of energy systems planning.</td></tr>
<tr><td>2.6. Format of instruction:</td><td colspan="5">☒ lectures
☐ seminars and workshops
☒ exercises
☐ online in entirety
☒ partial e-learning
☐ field work</td><td colspan="4">☒ independent assignments
☒ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>2.7. Comments:</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="10">Regular class attendance and active participation in lectures and exercises, seminar paper, oral exam.</td></tr>
<tr><td rowspan="5">2.9. Monitoring student work</td><td>Class attendance</td><td>YES</td><td></td><td>Research</td><td>YES</td><td></td><td>Oral exam</td><td>YES</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>NO</td><td>Report</td><td></td><td>NO</td><td></td><td></td><td></td></tr>
<tr><td>Essay</td><td></td><td>NO</td><td>Seminar paper</td><td>YES</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Preliminary exam</td><td></td><td>NO</td><td>Practical work</td><td></td><td>NO</td><td></td><td></td><td></td></tr>
<tr><td>Project</td><td></td><td>NO</td><td>Written exam</td><td></td><td>NO</td><td>ECTS credits (total)</td><td colspan="2">4</td></tr>
<tr><td rowspan="4">2.10. Required literature (available in the library and/or via other media)</td><td colspan="6">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="6">EnergyPLAN Documentation (November 2018 - online)</td><td>NO</td><td>YES</td></tr>
<tr><td colspan="6">Perković, L.: Energy conversion, script</td><td>NO</td><td>YES</td></tr>
<tr><td colspan="6">Perković, L.: Solving practical problems in energy planning, script</td><td>NO</td><td>YES</td></tr>
<tr><td>2.11. Optional literature</td><td colspan="10"></td></tr>
<tr><td>2.12. Other (as the proposer wishes to add)</td><td colspan="10"></td></tr>
</table>

This document was prepared in the framework of the project InterRGN – Internationalization of the Faculty of Mining, Geology and Petroleum Engineering, funded by the European Union from the European Social Fund. The content of this document is the sole responsibility of the University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering.