

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Engines and Power Plants of High Output</b>		Code <b>1010621261010620268</b>
Field of study <b>Mechanical Engineering</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>3 / 6</b>
Elective path/specialty <b>Internal Combustion Engines</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>1</b> Classes: <b>1</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>		No. of credits <b>1</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>technical sciences</b>		ECTS distribution (number and %) <b>1 100%</b>
<b>Responsible for subject / lecturer:</b>  DSc. DEng. Jarosław Markowski email: jaroslaw.markowski@put.poznan.pl tel. 61 647 59 92 Faculty of Machines and Transport Piotrowo 3 street, 60-965 Poznan		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Has a basic knowledge of the structure and rules of operation of internal combustion engines, especially high power.
2	<b>Skills</b>	Has the ability to acquire information from diagrams, sketches and drawings related thematically with internal combustion engines.
3	<b>Social competencies</b>	Has the ability to acquire information from diagrams, sketches and drawings related thematically with internal combustion engines.
<b>Assumptions and objectives of the course:</b> Provide basic information about the present and future marine propulsion systems and high-power engines. Acquainted with the construction of the power stations and high power internal combustion engines. Indications correlation between the construction of the power station and the internal combustion engine, and their impact on the environment.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Has a basic knowledge of control systems and automation of high-power engines - [K1A_W17] 2. Has knowledge about the development trends prevailing in the construction of the power stations and high power piston engines. - [K1A_W18] 3. Is able to assess the impact of selected types of power plants and high-power engines on the environment - [K1A_W20] 4. Has a basic knowledge about the structure and rules of traditional and nuclear power plants and high-power engines operation. - [K1A_W24] 5. - [-]		
<b>Skills:</b>		
1. Is able to obtain information from the literature, analyze collected data and draw conclusions about the structure of the marine power plants and high-power engines - [K1A_U03] 2. Is able, on the basis of technical documentation, to identify structural characteristics of high-power engine, to assess its structure and discuss them. - [K1A_U05] 3. Is able to advise on the selection of high-power engine to accomplish a specific task - [K1A_U25]		
<b>Social competencies:</b>		
1. Understands the need to supplement the knowledge of the entire professional life. - [K1A_K01] 2. Is aware of and understands the importance of the impact of the effects of marine power plants and high power engines operation on the human environment. - [K1A_K02]		

<b>Assessment methods of study outcomes</b>		
The discussion during the class, using visual materials, on topics related to the construction and operation of marine engines and power plants The written examination.		
<b>Course description</b>		
Power plants with steam turbines. Nuclear and combustion power plants. Construction and principle of operation of combustion engines of high power (ship). The design of marine engine components (foundations, racks, cylinder liners, pistons, crosshead, crank shafts, heads and injectors). Functional systems of marine engines (cooling, lubrication, fuel, starter). Remote control systems and automatic control. General principles for selection of the type of power plant and engine. Cooperation engines with high power receivers of energy. Economic and ecological effects of selected types of power plant. Development trends in the construction of the power plant and high power engines.		
<b>Basic bibliography:</b>		
<ol style="list-style-type: none"> <li>1. Piotrowski I., Okrętowe silniki spalinowe. Wydawnictwo Morskie, Gdańsk 1983.</li> <li>2. Włodarski J.K., Okrętowe silniki spalinowe. WSM, Gdynia 1995.</li> <li>3. Jayant Baliga B., Modern Power Devices. New York 1987.</li> <li>4. Pounder C.C., Marine diesel engines. Newness-Butterworths, London 1984.</li> </ol>		
<b>Additional bibliography:</b>		
1. Materiały informacyjne firm produkujących silniki dużej mocy.		
<b>Result of average student's workload</b>		
<b>Activity</b>	<b>Time (working hours)</b>	
1. Preparation for lectures	3	
2. Participation in lectures	15	
3. Learning of lectures content	3	
4. Office hours of labour	7	
5. Labour	15	
6. Participation in exam	3	
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	46	1
Contact hours	31	1
Practical activities	15	0