

FACULTY:	Department of Mechanical Engineering
FIELD OF STUDY:	Mechanics and Machine Building
ERASMUS COORDINATOR OF THE FACULTY:	Dr hab. inż. Agnieszka Kułakowska, Prof. PK
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COURSE TITLE:	Technical thermodynamics and fluid mechanics II
LECTURER'S NAME:	Dr. hab. Inż. Małgorzata Sikora, Prof PK
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COURSE CODE (USOS):	3S
ECTS POINTS FOR THE COURSE:	4 ECTS
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30 + 30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Lecture + laboratory
LANGUAGE OF INSTRUCTION:	English
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Written exam + written reports
COURSE CONTENT:	<p>Fluid properties (<i>density, viscosity, surface tension, methods of measurements</i>); pressure and its measurements (<i>Pascal's law, hydrostatic pressure</i>); fluid kinematics (<i>velocity and acceleration, Lagrange and Euler methods of analysis, volumetric flow rate, mass flow rate, conservation of mass, steady-state flow, continuity equation</i>); fluid dynamics (<i>flow regimes, laminar flow, turbulent flow, flow velocity profiles, average velocity, Reynolds number, equation of motion, Bernoulli equation, energy conversions in fluid systems, application of Bernoulli's equation</i>); flow through pipes (<i>pressure drop, friction factor and its measurements, Darcy's equation</i>).</p> <ol style="list-style-type: none"> <li>1. General principles of thermal metrology</li> <li>2. Temperature measurements (expansion thermometer, thermocouple)</li> <li>3. Temperature measurements (resistance thermometer, optical thermometer)</li> <li>4. Pressure measurements</li> <li>5. Measurement of humidity</li> <li>6. Measurement of viscosity</li> <li>7. Measurement of the local fluid velocity</li> <li>8. Flow measurement - classical methods</li> <li>9. Flow measurement - modern methods</li> <li>10. Reynolds experiment – flow motion</li> <li>11. Linear pressure losses in pipelines</li> <li>12. Local pressure losses in pipelines</li> <li>13. The characteristics of a fan</li> <li>14. The characteristics of a pump</li> <li>15. Final assessment</li> </ol>
ADDITIONAL INFORMATION:	

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