

## Syllabus

### Course description

<b>Course title</b>	<b>Advanced Production Technologies for Manufacturing and Energy Engineering</b>
<b>Course code</b>	47576
<b>Scientific sector</b>	ING-IND/16
<b>Degree</b>	Master Energy Engineering
<b>Semester</b>	I
<b>Year</b>	2
<b>Academic year</b>	2023/24
<b>Credits</b>	5
<b>Modular</b>	Yes
<b>Total lecturing hours</b>	36
<b>Total lab hours</b>	0
<b>Total exercise hours</b>	24
<b>Attendance</b>	Strongly recommended
<b>Prerequisites</b>	Module 1: students should be familiar with the basic knowledge of mathematical analysis.
<b>Course page</b>	<a href="https://www.unibz.it/courses/47576">Course Offering / Free University of Bozen-Bolzano (unibz.it)</a>

<b>Module 2</b>	<b>Technologies and Production Processes for Energy Engineering</b>
<b>Lecturer</b>	<b><i>Dr. Gabriele Pasetti Monizza</i></b> Faculty of Engineering Mail:
<b>Scientific sector of the lecturer</b>	Ing-Ind/16 Manufacturing Technology and Systems
<b>Teaching language</b>	English
<b>Office hours</b>	By appointment
<b>Teaching assistant (if any)</b>	-
<b>Office hours</b>	18
<b>List of topics covered</b>	Basic knowledge about the main features of power generation, storage, and distribution plants. Examination of the production processes (both conventional and advanced) used to yield components and assemblies in the energy engineering field, including: a) gas power generation plants; b) solar power plants; c) eolic plants; d) tanks and pressure containers for energy storage; e) tube and piping for energy distribution; f) electric energy distribution.

<b>Teaching format</b>	<p>The course is based on hours of frontal lectures and hours dedicated to classroom and/or laboratory activities.</p> <p>The topics of the course are reported in the lecture notes provided by the professor, as well as in the textbooks of the bibliography. After each lecture, the corresponding pdf presentation will be posted in the Reserve Collection database.</p> <p>The professor can also provide additional material (e.g., research papers).</p> <p>The professor can be contacted by students for questions and clarifications by appointment.</p>
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<b>Learning outcomes</b>	<p><b>Knowledge and understanding:</b></p> <p>Students will</p> <ol style="list-style-type: none"> <li>1. acquire a knowledge about some important production processes used for the fabrication of the main mechanical assemblies and components in the energy industry;</li> <li>2. be able to identify the advantages and limitations of these industrial production processes;</li> <li>3. acquire a basic knowledge of a production process</li> </ol> <p><b>Applying Knowledge and understanding:</b></p> <ol style="list-style-type: none"> <li>4. Students will be able to select some manufacturing processes to be used in the energy industry.</li> <li>5. Students will have the ability to apply their knowledge to identify which are the main systems and issues of a production process.</li> <li>6. The exercises in the classroom, progress tests, conversations with the teacher, and the performance of specific tasks would allow to assess and evaluate the students ability to apply his knowledge and understanding of the topics covered during the course.</li> </ol> <p><b>Making judgments:</b></p> <p>Students will acquire an autonomy of judgment that will allow him</p> <ol style="list-style-type: none"> <li>7. to select proper manufacturing processes for the fabrication of some mechanical assemblies and components in the energy engineering field;</li> <li>8. to examine objectively the results obtained from analytical processing, numerical simulations or experimental laboratory tests;</li> <li>9. to make use of technical and scientific literature.</li> </ol> <p><b>Communication skills:</b></p> <ol style="list-style-type: none"> <li>10. Students will have the ability to structure and prepare scientific and technical documentations inherent to the selection of some manufacturing processes used in the energy engineering field;</li> <li>11. students will have the ability to present, communicate, discuss and argue the topics covered in the</li> </ol>
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	<p>course.</p> <p><b>Learning skills:</b></p> <p>12. The students will develop learning skills through the individual study of the topics dealt in the lecturing and exercise hours. In addition, the analysis of different problems relative to the fabrication of mechanical components for the energy engineering field will also be addressed by group discussions.</p> <p>13. The students will have the opportunity to extent the knowledge of the topics of the course by consulting scientific literature, specialized texts, technical standards and international standards that the professor will provide during the course.</p>
<b>Assessment</b>	<p><i>Formative assessment</i></p> <p>In class discussion about the topics covered during the course (ILOS assessed 1,2,3,6,12).</p> <p><i>Summative assessment</i></p> <p>The assessment of the course is:</p> <ul style="list-style-type: none"> <li>• Oral exam (ILOS assessed 4,5,7,8,11)</li> </ul> <p>The oral exam consists in 2 or 3 open-end questions to assess the knowledge and understanding of the topics of the course and the ability of the student to present, communicate, discuss and argue the basics of industrial plant systems and of some industrial processes used in energy industry.</p> <p>Moreover, the student will should reflect on the characteristics of a production process and its limitations in terms of product quality, cost and so forth.</p>
<b>Assessment language</b>	English
<b>Evaluation criteria and criteria for awarding marks</b>	<p>The evaluation criterion of the oral exam is based on the knowledge of the topics of the course, the clarity of the response and the properties of language of the student (in relation to the language of the course), the pertinence and the relevance of the response, and the autonomy of judgment.</p> <p><b>Final Mark of the Course "Applied Mechanics and Technologies for energy Efficiency"</b></p> <p>Mathematical average of the marks obtained in the Module 1 and 2.</p>
<b>Required readings</b>	<p>There is no single textbook that covers the entire course. A collection of suggested readings from various sources will be announced during the course.</p>
<b>Supplementary readings</b>	<p>Additional textbooks, lecture notes, research papers and readings may be provided by the professor.</p>

