



<b>Course</b>	<b>Inventive Product Design and Advanced TRIZ: from problem solving to product-service system innovation, 3 ECTS credits</b>
<b>Year and period</b>	M.Sc. 1-2, 24 – 28.7.2017
<b>Teacher(s)</b>	Visiting lecturer, NN
<b>Person(s) in Charge</b>	Prof. Leonid Chechurin, LUT
<b>Additional Information</b>	The course topics are related to sustainable development.
<b>Aims</b>	<p>The aim of the course is to introduce the students to the wide range of existing Design Methods with a focus on Design Creativity and Innovation.</p> <p>The participants will gain both theoretical competences and practical skills, from the descriptive models for analysing Design processes and behaviours, to the prescriptive tools that provide a structured and multi-disciplinary approach to design.</p> <p>The course will also allow experiencing the application of exemplary Design tools within a collaborative design contest.</p>
<b>Content</b>	<p>Overall, lectures, tutorials and team-working sessions will develop a comprehensive overview of the aims and scopes of Design Methods, providing the students with theoretical and practical aspects on:</p> <ul style="list-style-type: none"><li>- a general framework of design for innovation;</li><li>- the main classification schemes of Design approaches;</li><li>- cognitive studies on designing;</li><li>- design creativity and its influential factors;</li><li>- current and future challenges of Design Methods;</li><li>- how to build an exhaustive design specification;</li><li>- how to stimulate idea generation;</li><li>- how to select the most suitable design concept among several ones.</li></ul> <p>The course is proposed to be suitable also for doctoral studies.</p>
<b>Modes of Study</b>	<ul style="list-style-type: none"><li>- Introductory lectures and exercises 24 hours</li><li>- Team work and a limited project work 20 hours</li></ul>

	<ul style="list-style-type: none"> <li>- Presentations of the results of the team work/ project work 8 hours</li> <li>- Independent work, reading 26 hours</li> </ul> <p>Total workload 78 hours</p> <p>The course will consist of lectures, tutorials and team-working sessions:</p> <ul style="list-style-type: none"> <li>- The lectures, typically scheduled in the morning sessions, will develop a general framework of methods enhancing design creativity, their purposes and key characteristics; different points of views and approaches will provide all the fundamentals and criteria to orient the students for assimilating a structured approach to design according to their personal attitude and expectations.</li> <li>- Tutorials will propose practical examples of specific tools and techniques suitable to guide the main design phases of analysis, synthesis, and choice. More in details, the tutorials will focus on the analysis of product and service requirements for a proper organization of the design tasks; on the generation of conceptual solutions with the support of inventive heuristics; on the assessment of the proposed concepts and the choice of the preferred solution.</li> <li>- The afternoon sessions will be dedicated to team working activity on a practical design task, so as to enable the students to work on a product-service system project: the teams will be involved in a multi-disciplinary design contest, where students will experience the complex dynamics of concurrent engineering. An ex-post plenary session will wrap up the main lessons learned within the team working activity, highlighting how the proposed design tools should or should not be used.</li> </ul>
<p><b>Evaluation</b></p>	<p>Final grade 0-5:</p> <ul style="list-style-type: none"> <li>- Attendance 20%</li> <li>- Active Participation to team working activities 30%</li> <li>- Presentation of project outcomes (assignment) 50%</li> </ul>
<p><b>Study Materials</b></p>	<p>Hand outs of lecture notes, internet resources in open access (given); selection of papers (given).</p>
<p><b>Prerequisites</b></p>	<p>Preferably, students of engineering major with Bachelor's degree or M. Sc. in non-technical studies. Basic definitions and tools of inventive thinking are needed (TRIZ).</p>