

<b>Course</b>	<b>Systematic Creativity – TRIZ Basics, 3 ECTS credits</b>
<b>Year and period</b>	M.Sc. 1–2, 29 July–2 August 2019
<b>Teacher(s)</b>	Visiting lecturer
<b>Person(s) in Charge</b>	Leonid Chechurin, LUT University
<b>Aims</b>	<p>After having completed the course, student should be able to:</p> <ul style="list-style-type: none"> <li>- recognise the role, place and institutions of invention in innovation process/business,</li> <li>- recognise the trends of technology/technical system evolution,</li> <li>- model a problem situation as a contradiction and apply standard methods of their resolving. Model a problem situation as Su-Field triple and apply standard SuField transformations,</li> <li>- formulate the model of inventive (to be) solution,</li> <li>- organise effective search/adaptation of the inventive solution.</li> </ul>
<b>Content</b>	<p>Introduction: creativity, invention, innovation. Creativity obstacles and supporters. Place of creativity in modern economy. Invention and Innovation. Basic institutions of invention: know-how, patent, public good (paper). Thinking inertia and other invention killers. Tools for creativity support and place of TRIZ among them. Genrich Altshuller and the history of TRIZ.</p> <p>Part 1. Trends of Engineering System Evolution (TESE)        Altshuller's finding: evolution patters engineering systems. S-curve evolution trend, Trend of ideality increase, Dynamisation, Functionality Increase, Transition to Macrollevel etc. Applications to technology intelligence and system design.</p> <p>Part 2. Ideal Final Result concept        Axiom of Ideality in TRIZ. Formulation, examples. Operation time, operation zone. 3 ways to reach IFR. Ideality and system reduction (trimming).</p> <p>Part 3. Contradiction analysis and elimination.        Invention as contradiction elimination. Engineering contradictions and elimination standards. Altshuller Matrix. Physical contradictions and elimination standards. Separation principles. Case studies and examples, Hands on.</p>

	<p>Part 4. SuFiled modeling and transformation Modeling of interactions in engineering system by subject-object-action triple. Substabce-Field. Standards for SuField model transformations. Case Studies, examples, Hands on.</p> <p>Part 5. Algorithm Algorithm of inventive problem analysis (simplified ARIZ). Case studies. Project presentation.</p> <p>Conclusion</p> <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>- Lectures and exercises 24 hours</li> <li>- Team work and a limited project work 20 hours</li> <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>
<b>Evaluation</b>	<p>Final grade 0-5:</p> <p>Attendance 30%</p> <p>Test 30%</p> <p>Assignment - report on project 40%</p>
<b>Study Materials</b>	<p>Hand outs of lecture notes, internet resources in open access.</p>
<b>Prerequisites</b>	<p>Preferably, students of engineering major or Bachelor's degree in non-technical studies.</p>