

ME59700 INNOVATION AND PROBLEM SOLVING

WITH AN EMPHASIS ON TRIZ TOOLS

<https://engineering.purdue.edu/ProEd/courses/innovation-problem-solving-emphasis-triz-tools>

School of Mechanical Engineering

Purdue University

Target Audience: You have hard problems that have eluded solution for months or even years. You want to be a problem solver, but haven't found a framework that takes you beyond mere concepts without quantification (many popular design theories or idea generation methods). You want to perform work that cannot be commoditized or automated or replaced by Artificial Intelligence. Your problem may be any of *product/service/organization/policy design or analysis*.

Course Material: Understanding the objective function, developing problem representation and system modeling based on the objective, developing your own solution approaches or adapting methods from a variety of disciplines integrated in a functional framework on <http://opensourcetriz.com/> to reduce problem complexity, solving simplified optimization problems with standard methods, designing experiments, implementation, market and IP strategy. You will have a full system analysis or concept design by the end of the course project.

Past Examples with papers hyperlinked: These range from [Residential waste heat recovery](#) to [Predicting the value of financial assets](#) to [Business model innovation](#) through [Efficient training in foreign languages](#), [Weed detection and remediation](#) to making science-fiction real—[constructing Dyson spheres](#). Given that Purdue will host TRIZCON 2019, you will have a shot at publishing your work and interacting with a worldwide community interested in problem solving. One student *won the Burton Morgan prize* with the competition entry developed via work on this course.

Instructor Biography: **Kartik B. Ariyur** (https://www.researchgate.net/profile/Kartik_Ariyur) teaches part time at Purdue University in the School of Mechanical Engineering, and is co-founder/CTO of the engineering consultancy firm SAMMS LLC (www.samms.us). He has authored over 60 peer reviewed publications, two books, and 17 US patents, and another 15 US patents pending. *The typical engineer or academic with many patents or publications usually has their work in a narrow, usually burgeoning specialty.* Kartik's patents and papers contain fundamental results across engineering disciplines (aerospace, civil, chemical, electrical, mechanical), besides the humanities and social sciences. For example, his health monitoring algorithms currently run on Honeywell APUs in service in commercial aircraft (around 70% of all commercial aircraft); his front-end filtering algorithms developed at Qualcomm reside in all CDMA chips in cell-phones. He is on the editorial boards of several prestigious journals and international conferences in controls, signal processing, robotics, intelligent systems, and differential equations.