

POLITEHNICA University of Bucharest (UPB)  
 Faculty of Engineering and Management of Technological Systems (IMST)  
 Study Programme: Industrial Engineering (IE)  
 Form of study: Master

## COURSE SPECIFICATION

<b>Course title:</b>	<b>CREATIVITY AND INTELLECTUAL PROPERTY</b>	<b>Semester:</b>	1
<b>Course code:</b>	UPB.06.M.1.O.03	<b>Credits (ECTS):</b>	7

<b>Course structure</b>	Lecture	Seminar	Laboratory	Project	Total hours
<i>Number of hours per week</i>	2	-	2	2	6
<i>Number of hours per semester</i>	28	-	28	28	84

<b>Lecturer</b>	Lecture	Seminar / Laboratory / Project
<i>Name, academic degree</i>	Assoc. Prof. PhD. Eng. Nicolae IONESCU	Assoc. Prof. PhD. Eng. Nicolae IONESCU
<i>Contact (email, location)</i>	ionescu_upb@yahoo.com	ionescu_upb@yahoo.com

### **Course description:**

1. **Main concepts and notions regarding innovation and inventive problem solving:** praxiological, psiho-gnoseological, psihopedagogical and logical – mathematics bases of the inventions; defining and classification of the inventions; Stages of inventive problem solving; the main impediments regarding technical creativity and inventive problem solving.
2. **Methods and techniques for creativity stimulation:** intuitive techniques and methods, logical-combining-deductive methods, Edward de Bono techniques
3. **The content and structure of the Theory of Inventive Problem Solving:** History of birth and development of TRIZ; Concepts and main notions for inventive problem solving, TRIZ philosophy, the main stages of TRIZ, TRIZ structure, Advantages and limits of TRIZ, implementing TRIZ in an organisation
4. **Methods, techniques and tools for inventive problem solving:** Tools for technical contradictions solving – Contradiction matrix, 40 inventive principles, 39 TRIZ parameters, separation principles for physical contradiction solving, 76 Standard solutions., Technical systems evolution laws, ARIZ Algorithm, Su – Field analysis, 9 Screen Method and Multiscreen Method, Smart Little People Method– emphatic methods, Operators sistem, Direct product evolution models, Anticipatory Failure Determination, case studies
5. **Software for inventive problem solving:** TRIZExplorer, Innovation WorkBench, Ideator, TRIZ Improver, CreaTRIZ, TechOptimizer, TriSolver, case studies.
6. **Using inventive problem solving in some product development methods:** Using with QFD and technical scenario, Sinergy TRIZ – QFD – Taguchi, Using AFD - TRIZ with FMEA, Using TRIZ with Value Analysis, case studies
7. **Intellectual property: copyright; Related rights; Industrial property protection - Patents for invention, Trademarks protection, Industrial design protection, Geographical Indication protection, Plant variety patents, Topographies of integrated circuits protection, Protection against unfair competition.**

### **Seminar / Laboratory / Project description:**

#### **Practical works**

1. Brainstorming meeting, 4-5 students teams for founding a technical solution for a certain problem
2. Application regarding 9 screen method: evolutive systemic study for a product, establishing of the technological evolution of the product and prediction of the next generation of the product
3. Application regarding innovation/invention realisation by technical contradiction solving for a specific product; case study presentation
4. Application regarding innovation/invention realisation by physical contradiction solving for a specific product; Application regarding Su-Field analysis for a specific product and case study presentation
5. Application regarding a problem solving using Creax software and case study presentation
6. Application regarding applying the technical systems evolution laws for re-design a specific product and case study presentation
6. Application regarding using TRIZ, QFD, Taguchi and Technical Scenario in conceptual – innovative re-design of a specific product
7. Applications regarding copyright; related rights; patents for invention, trademarks protection, industrial design protection, geographical indication protection, protection against unfair competition; registration of a patent based an original solution developed by the (master) students. Registration of a trademark

#### **Project**

1. Receiving theme, Project Guide and general indications
2. Systemic analysis of the product; study of historical evolution of the product
3. Competitive and functional design of the product
4. Conceptual design of the product: generating of innovative concepts using House of the Quality and TRIZ
5. Embodiment and detailed design of the product
6. Patenting of the product at national and European level
7. Conception of a trade mark for the product and registration as national trademark an European Union trademark
8. Protection of the product as national industrial design an European Union (community) industrial design
9. Strategies for protection against unfair competition

### **Intended learning outcomes:**

- *Advanced knowledge regarding innovation methods and techniques and protection, valuation and capitalization of intellectual property*
- *Developing the capacity to design complex and innovative industrial processes and systems using original solutions*
- *Developing the capacity to act in order to obtain maximum benefit from the application of these processes and from technological transfer*

<b>Assessment method:</b>	<b>% of the final grade</b>	<b>Minimal requirements for award of credits</b>
Written exam	40	<b>Examination</b> , 3 written topics (3x 10 points) + 1 oral topic (10 p) Knowledge for mark 5: minimum 20 p obtained Knowledge for mark 10: 40 p obtained
Project	25	Minimum 13 points
Homework	-	-
Laboratory	20	Examination in sessions - Knowledge for mark 5: minimum 10 p obtained - Knowledge for mark 10: 20 p obtained
Other	15	Semesterverification paper - 2 topics written x 8 points each

<b>References:</b>	
<p>[1] Choulier, D., Drăghici, G., TRIZ: une approche de résolution des problèmes d'innovation dans la conception de produits, <a href="http://www.mec.utt.ro/~draghici/index_ro.html">http://www.mec.utt.ro/~draghici/index_ro.html</a></p> <p>[2] N. Ionescu, A., Vișan, C., Doicin, D., Hincu, Benefiting From the Teaching Experience with TRIZ Method in Technical and Economic Field, The First International Conference on Strategic Innovation and Future Creation, Malta, 23 – 24 Martie, 2009</p> <p>[3] Domb E., 40 Inventive Principles with examples, 1998, <a href="http://www.triz-journal.com">http://www.triz-journal.com</a></p> <p>[4] Ionescu N., Vișan A., Teoria Rezolvării Inventive a Problemelor, Editura BREN, București, 2016</p> <p>[5] Ionescu N., Vișan A., Creativity and Intellectual Property, Editura BREN, București, 2016</p> <p>[6] ***, <a href="http://www.wipo.int">www.wipo.int</a></p> <p>[7] ***, <a href="http://www.osim.ro">www.osim.ro</a></p>	
<b>Prerequisites:</b>	<b>Co-requisites</b> <i>(courses to be taken in parallel as a condition for enrolment):</i>
<i>Graduated licensing (Bachelor) - Industrial Engineering, Mechanical Engineering or Mechatronics and Robotics field</i>	
<b>Additional relevant information:</b>	
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Date: May 2017

Professional degree, Surname, Name:

Assoc. Prof. PhD. Eng. Nicolae IONESCU