

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

## COURSE SPECIFICATION

<b>Course title:</b>	<b><i>Mechanical Systems Design</i></b>	<b>Semester:</b>	<b>5</b>
<b>Course code:</b>	<b>UPB.06.D.05.O.001</b>	<b>Credits (ECTS):</b>	<b>4</b>

<b>Course structure</b>	Lecture	Seminar	Laboratory	Project	Total hours
<i>Number of hours per week</i>	<b>2</b>		<b>2</b>		<b>4</b>
<i>Number of hours per semester</i>	<b>28</b>		<b>28</b>		<b>56</b>

<b>Lecturer</b>	Lecture	Seminar / Laboratory / Project
<i>Name, academic degree</i>	George ADÎR Assoc. Prof. Dr.	George ADÎR Assoc. Prof. Dr.
<i>Contact (email, location)</i>	<a href="mailto:georgeadir@yahoo.com">georgeadir@yahoo.com</a> JC106	georgeadir@yahoo.com

### **Course description:**

The target of the course is to familiarize the students with the notions of mechanical system, machine, mechanism, kinematic element, kinematic joints, structure, kinematics, kinetostatics and dynamics of mechanical systems, balance of mechanical systems, mechanical systems with gears and cams.

Also, the students will be able to use the theoretical and practical knowledge and the typical terms of the discipline, as well, to design, achieve and test some mechanical systems, simple and / or complex, so necessary to improve the activity in different fields of life. By using this discipline, many notions and technical designs in industrial engineering will be explained much easier, contributing in this way to create a responsible and positive attitude against science, generally, and industrial engineering, particularly.

The course will support the achievement of the adequate conditions to develop the creative work in the industrial engineering field, the use with great efficiency of the engineering potential, the social-professional development of students / graduates.

The theoretical and practical knowledge of the discipline will support students / graduates in establishing partnerships with different companies, institutions or potential private investors, in promotion of the technical innovations.

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

The laboratory activity wants to underline the theoretical knowledge introduced by lecture, by supporting students to clearly understand many notions, starting from the kinematic elements and kinematic joints up to structure, analysis and synthesis of mechanical systems. In this way, the students have the opportunity to use a lot of different constructive patterns (with linkages, with gears and with cams) and modern techniques to establish the kinematic and kinetostatic parameters.

### **Intended learning outcomes:**

An easier understanding of the structural schemes of different mechanical systems and of their kinematics, kineto-statics and dynamics. Also, the graduates will be able to better understand the phenomena that happen inside of mechanical systems. They could develop a creative work and become more responsible in designing new and efficient mechanical structures to improve the quality of life. The graduates will establish in a more comfortable and positive way various partnerships with private / public companies to develop their technical solutions for different problems.

<b>Assessment method:</b>	<b>% of the final grade</b>	<b>Minimal requirements for award of credits</b>
Written exam	40	minim 20%
Report / project	-	-
Homework	10	minim 30%
Laboratory	25	
Other	25	

**References:**

1. Adîr, G., Course (in English)
2. Adîr G., Adîr, A., ș.a. Mecanisme. Teorie și aplicații. Ed. Printech, 2013, București
3. Grecu, B., Adîr G., ș.a., Mecanisme. Lucrări de laborator, Ed. Bren, 2010
4. Adîr, G., Mecanisme și organe de mașini, Ed. Printech, București, 2003
5. Antonescu, P., Mecanisme, Editura Printech, București, 2003
6. Ocnărescu, C., Mecanisme și manipuloare (I și II), Ed. Bren, 2001
7. Artobolevski, I., I., Theorie des mecanismes et des machines, Edition Mir, Moscow, 1977

**Prerequisites:**

Mathematics, Mechanics, Machine Elements, Materials Technology, Technical Drawing

**Co-requisites**

*(courses to be taken in parallel as a condition for enrolment):*

Instrumentation and Measurement, Biomechanical Structures, Robotics, Computer Aided Engineering

**Additional relevant information:**

It is very important to take part when lecture and labs activity is running, to solve the problems given as homework, to participate at all the tests papers etc.

Date: July 5, 2016

Assoc. Prof. Dr. George ADÎR