

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>	Manufacturing Processes 1	<b>Semester:</b>	1
<b>Course code:</b>	UPB.06.S.05.O.004	<b>Credits (ECTS):</b>	7

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

<b>Lecturer</b>	Lecture	Seminar / Laboratory / Project
<i>Name, academic degree</i>	MANOLACHE Daniel, Lecturer	MANOLACHE Daniel, Lecturer
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### **Course description:**

This course will provide basic knowledge related to conventional (chip removing) and non-conventional machining processes. It will provide understanding of what is involved and how each process works. Firstly is presented the correlation between prescribed accuracy of the feature on drawing and machining accuracy of most common machining processes. Then are presented basic concepts related to fundamentals of cutting: chip formation, tools geometry and materials, cutting fluids, tool life estimation. On following for common cutting machining processes are presented in more detailed manner the definition, tooling, machine tool and equipment, methods, movements and machining parameters. There are presented the formulas for calculating machining time for different type of machined features. The common machining processes presented are: turning, milling, drilling, boring, broaching, shaping, gear machining. For finishing processes, like grinding, honing and lapping are presented similar elements and also for non-conventional machining processes, like electro-discharge machining and machining using beams and jets. The characteristics of new manufacturing processes using additive technology (additive manufacturing) are presented on the final.

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

Laboratory will allow to the students to achieve the practical abilities related to usage of manufacturing processes and equipment associated to each process. It will allow to understand how different features are obtained on mechanical parts using different manufacturing processes, which is necessary setup of workpiece on machine tools, what types of tools could be used and how to set-up, what kind of movements are performed by workpiece and/or tool; what process parameters could be set-up on machine and how to calculate machining time.

Starting from an engineering drawing for a mechanical parts, through homework the students will analyse the characteristics of the features which compound the part geometry, the prescribed accuracy of those features. Based on those information and the knowledge accumulated about manufacturing processes, will be presented solutions related to what manufacturing processes could be used in general to obtain the

features geometry and which ones are optimal to be used based on feature characteristics. For a maximum number of three features will be presented a more detailed analysis of manufacturing plan.

**Intended learning outcomes:**

- Learning the basic of manufacturing processes based on cutting machining and non-conventional machining
- Learning of concepts and terminology used in manufacturing process;
- Acquiring knowledge about tooling, machine tools, movements involved on each manufacturing process presented;
- Obtaining practical knowledge about usage of equipment and tools for some of the manufacturing processes presented;

<b>Assessment method:</b>	<b>% of the final grade</b>	<b>Minimal requirements for award of credits</b>
Written exam	40	minimum 20 p obtained
Report / project	-	-
Homework	15	delivery of homework
Laboratory	15	attending all laboratory applications
Other	30	20 points for intermediate semester verification quiz - minimum 10 p obtained 10 points for attending all course presence

**References:**

- Manolache D., *Manufacturing Processes 1*, Course Notes, UPB, 2015-16
- Epureanu, Al., Pruteanu, O., Gavrilaş, I., *Tehnologia construcției de mașini*, Ed. Didactică și pedagogică, 1983;
- Gavrilaş, I., Marinescu, N., *Prelucrări neconvenționale în construcția de mașini*, Ed. Tehnică, 1991;
- Andrei, N., Drăgulănescu, E., *Elemente tehnologice pentru prelucrări prin așchiere*, Ed. Bren, 2003;
- Tschätsch, H., *Applied Machining Technology*, Springer, 2009;
- Klocke, F., *Manufacturing Processes 1 – Cutting*, Springer, 2011;
- Bralla, J.G. ed., *Handbook of Manufacturing Processes – How products, components and materials are made*, Industrial Press Inc., 2007;
- Kalpakjian, S., *Manufacturing Engineering and Technology*, Pearson Education, Inc., 2001;
- Walker, J.M. ed., *Handbook of Manufacturing Engineering*, Marcel Dekker Inc., 1996;
- Society of Manufacturing Engineers web site: [www.sme.org](http://www.sme.org)

**Prerequisites:**

**Co-requisites**

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

Tolerance design; Materials technology

**Additional relevant information:**

Date: 22.07.2016

Professional degree, Surname, Name: Lecturer, PhD. Eng. MANOLACHE Daniel-Silviu