

## SYLLABUS

### 1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Automotive Engineering, Mechatronics and Mechanics
1.3	Department	Automotive Engineering and Transportation
1.4	Field of study	Automotive Engineering
1.5	Cycle of study	Master in Science
1.6	Program of study/Qualification	Tehnici Avansate în Ingineria Autovehiculelor (Advanced Techniques in Automotive Engineering) - în limba engleză
1.7	Form of education	Full time
1.8	Subject code	5.10

### 2. Data about the subject

2.1	Subject name	Manufacturing and production in automotive engineering									
2.2	Subject area	Automotive engineering									
2.3	Course responsible/lecturer	Asoc. Prof. PhD. Eng. Paul BERE									
2.4	Teachers in charge of seminars	Asoc. Prof. PhD. Eng. Paul Bere									
2.5	Year of study	I	2.6	Semester	I	2.7	Assessment	C	2.8	Subject category	DS/DO

### 3. Estimated total time

3.1	Number of hours per week	1	3.2	of which, course:	1	3.3	applications:	1
3.4	Total hours in the curriculum	28	3.5	of which, course:	14	3.6	applications:	14
Individual study								hours
Manual, lecture material and notes, bibliography								15
Supplementary study in the library, online and in the field								15
Preparation for seminars/laboratory works, homework, reports, portfolios, essays								10
Tutoring								5
Exams and tests								2
Other activities								-
3.7	Total hours of individual study			47				
3.8	Total hours per semester			75				
3.9	Number of credit points			3				

### 4. Pre-requisites (where appropriate)

4.1	Curriculum	General knowledge of mathematics, physics, mechanics, manufacturing basics, materials science computing engineering
4.2	Competence	Computer use knowledge

### 5. Requirements (where appropriate)

5.1	For the course	-multimedia projector
5.2	For the applications	Attendance (present 100%) and performing (completion / promotion) the applications activities, condition the admission to the final evaluation of the discipline.

## 6. Specific competences

Professional competences	<ul style="list-style-type: none"> <li>• Identification, definition and using of the specific technology for different materials;</li> <li>• Describing the theory method and basic principle for designing the process specific to automotive manufacturing parts;</li> <li>• Using the basic knowledge for explaining and interpreting of the various type of manufacturing processes specific to automotive building technology;</li> <li>• Applying the basic principle the method and solution for designing the manufacturing process on classical machines or/ CNC with well-defined inputs under qualified assistance;</li> <li>• Proper use the standard evaluation criteria and methods to appreciate the quality, advantages, and limitation of manufacturing process on classical machine or modern and the flexible system in manufacturing;</li> <li>• Develop of the new technology and materials in the field of engineering automotive;</li> <li>• Development of technical solutions and study methodologies in the field of engineering automotive;</li> </ul>
Cross competences	<ul style="list-style-type: none"> <li>• Responsibly execution of the complex professional duties in conditions of restricted autonomy and qualified assistance - <i>Autonomy and responsibility</i></li> <li>• Awareness of the need for continuous training; efficient use of the resources and the learning techniques for personal and professional development - <i>Personal and professional development</i></li> <li>• Effective use of language skills and knowledge of information technology and communication.</li> </ul>

## 7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	<ul style="list-style-type: none"> <li>• Development of professional skills in the field of manufacturing technology applied in automotive engineering</li> </ul>
7.2	Specific objectives	<ul style="list-style-type: none"> <li>• Knowledge, understanding concepts, theories and methods of Manufacturing process; Their proper use in the professional communication;</li> <li>• Use the basic knowledge for the application and interpretation of various types of methods, situations, processes etc. (In wider contexts) associated to the vehicle manufacturing parts - Explanation and Interpretation;</li> <li>• Development of professional projects using innovative principles and methods, quantitative and qualitative, consecrated in the field of the manufacturing process parts applied in automotive- Creativity and Innovation</li> </ul>

## 8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	Introduction. Generality concerning the manufacturing technology in automotive development.	Exposure (explanation, description), presentation, analysis, advantages, disadvantages, applicability,	Visual technical equipment, materials, devices.
2.	Plastic and composites materials applications in automotive manufacturing.		
3.	Plastic materials technologies. Injection moulding, extrusion, thermoforming, calendaring.		
4.	Composite materials technologies. Hand layup, RTM, VRTM, vacuum bag technology, autoclave forming,		

	pressing.	conversation, demonstration, illustration, guidance etc.	
5.	Productions processes and equipment. Machining for metal casting		
6.	Cutting processing technologies		
7.	Technology for plastic deformation		

#### Bibliography

1. Ancau M., Manufacturing Technologies, Editura Casa Cartii de Stiinta , Cluj-Napoca, 2003
2. DeGarmo E.P.s.a, Materials and Processes in Manufacturing, Prentice Hall, New York, 8<sup>th</sup> edition, 1997,
3. Kalpacjian S., Manufacturing Processes for Engineering Materials, Adison Vesley Longman Inc. 3<sup>rd</sup> edition, 1997,
4. Berce, P., Bâlc, N., ș.a. Tehnologii de Fabricare Rapidă a Prototipurilor, Editura Tehnică, București, 2000,
5. Bâlc, N. Tehnologia Neconvențională, Cluj-Napoca, Editura Dacia, 2001,
6. Bâlc, N., Gyenge, Cs., Berce, P., Proiectare pentru Fabricația Competitivă, Cluj-Napoca, Editura Alma Mater, 2006,
7. Gyenge,Cs., Fratila,D. Ingineria fabricatiei. Editura Alma Mater, Cluj-Napoca .2004. ISBN 973-8397-77-4
8. Bere P., Materiale compozite polimerice, Editura UTPRESS 2012
9. Hancu,L., Iancu,H., Tehnologia materialelor nemetalice. Tehnologia fabricării pieselor din materiale plastice, Editura ALMA MATER, 2003, 304 pagini, ISBN 973-8397-34-0..
10. Iancău,H., Nemeș, O., Materiale compozite- concepție și fabricație, 2002, 155 pagini, editura MEDIAMIRA-Cluj Napoca.
11. Seres I., Injectarea materialelor plastice. Editura Imprimeriei de Vest.

8.2. Applications/Seminars		Teaching methods	Notes
1.	Introduction. Presentation of laboratories. NTS rules, PSI in laboratories	Presenting the equipment, Manufacture samples and discuss illustration. Studies the best practices, automotive application, examples Results, method guidance etc.	Visual technical equipment, materials, devices, computer
2.	Analysis of different manufacturing methods applied on parts. Case Study		
3.	Thermoforming of plastic materials.		
4.	Hand lay-up technology of composites.		
5.	Vacuum bag technology of composites. Case study		
6.	Stamping the metal sheets.		
7.	Casting of thermosetting materials in flexible molds		

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1. Ancau M., Manufacturing Technologies, Editura Casa Cartii de Stiinta , Cluj-Napoca, 2003
2. Berce, P., Bâlc, N., ș.a. Tehnologii de Fabricare Rapidă a Prototipurilor, Editura Tehnică, București, 2000,
3. Bâlc, N. Tehnologia Neconvențională, Cluj-Napoca, Editura Dacia, 2001,
4. Bere P. ș.a., Materiale compozite cu matrice polimerică. Lucrări de laborator, UTPRESS

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5. Bere P., Materiale compozite polimerice, Editura UTPRESS 2012
6. Hancu L., Iancu, H., Tehnologia materialelor nemetalice. Tehnologia fabricării pieselor din materiale plastice, Editura ALMA MATER, 2003, 304 pagini, ISBN 973-8397-34-0.
7. Iancău, H., Nemeş, O., Materiale compozite. Concepție și fabricație, 2002, 155 pagini, editura MEDIAMIRA-Cluj Napoca
8. Seres I., Injectarea materialelor plastice . Editura Imprimeriei de Vest

**9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field**

The gained skills will be required to the employees who work in the field of the motor vehicle engineering. In the training of the competences are taking into account the employers options recommended for the higher education institutions for training the graduates (ability to use the time efficiently, empowering team work, ability to learn quickly, the ability to coordinate teams, new opportunities in the field the interest of the company, ability to use the computer simulation, ability to adapt to new situations, etc.) and the priorities recommended by the employers in the field for training the graduates (creativity and capacity for innovation, ability to negotiate, critical and self-critical analysis ability, knowledge of other areas).

**10. Evaluation**

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	Frequency and behaviour in activities. The given marks to the final examination	written assessment	
Applications	- Ability to work with assimilated knowledge; - Ability to apply in practice;	Active participation at applications.	
10.4 Minimum standard of performance			
- Development of physical-mathematical models in order to study their use in vehicle dynamics;			

Date 12.10.2020

Course responsible  
Asoc. Prof. PhD. Eng.  
Paul Bere

Teacher in charge of seminars  
Assoc. Prof. PhD. Eng.  
Paul Bere

Department approval date

Department Director  
Prof. PhD. Eng. Barabas Istvan

Faculty Council approval date

Dean  
Prof. PhD. Eng. Nicolae Filip