ACADEMIA ROMÂNĂ - SCOSAAR
DOCTORAL SCHOOL OF ENGINEERING, MECHANICAL, COMPUTER SCIENCES

DISCIPLINE SHEET

Name of the discipline: MANUFACTURING TECHNOLOGIES FOR MECHANICAL COMPONENTS OF INDUSTRIAL ROBOTS
Holder of course activities: CSI dr. ing. Mihaiela ILIESCU
Year of study: 1

Number of hours per week/Checking/Credits:		
Course	**Form of examination**	**Credits**
Experimental course / module 6 / 9	Examination	15

A. DISCIPLINE OBJECTIVES (The objectives are formulated in terms of professional competence):

General objective of the discipline	• Knowledge of manufacturing technologies specific to mechanical components.
Specific objectives:	• Knowledge of the basic principles of design – parts, technologies. • Knowledge of conventional / unconventional (laser) processing processes. • Establishing the characteristics of classic equipment / CNC / machining centers. • 3D printing techniques (Rapid Prototyping / Rapid Manufacturing). Reverse engineering. • Control and control of mechanical components within mechatronic systems. • Industry 4.0 ; Circular economy. • Design and prototype of mechanical / mechatronic systems.

B. CONDITIONS (where applicable)

course development	• computer, projection system, software: SolidWorks, Catia. • technological system equipment / devices

C. SPECIFIC COMPETENCES ACCUMULATED (Refers to the competences provided by the study program to which the discipline belongs;)

Professional skills	1. Increased capacity for analysis, concept and design 2. Ability to elaborate scientific papers and experimental reports 3. Ability to critically interpret research results 4. Ability to quickly and correctly understand and evaluate new information • Modeling, simulation, prototyping capability
Transversal competenţe	• Teamwork skills • Oral and written communication skills • Respecting and developing professional values and ethics • Adaptation to new technologies, professional and personal development, through continuous training

D. CONTENT OF THE COURSE _

a) Course

Chapter	Content	No. of hours
1.	Basics of manufacturing technologies for mechanical components of industrial robots	6
2.	Design of technological processes for manufacturing mechanical components of industrial robots	9
3.	Fundamentals of machining on CNC machine tools	6
4.	Manufacturing technologies on lathes and CNC turning centers	12
5.	Manufacturing technologies on vertical / horizontal machining centers with CNC	12
6.	Manufacturing technologies on CNC grinding centers	6
7.	Manufacturing technologies on CNC teething machines	6
8.	Cold plastic deformation manufacturing technologies	12
9.	Additive Manufacturing technologies. Rapid Prototyping	9
10.	Reverse Engineering	6
	Total Hours **6 x** 14 (Weeks)	**84**

b) Experimental module - mechanical / mechatronic systems

Chapter	Content	No. of hours
1.	Design of technological processes	18
2.	Manufacturing technologies	27
3.	Cold plastic deformation	18
4.	Rapid Prototyping	27
5.	Reverse Engineering	18
6.	Case Studies	18
	Total Hours 9 x 14 (Weeks)	**126**

E. EVALUATION (The methods, forms of evaluation and their weight in establishing the final grade are specified. Indicate minimum performance standards in relation to the competences defined in point **A. Objectives of the discipline**)

Activity Type	Assessment criteria	Assessment methods	Share of final grade
Course	-Accuracy and quality of treatment of exam topics	Written exam	55%
Experience mode	- Application of knowledge acquired in the course	Theme - experimental	45%
Minimum performance standard: Knowledge of 70% of the information presented at the course and seminar			
The results of the subject evaluation are quantified in grades, expressed on a scale from 10 to 1, with a minimum threshold of passing grade 5 (five). The stipendium awarded to doctoral students is suspended if they fail to obtain at least grade 8 (eight)			

F. METHODOLOGICAL MILESTONES_

Lecture combined with dialogue. Use of modern means of training (ppt). Course support.

G. CORROBORATING THE CONTENTS OF THE DISCIPLINE WITH THE EXPECTATIONS OF REPRESENTATIVES OF THE EPISTEMIC COMMUNITY, PROFESSIONAL ASSOCIATIONS AND EMPLOYERS REPRESENTATIVE IN THE FIELD RELATED TO THE PROGRAM_

- The discipline provides a wide background of fundamental and practical knowledge on modern research methods, design, manufacturing technologies, etc.
- The discipline provides basic elements that help the doctoral student in the specialties of Mechanical Engineering in carrying out research.

H. BIBLIOGRAPHY_

1. Neagu C., Iliescu V., Iliescu M., Purcărea M., "Technology of machine building – Theoretical bases", ISBN 973- 685-504-X, MATRIX ROM Publishing House, Bucharest, 2002
2. Mihaiela ILIESCU, "Technologies for Manufacturing Mechanical Components of Industrial Robots - Fundamental Elements", publishing house PRINTECH, ISBN 978-606-521-984-7, 2013
3. Tache V., ş.a., "Design of devices for machine tools", Technical Publishing House, Bucharest, 1979
4. Popescu I., Vlase A., ş.a., "Technology of manufacturing mechanical products, vol. I", ISBN 973-685- 495-7, MATRIX ROM Publishing House, Bucharest, 2005
5. Vlase A., ş.a., "Technology of machine building", Editura Tehnica, Bucharest, 1996
6. M. Piska, M. Hill, P. Cihlarova, "Fundamentals of CNC Machining", Brno University of Technology, Institute of Manufacturing Technology, 2008
7. Ciocârdia C., ş.a., "Technology of cold pressing", Didactic and Pedagogical Publishing House, Bucharest, 1991
8. N. Hopkins, R.J.M. Hague, P.M. Dickens, "Rapid Manufacturing – an Industrial Revolution for the Digital Age", John Wiley & Sons Inc, West Sussex, 2006

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