COURSE DESCRIPTION CARD - SYLLABUS

Course name

Automation and Virtualization in Injection Molding Technology

Course

Field of study	Year/Semester
Mechanics and Machine Building	3/6
Area of study (specialization)	Profile of study
	general academic
Level of study	Course offered in
First-cycle studies	Polish
Form of study	Requirements
full-time	elective

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15		
Tutorials	Projects/seminars	
	15	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Faculty of Mechanical Engineering

Piotrowo 3 st., 60-965 Poznań

Responsible for the course/lecturer:

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Wydział Inżynierii Mechanicznej

ul. Piotrowo 3, 60-965 Poznań

Prerequisites

The student should have knowledge of the typical equipment used in material technologies.

Course objective

Student should obtain knowledge about selected issues in automation of materials processes in processing of plastics.

Course-related learning outcomes

Knowledge

The student has knowledge about manufacturing technologies mainly used in the machinery industry, especially in plastics processing.

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The student has knowledge about the automation and robotization of production processes, including the structure of numerical control and automatic regulation.

Skills

The student is able to develop assumptions regarding the selection of automation systems and robotization of production processes and make a choice of a justified degree of automation and robotization.

Social competences

The student understands the social aspects of processes automation and problems associated with their use.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture

Written colloquium at the end of the semester, contains 5 to 6 questions (credit in case of obtaining at least 50,1% correct answers).

Laboratory classes

Passing on the credits based on projects implemented during the classes, containing automated devices used in processing of plastics, tooling and drawings of their schematic view. All projects must be passed with positive note.

Programme content

Lecture

1. Construction of pickers and linear manipulators. Drive and control systems.

2. A series of manipulators used in injection molding technique, grip types for injection part, suction pads.

3. Interaction of injection molding machine with manipulator.Programming of manipulator movements

4. Computer programs for the visualization of production stations. Computer aided selection of elements of the injection mold.

5. Examples of automation in screen printing processes of plastic parts.

6. Automation in mould labeling processes: IML/IMD .

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Projets:

1. Selection of a picker for receiving sprues and a mechanical gripper.

2. Selection of the linear manipulator for receiving injection molding parts.

3. Design of a vacuum gripper made of modular elements.

4. Design and programming of manipulator movements in the molding collection mode in the Virtual Mould programm.

5. Design and programming of manipulator movements in the mode of putting the molded part on the conveyor in the Virtual Mould programm.

6. Design and programming of manipulator movements in the insertion-to-mold mode in Virtual Mould programm.

Teaching methods

Lecture: multimedia presentation illustrated with examples given on a board

Project: demonstration of machine and equipment operation by using Virtual Mould software, solving tasks, discussion, teamwork.

Bibliography

Basic
1. Wilczyński K. (red.):Wybrane zagadnienia przetwórstwa tworzyw sztucznych, Ofic. Wyd. Politechniki Warszawskiej, Warszawa, 2011.

2. Frącz W., Krywult B.: Projektowanie i wytwarzanie elementów z tworzyw sztucznych, wyd. Politechniki Rzeszowskiej, Rzeszów, 2005.

3. Praca zbiorowa: Techniki barwienia, zdobienia i znakowania wyrobów z tworzyw sztucznych, Wydawnictwo PLASTECH 2002.

4. Bociąga E.: Specjalne metody wtryskiwania tworzyw termoplastycznych, WNT,Warszawa 2008.

Additional
1. Frącz W.: Przetwórstwo tworzyw polimerowych, Wyd. Poli. Rzeszowskiej, Rzeszów 2011.

2. Marciniak M., Elementy automatyzacji we współczesnych procesach wytwarzania, WPW, Warszawa, 2007

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Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	40	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	35	1,5

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[1] delete or add other activities as appropriate