Course code:
03-MBM-EMS-PPD-SP6

Course item: **D.4.5**

1. INFORMATION ABOUT THE COURSE

a. Basic information

Course title	***Plastics part design***
Field of study	*Mechanical Engineering*
Cycle	*first degree*
Study profile	*general academic*
Study mode	*full-time*
Specialisation	*Techniques of Plastics*
Unit responsible for the field of study	*Faculty of Mechanical Engineering*
Lecturer	*Dariusz Sykutera, DSc* *Karol Pepliński, PhD* *Piotr Czyżewski, PhD*
Introductory courses	*Engineering graphics, Engineering materials*
Prerequisites	*Computer aided design - CAD*

b. Semester/ weekly timetable

Semester	Lectures (W)	Classes (C)	Laboratories (L)	Project classes (P)	Seminars (S)	Fieldwork (T)	ECTS credits ECTS*
VI	15			15			5

C. Assumed outcomes and aims - aims bind the course programme with the study programme and are referred to in learning outcomes point 2

2. LEARNING OUTCOMES (acc. to National Qualifications Framework)

No.	Description of learning outcomes	Reference to learning outcomes for the field of study	Reference to learning outcomes for the area of study
KNOWLEDGE			
K1	has knowledge in the field of construction of plastics products, inter alia: injected and blowing products	K_W07	P6S_WG
SKILLS			
S1	can prepare technical documentation for the designed polymer product	K_U02	P6S_UW
S2	has the ability to use CAD programs in the preparation of spatial and flat documentation	K_U03	P6S_UW
SOCIAL COMPETENCES			
SC1	is aware of the responsibility for their own work and readiness to submit to the principles of teamwork, and to be responsible for jointly performed tasks.	K_K02	P6S_KK

SC2	can think and act creatively in the field of designing plastics products	K_K03	P6S_KO

3. TEACHING METHODS

multimedia lecture, project, and other methods, e.g. videos, books, catalogs, diagrams, blackboard, online techniques, exercise workbook classes, lectures, brainstorming, discussion, show, situational methods, mind maps, drama, etc.

4. METHODS OF EXAMINATION

class attendance, final pass, partial or final project report during design classes, presentation final project

5. COURSE CONTENT

Specify the content separately for each type of classes in accordance with point I.B. Lecture	An introduction to the sustainable design and construction of plastics part design products in a circular economy. Designing, prototyping, testing. The technological basis for the design and construction of injection moldings: thickness and shape of the walls of products. Strengthening walls, openings, and edges. Wall slopes. Shape and arrangement of holes. Undercuts and side openings. Hooks. Threads. Flexible hinges. Shaping the surface of moldings, and connection lines. Partitioning planes. Molded pieces with crimps. Basics of design and construction of blow-molded products: thickness and shape of the walls of blow-molded products, bottles: neck, body, bottom, handle. Wall reinforcements and slopes. Other blown products, for example, technical products. The essence of the design and construction of PET-blown products from the point of view of the application of final products and the unit demand of polymeric material for the product.
Project	Designing and assessing the condition and structure of products with balanced features, produced by injection and blow molding techniques, for the example bottle packaging or polymer molding (distribution of topics, project evaluation). Development of design steps leading to the completion of a specific task. Preparation of spatial models and flat documentation. Presentation and discussion of completed projects in the form of presentations.

6. VALIDATION OF LEARNING OUTCOMES

(Each learning outcome from the list requires validation methods to ensure that it was achieved by a student.)

Learning outcome	Form of assessment					
	Oral examination	Written examination	Final pass	Project	Report	Class attendance
K1			x	x		x
S1 – S2			x	x		x
SC1 – SC2			x	x		x

7. LITERATURE

Basic literature	1. Robert A. Malloy.: Plastic Part Design for Injection Molding An Introduction 2nd Edition. Carl Hanser Verlag, Munich 2010 2. Rosato, D., Rosato, A., DiMattia, D.: Blow Molding Handbook 2E. Hanser Publications; 2nd edition 2004
Supplementary literature	1. Alfredo Campo E.: The Complete Part Design Handbook: For Injection Molding of Thermoplastics. Hanser Publishers, Munich 2006 2. Engineering Polymers. Part end mold design – thermoplastics. A Design Guide. Bayer Material Science Publisher 2006

8. TOTAL STUDENT WORKLOAD REQUIRED TO ACHIEVE EXPECTED LEARNING OUTCOMES EXPRESSED IN TIME AND ECTS CREDITS

Student's activity		Student workload– number of hours
Classes conducted under a direct supervision of an academic teacher or other persons responsible for classes	Participation in classes indicated in point 2.2	30
	Supervision hours	5
Student's own work	Preparation for classes	20
	Reading assignments	30
	Other (preparation for exams, tests, carrying out a project etc)	40
Total student workload		125
Final number of ECTS credits		**5**