12. Processing polymer materials

GENERAL INFORMATION ABOUT THE COURSE		
Course coordinator	Pero Raos, PhD, professor; Josip Stojšić, PhD, assistant professor	
Course name	**Processing polymer materials**	
Study program	**Mechanical Engineering**	
Course status	Compulsory	
Year	4	
Semester	7	
Number of credits and teaching methods	ECTS student load coefficient	5
	Number of hours (lectures + seminars + exercises)	30+0+30

1. DESCRIPTION OF THE COURSE
1.1. Course objectives
Familiarising students with polymer materials and modern production procedures in processing polymer materials.
1.2. Course enrolment prerequisites *(if applicable)*
No prerequisites for enrolling into the course.
1.3. Expected course learning outcomes
1. Compare the main groups of polymer materials 2. Apply mathematical models for shear flow in describing the flow of polymer melts 3. Define elements of the production line for processing polymer materials 4. Describe production procedures for processing polymer materials

1.4. Course content
1. Introduction 2. Polymers 3. Physical state of polymers 4. Rheology of polymer melts 5. Highly elastic states in polymer materials 6. Thermal properties of polymer materials 7. Mechanical properties of polymer materials 8. Systematisation of procedures in the production of polymer products 9. Preforming procedures: calendaring and extrusion 10. Preforming procedures: coating, casting, direct and indirect moulding 11. Preforming procedures: injection moulding 12. Shaping procedures 13. Procedures for joining polymer materials

14. Procedures for producing strengthened products
15. Procedures for producing foam products

1.5. Types of teaching	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ Distance learning ☐ Field work	☒ Autonomous exercises ☒ Multimedia and network ☒ Laboratory ☐ Mentor assistance ☐ Other types
1.6. Comments	Classes take places in the classroom in the form of lectures and auditory exercises. Some of the exercises in the area of materials take place on computers. Laboratory classes anticipate practical learning about injecting moulding and mechanical properties of polymers.	

1.7. Student obligations *(attendance at classes, lectures, tutorials, seminars)*

- Attending lectures and exercises
- Active participation in classes

1.8. Tracking student work (proportion of individual activities in terms of ECTS credits based on the total number of ECTS credits)

Class attendance	2	Class participation		Seminar paper		Experimental work	
Written exam	1.5	Oral exam	1.5	Essay		Research	
Project		Continual assessment of knowledge		Written seminar paper		Practical work	
Online activity							

1.9. Grading and assessment of student work during the semester and for the final exam *(inter exam, written exam, oral exam)*

All student activities are scored with a certain number of points

1. Attending lectures and exercises: 5% of points
2. Written part of the exam: 80% of points
3. Oral part of the exam: 15% points

1.10. **Mandatory literature** (relevant at the time of submitting the proposed study program)

- Raos, Pero; Šercer, Mladen. Teorijske osnove proizvodnje polimernih proizvoda. Slavonski Brod: Strojarski fakultet u Slavonskom Brodu Sveučilišta u Osijeku i Fakultet strojarstva i brodogradnje Sveučilišta u Zagrebu 2010.

1.11. Supplementary literature (relevant at the time of submitting the proposed study program)

- Čatić, Igor. Proizvodnja polimernih tvorevina. Zagreb: Društvo plastičara i gumaraca, 2006.
- Michaeli, Walter. Einf(hrung in die Kunststoffverarbeitung. 5. Auflage. München: Hanser Verlag, 2007.