

Subject programme

1. Subject name / subject module: **Rapid Prototyping (3D Printing)**
2. Lecture language: **English**
3. The location of the subject in study plans:
 - Area or areas of the studies: **Computer Engineering and Mechatronics**
 - Degree of the studies: **1st degree studies**
 - Field or fields (implementation of effects standard): **Mechatronics**
4. Supervision of subject implementation:
 - The Institute / Another unit: **Institute of Informatics and Mechatronics**
 - The person responsible for the subject: **Repka Michal, dr inž.**
 - People cooperating in the development of the programme of the subject:
5. The number of hours and forms of teaching for individual study system and the evaluation method:

Mode of study	Teaching activities with the tutor																								Total ECTS
	Form of classes																								
	...	SOW	ECTS	Laboratory work	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	
Full-time studies				22	28	2																			
Part-time studies																									
Credit rigor				Graded assignment																					

6. Student workload – ECTS credits balance:
1 ECTS credit corresponds to 25-30 hours of student work needed to achieve the expected learning outcomes including the student's own work

Activity (please specify relevant work for the subject)	Hourly student workload (full-time studies/part-time studies)
Participation in lectures	-
Participation in laboratory classes	22
Independent study of the subject	6
Preparation to laboratory classes	12
Preparation of homeworks	8
Participation in an exam / graded assignment	2
Total student workload (TSW)	50
ECTS credits	2
* Student's workload related to trainings	50
Student's workload in classes requiring direct participation of academic teachers	22

7. Implementation notes: recommended duration (semesters), recommended admission requirements, relations between the forms of classes:
 - Recommended admission requirements – none.
 - Recommended duration of the subject is taken from the course plan.
8. Specific learning outcomes – knowledge, skills and social competence:

Specific learning outcomes for the subject		Form	Teaching method	Methods for testing of (checking, assessing) learning outcomes
Outcome symbol	Outcome description			
Knowledge				
K_W02	A student has basic knowledge in the field of rapid prototyping technologies, materials suitable for 3D printing.	Laboratory work	Inquiry methods	Student learning activities
K_W03	A student has basic knowledge in the field of 3D graphics and 3D modelling.			
Skills				
K_U02.	A student is able to create 3D model, prepare this model for 3D printer and use 3D printer.	Laboratory work	Inquiry methods	Student learning activities

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9. Assessment rules / criteria for each form of education and individual grades

0% - 50%	ndst	80% - 86%	db
51% - 70%	dst	87% - 93%	db+
71% - 79%	dst+	94% - 100%	bdb

Activity	Grades	Calculation	To Final
Lab reports	dst, db, bdb(3,4,5)	arithmetic mean (5,3,4)* 50%	2
Activity during classes	dst, db, bdb(3,4,5)	arithmetic mean (5,3,4)* 20%	0,8
Homeworks	dst, db, bdb(3,4,)	arithmetic mean (5,3,4) * 20%	0,8
Attendance	on 80% of all classes	80% * 5 -> 4 * 10%	0,4
Final result			4,0
Grade		4,0/5 = 80%	db (4.0)

10. The learning contents with the form of the class activities on which they are carried out:

(Laboratory work)

1. Introducing to prototyping;
2. Arduino and Raspberry Pi as a base for Rapid Prototyping;
3. Arduino IDE ;
4. Designing electronic devices: Fritzing software, Breadboards;
5. Building electronic devices;
6. Introducing to 3d Printing: Materials, Printers types, Using 3d printer;
7. Designing 3D models;
8. Building own solutions

11. Required teaching aids:

- a. Lecture - multimedia projector.
- b. Laboratory classes - specialist laboratory.

12. Literature:

a. Basic literature:

Evans, B.: Practical 3D Printers. Apress 2012, ISBN: 978-1-4302-4393-9

R. Horne, K. K. Hausman : 3D Printing For Dummies. 2nd Edition, Kindle Edition, 2019, ISBN-13: 978-1119386315

L. Wallach Kloski, N. Kloski : Getting Started with 3D Printing.1st Edition, Kindle Edition, 2019, ISBN-13: 978-1680450200

b. Supplementary literature:

Stephen W. Rock: 3D PRINTING GUIDE FOR NEWCOMERS. Independently published, 2019, ISBN-13 : 978-1794187436

Neil Wyatt: 3D Printing for Model Engineers. 1st Edition, ISBN-13: 978-1785004254

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13. Available educational materials divided into forms of class activities (Author's compilation of didactic materials, e-learning materials, etc.)

14. Teachers implementing particular forms of education:

Form of education	Name and surname
1. Lecture	
2. Laboratory classes	Repka Michal, dr inž.
3. Training	
4. Project classes	
5. Workshop classes	
6. Simulation game	
7. Language classes	