



Module name: Fundamentals of Computer Aided Design

Academic year: 2019/2020 Code: ZZIP-1-623-s ECTS credits: 4

Faculty of: Management

Field of study: Management and Production Engineering Specialty: —

Study level: First-cycle studies Form and type of study: Full-time studies

Lecture language: English Profile of education: Academic (A) Semester: 6

Course homepage: <http://upel.agh.edu.pl/>

Responsible teacher: dr inż. Rumin Rafał (rrumin@zarz.agh.edu.pl)

Module summary

Students learn how to visualize conceptual objects and make them a reality using CAD and 3D printing software.

Description of learning outcomes for module

MLO code	Student after module completion has the knowledge/ knows how to/is able to	Connections with FLO	Method of learning outcomes verification (form of completion)
Skills: he can			
M_U001	design and print object	ZIP1A_U07	Project, Test
Knowledge: he knows and understands			
M_W001	3D printing process and how it works	ZIP1A_W01	Test
M_W002	know how to visualize and plan 3D projects.	ZIP1A_W01	Test
M_W003	how to design and 3D print prototypes for design challenges.	ZIP1A_W01	Test

Number of hours for each form of classes

Suma	Form of classes										
	Lectures	Auditorium classes	Laboratory classes	Project classes	Conversation seminar	Seminar classes	Practical classes	Fieldwork classes	Workshops	Prace kontrolne i przejściowe	Lektorat
60	30	0	0	0	0	0	0	0	30	0	0

FLO matrix in relation to forms of classes

MLO code	Student after module completion has the knowledge/ knows how to/is able to	Form of classes										
		Lectures	Auditorium classes	Laboratory classes	Project classes	Conversation seminar	Seminar classes	Practical classes	Fieldwork classes	Workshops	Prace kontrolne i przejściowe	Lektorat
Skills: he can												
M_U001	design and print object	-	-	-	-	-	-	-	-	+	-	-
Knowledge: he knows and understands												
M_W001	3D printing process and how it works	+	-	-	-	-	-	-	-	-	-	-
M_W002	know how to visualize and plan 3D projects.	+	-	-	-	-	-	-	-	-	-	-
M_W003	how to design and 3D print prototypes for design challenges.	+	-	-	-	-	-	-	-	-	-	-

Student workload (ECTS credits balance)

Student activity form	Student workload
Udział w zajęciach dydaktycznych/praktyka	60 h
Preparation for classes	10 h
przygotowanie projektu, prezentacji, pracy pisemnej, sprawozdania	20 h
Realization of independently performed tasks	10 h
Summary student workload	100 h
Module ECTS credits	4 ECTS

Additional information

Module content

Lectures

1. Role of CAD in mechanical design and rapid prototyping
2. Sketching
3. Solid modeling
4. Engineering drawings
5. Assembly modeling
6. Introductory Topics about 3D Printing
7. Pros and Cons of 3D Printing
8. 3D Printing Background
9. Export files to the 3D printer.

Workshops

1. CAD modeling and rapid prototyping
2. Sketching
3. Solid modeling
4. Engineering drawings
5. Assembly modeling
6. Introductory Topics about 3D Printing
7. Export files to the 3D printer.
8. Printing of selected design

Teaching methods and techniques:

Lectures: The content presented at the lecture is provided in the form of a multimedia presentation in combination with a discussion, enriched with activating exercises relating to the issues presented.

Workshops: During the classes, the students solve different problems and work on a project related to the topic. The lecturer systematically applies the explanations and moderates the discussion with the group over the given problem. A part of the course is conducted online (blended learning)

Warunki i sposób zaliczenia poszczególnych form zajęć, w tym zasady zaliczeń poprawkowych, a także warunki dopuszczenia do egzaminu:

The final grade is calculated as a weighted sum of the grade obtained from the final test and the grade obtained from preparing project.

Zasady udziału w poszczególnych zajęciach, ze wskazaniem, czy obecność studenta na zajęciach jest obowiązkowa:

Lectures:

- Attendance is mandatory: No
- Participation rules in classes: Students participate in the classes learn the content according to the course syllabus. Students should constantly ask questions and explain doubts. Audiovisual recording of the lecture requires the teacher's consent.

Workshops:

- Attendance is mandatory: Yes
- Participation rules in classes: Students are obliged to come prepared to the class, read all the required materials and cases indicated each time by the teacher, upload the required tasks. The student's work assessment can be based on oral or written statements in the form of a colloquium, which according to the AGH study regulations translates into a final grade in this form of classes.

Method of calculating the final grade

The final grade is calculated as:

if gradeA=2.0 then FINAL GRADE = 2.0,
otherwise FINAL GRADE = 0.5 • gradeA+ 0.5 • gradeB

where the two components are as follows:

- gradeA - a grade gained on the basis of the final test,
- gradeB - a grade gained after preparing project

Sposób i tryb wyrównywania zaległości powstałych wskutek nieobecności studenta na zajęciach:

Catching-up after the absence of a student during classes takes place during office hours.

Every unjustified absence may impact the student's level of individual engagement as an element of calculating the final grade.

In case of longer – justified absence student is obliged to discuss with the teacher the individual condition of passing the course.

Prerequisites and additional requirements

Prerequisites and additional requirements not specified

Recommended literature and teaching resources

Branowski B., Wprowadzenie do projektowania. PWN. Warszawa 1998.

Dobrzański T. Rysunek techniczny maszynowy WNT, Warszawa 2007.

Gasparski W. i in., Projektoznawstwo. Elementy wiedzy o projektowaniu. WNT Warszawa 1988.

Kiciak P.: Podstawy modelowania krzywych i powierzchni. Zastosowania w grafice komputerowej. WNT, Warszawa 2000.

A. France, Swiat druku 3D. Przewodnik, Wyd. Helion, 2014 ISBN 978-83-246-9114-2,

P. Siemiński, G.Budzik, Techniki przyrostowe. Druk 3D. Drukarki 3D, OWPW, Warszawa, 2015,

E. Canessa, C. Fonda, M. Zennaro, Low-cost 3D Printing for Science, Education & Sustainable Development, ICTP 2013 (ebook)

C. Barnatt, 3D Printing: Second Edition, CreateSpace Independent Publishing Platform, 2014

Pikoń A AutoCAD 2002. Pierwsze kroki Helion 2001.

Suseł M Komputerowa grafika inżynierska – zbiór zadań Oficyna Wydawnicza Politechniki Wrocławskiej.

Tarnowski W., Podstawy projektowania technicznego. WSI w Koszalinie, Koszalin 1989.

Tytyk E., Projektowanie ergonomiczne. PWN. Warszawa 2001.

Scientific publications of module course instructors related to the topic of the module

Additional scientific publications not specified

Additional information

CAD and 3D Printing