

MODULE DESCRIPTION

Module code	Z-ZIP-447z
Module name	Prototypowanie nowych wyrobów
Module name in English	New Products Prototyping
Valid from academic year	2016/2017

A. MODULE PLACEMENT IN THE SYLLABUS

Field of study	Management and Production Engineering
Level of education	1st degree <i>(1st degree / 2nd degree)</i>
Studies profile	General <i>(general / practical)</i>
Form and method of conducting classes	Full-time <i>(full-time / part-time)</i>
Specialisation	Production and Innovation Management
Unit conducting the module	The Department of Production Engineering
Module co-ordinator	Artur Szmidt, PhD
Approved by:	

B. MODULE OVERVIEW

Type of subject/group of subjects	Specialist subject <i>(basic / major / specialist subject / conjoint / other HES)</i>
Module status	Compulsory <i>(compulsory / non-compulsory)</i>
Language of conducting classes	English
Module placement in the syllabus - semester	6th semester
Subject realisation in the academic year	Summer semester <i>(winter semester/ summer)</i>
Initial requirements	Engineering Graphics <i>(module codes / module names)</i>
Examination	No <i>(yes / no)</i>
Number of ECTS credit points	2

Method of conducting classes	Lecture	Classes	Laboratory	Project	Other
Per semester	15			15	

C. TEACHING RESULTS AND THE METHODS OF ASSESSING TEACHING RESULTS

Module target	The aim of the module is to: acquaint students with the knowledge as regards product prototyping, the methods of making stereographical models; design a new object or a device; prepare its shape and dimensions in 3D; prepare the necessary strength calculations of crucial construction walls and prepare its manufacturing technology. The final effect is to prepare an application to the Intellectual Property Centre.
----------------------	---

Effect symbol	Teaching results	Teaching methods (l/c/lab/p/other)	Reference to subject effects	Reference to effects of a field of study
W_01	A student has knowledge as regards preparing documentation and product manufacturing technology.	l/p	K_W07 K_W09	T1A_W06 T1A_W04
W_02	A student has knowledge as regards the technology of manufacturing prototypes with stereolithography methods as well as other methods in 3D.	l/p	K_W02	T1A_W01 T1A_W02 T1A_W07
W_03	A student has knowledge as regards preparing documentation which concerns submitting an application to the Intellectual Property Centre at Kielce University of Technology.	l/p	K_W04 K_W06 K_W16	T1A_W03 S1A_W06 T1A_W04 T1A_W05 T1A_W11
U_01	A student can assess the usefulness of the selected technology to manufacture his/her own products.	l/p	K_U03	TA1_U03
U_02	A student is able to make a project of a CAD-3D product, prepare a method of positioning the product on a machine platform, and initiate printing elements in 3D.	l/p	K_U03 K_U17	TA1_U03 TA1_U09 TA1_U16
U_03	A student can make appropriate drawings, develop a product manufacturing technology and prepare an application to the Intellectual Property Centre.	l/p	K_U11	TA1_U01 SA1_U03
K_01	A student understands the necessity of having skills as regards creating new devices; a student is also able to make necessary calculations and to develop a manufacturing technology.	l/p	K_K01 K_K04	T1A_K01 T1A_K03 T1A_K04
K_02	A student is aware of new prototype manufacturing methods in a three-dimensional space.	l/p	K_K01 K_K04	T1A_K01 T1A_K03 T1A_K04
K_03	A student is capable of preparing patent documentation or an industrial design to the Intellectual Property Centre.	l/p	K_K01 K_K04	T1A_K01 T1A_K03 T1A_K04

Teaching contents:

1. Teaching contents as regards lectures

Lecture number	Teaching contents	Reference to teaching results for a module
1	A review of modern manufacturing technologies concerning technical products. Technical preparation of new products.	W_01 U_01 K_01 K_02
2	The beginnings of element shaping with the stereolithographic method. 3D printing methods: SL, SLA, SLS, FDM, LENS, 3DP-3D Proting, IJP, and LOM.	W_02 U_02 K_01 K_02
3	Designing new objects and imaging their geometry in a virtual manner. CAD	W_02

	methods and programs. Obtaining and processing spatial data for three-dimensional reconstruction of physical objects.	U_02 K_02
4	The constructions of machine parts and mechanical mechanisms as well as their strength calculations.	W_01 W_02 U_01 U_02 K_01
5	Verifying geometrical models of the designed objects through physical models using stereolithography.	W_02 U_02 K_02

2. Teaching contents as regards classes

Class number	Teaching contents	Reference to teaching results for a module

3. Teaching contents as regards laboratory classes

Laboratory class number	Teaching contents	Reference to teaching results for a module

4. The characteristics of project assignments

Project class number	Teaching contents	Reference to teaching results for a module
1	A review of projects made by students and Patent Office databases.	W_01 W_02 U_01 U_02 K_01 K_02
2	Developing an own concept as regards the preparation, a utility model, etc. as well as making a sketch with a description of principles of operation.	W_01 W_02 U_01 U_02 K_01 K_02
3	Construction and strength calculations of particular elements. Assembling a construction from an initial construction together with possible corrections (SolidWorks).	W_01 W_02 U_01 U_02 K_01 K_02
4	Developing a technology of implementing one's own concept with an estimation of costs concerning piece and lot production.	W_01 W_02 U_01 U_02 K_01 K_02
5	Preparing and completing patent application to the Intellectual Property Centre.	W_03 U_03

		K_03
6	Obtaining a credit for project classes.	

The methods of assessing teaching results

Effect symbol	Methods of assessing teaching results <i>(assessment method, including skills – reference to a particular project, laboratory assignments, etc.)</i>
W_01	Preparing a complete project with technical drawings, engineering calculations, technology description of an element or device completion.
W_02	Preparing a complete project with technical drawings, engineering calculations, technology description of element or device completion.
W_03	Preparing a patent application form to the Intellectual Property Centre.
U_01	Preparing a complete project with technical drawings, engineering calculations, technology description of an element or device completion.
U_02	Preparing a complete project with technical drawings, engineering calculations, technology description of an element or device completion.
U_03	Preparing a patent application form to the Intellectual Property Centre.
K_01	Preparing a complete project with technical drawings, engineering calculations, technology description of an element or device completion.
K_02	Preparing a complete project with technical drawings, engineering calculations, technology description of an element or device completion.
K_03	Preparing a patent application form to the Intellectual Property Centre.

D. STUDENT'S INPUT

ECTS credit points		
	Type of student's activity	Student's workload
1	Participation in lectures	15
2	Participation in classes	
3	Participation in laboratories	
4	Participation in tutorials (2-3 times per semester)	
5	Participation in project classes	15
6	Project tutorials	4
7	Participation in an examination	
8		
9	Number of hours requiring a lecturer's assistance	34 <i>(sum)</i>
10	Number of ECTS credit points which are allocated for assisted work <i>(1 ECTS point=25-30 hours)</i>	1
11	Unassisted study of lecture subjects	1
12	Unassisted preparation for classes	
13	Unassisted preparation for tests	
14	Unassisted preparation for laboratories	
15	Preparing reports	
15	Preparing for a final laboratory test	
17	Preparing a project or documentation	31
18	Preparing for an examination	
19		
20	Number of hours of a student's unassisted work	32 <i>(sum)</i>
21	Number of ECTS credit points which a student receives for unassisted work <i>(1 ECTS point=25-30 hours)</i>	1
22	Total number of hours of a student's work	66
23	ECTS points per module <i>1 ECTS point=25-30 hours</i>	2
24	Work input connected with practical classes <i>Total number of hours connected with practical classes</i>	50
25	Number of ECTS credit points which a student receives for practical classes <i>(1 ECTS point=25-30 hours)</i>	1.5

E. LITERATURE

Literature list	1. <i>Projektowanie i konstrukcje inżynierskie</i> – miesięcznik. 2. Deja M., Przybylski W., <i>Komputerowo wspomagane wytwarzanie maszyn. Podstawy i zastosowanie Naukowo-Techniczne</i> , Listopad 2007.
Module website	www.tu.kielce.pl/~wzmk_mat