

FACULTY OF ELECTRICAL
ENGINEERING**SUBJECT CARD**

Name in Polish: **Grafika inżynierska**
 Name in English: **Engineering graphics**
 Main field of study (if applicable): **Control Engineering and Robotics**
 Specialization (if applicable):
 Level and form of studies: **1st level, full-time**
 Kind of subject: **obligatory**
 Subject code: **ARR043101**
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	15		30		
Number of hours of total student workload (CNPS):	60		60		
Form of crediting:	crediting with grade		crediting with grade		
For group of courses mark (X) final course:					
Number of ECTS points:	2		2		
including number of ECTS points for practical (P) classes :			2		
including number of ECTS points for direct teacher-student contact (BK) classes:	1.40		1.40		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. 1. Basic knowledge of geometry 2. Skills to work with computer and Windows system

SUBJECT OBJECTIVES

- C1. Knowledge of methods of axonometric and multi-view projection of 2D and 3D geometric objects and principles of computer engineering graphics by using AutoCAD.
 C2. Knowledge of principles of forming details and assembly drawings of electromechanical constructions.
 C3. Achievement of skills of sketching of elements by multi view projection including views, sections and drawing by AutoCAD system.
 C4. Achievement of skills forming and reading technical documentation including detail and assembly drawings of electromechanical constructions.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 Student is able to determine the way of multi-view projection in European system of 2D and 3D geometric objects by technical sketches and computer drawings using AutoCAD.

PEK_W02 Student is able to formulate the way of making detail and assembly technical drawings as a technical sketches or electronic files using AutoCAD

relating to skills:

PEK_U01 Student is capable of making technical drawings as a sketches or electronic files using AutoCAD system.

PEK_U02 Student is able to analyze detail and assembly technical drawings containing European system of multi-view projection, sections, dimensioning and standard elements in joints of mechanical constructions

relating to social competences:

PEK_K01 Obtaining skills of systematic study and work in team while doing laboratory tasks.

PROGRAMME CONTENT

Form of classes - lecture		Number of hours:
Lec 1	Introduction to the course, requirements. Engineering graphic notation, types of drawings, drawing sizes, lines, scales. Principles of computer engineering graphics - introduction to AutoCAD system.	2
Lec 2	Methods of projection: axonometric and multi-view projection. Projection of geometric objects: figures and solids. Sections of solids by planes.	2
Lec 3	European system of multi-view projection of 3D components (structural members). Intersection of details using straight and complex sections.	2
Lec 4	Dimensioning: principles, symbols and size dimensions, detailed cases.	2
Lec 5	Tolerancing and types of mating. Tolerance of position and shape of elements.	2
Lec 6	Standard elements and joints applied in mechanical constructions.	2
Lec 7	Technical documentation: detail and assembly drawings.	1
Lec 8	Written test.	2
Total hours:		15

Form of classes - laboratory		Number of hours:
Lab 1	Course schedule and requirements. Instruction on a structure and usage of the AutoCAD program package.	2
Lab 2	Drawing of plane curves: parabola, hyperbola and sinusoid.	2
Lab 3	Precise drawing of sheet metal patterns of different geometrical shapes.(ACAD)	2
Lab 4	Multi-view projection of polygons.	2
Lab 5	Multi-view projection of complex solids.	2
Lab 6	Multi-view projection of elements (details) - views.	2
Lab 7	Multi-view projection of elements (details) - sections.	2
Lab 8	Isometric drawings: details in isometric projection.	2
Lab 9	Isometric projection of an element on the base of its multi-view projection.	2
Lab 10	Sketching of working drawing of an individual part (element) - necessary multi-views and sections.	2
Lab 11	Sketching of working drawing of an individual part (element) - dimensioning.	2
Lab 12	Working drawing of an individual part (element) - multi-views, sections and dimensioning. (ACAD)	2
Lab 13	Sketching of screw joints of elements in mechanical constructions: views, sections, dimensioning and details specification.	2
Lab 14	Drawing of screw joints of elements in mechanical constructions in AutoCAD system.	2
Lab 15	Supplementations and crediting.	2
Total hours:		30

TEACHING TOOLS USED

- N1. Multimedia and traditional presentation illustrated by numerous examples.
 N2. Sketching on sheet of paper by pencil and computer aided technical drawing using AutoCAD.

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation <i>F - forming (during semester) P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(W)	PEK_W01 PEK_W02	Written test
P(W)	P=F1	
F1(L)	PEK_U01 PEK_U02 PEK_K01	Evaluation of technical sketches
F2(L)	PEK_U01 PEK_U02 PEK_K01	Evaluation of drawings executed in AutoCAD system
P(L)	P=0.5F1+0.5F2	

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

- [1] Suseł M., Makowski K., Grafika inżynierska z zastosowaniem programu AutoCAD, OWPWr, 2005.
- [2] Suseł M., Komputerowa grafika inżynierska. Zbiór zadań. OWPWr, 1999.
- [3] Dobrzański T., Rysunek techniczny maszynowy. WNT, Warszawa 2002.
- [4] Rydzanicz I., Zapis konstrukcji - zadania. WNT, Warszawa, 1999.
- [5] Textbook: AutoCAD 2002 LT., First steps, Autodesk, Inc., 2001.

SECONDARY LITERATURE:

- [1] Zbiór Polskich Norm, Rysunek techniczny maszynowy.
- [2] Zbiór Polskich Norm, Rysunek elektryczny.
- [3] Strony internetowe: www.cad.pl/kursy, <http://students.autodesk.com>

SUBJECT SUPERVISOR

Krzysztof Makowski, krzysztof.makowski@pwr.edu.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT ARR043101 - Engineering graphics AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Control Engineering and Robotics**

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)	Subject objectives	Programme content	Teaching tool number
PEK_W01	K1AiR_W09	C.1	Lec1 Lec2 Lec3	N.1
PEK_W02	K1AiR_W09	C.2	Lec4 Lec5 Lec6 Lec7 Lec8	N.1
PEK_U01	K1AiR_U07	C.3	Lab1 Lab2 Lab3 Lab4 Lab5 Lab6 Lab7 Lab8 Lab9	N.2
PEK_U02	K1AiR_U07	C.4	Lab10 Lab11 Lab12 Lab13 Lab14 Lab15	N.2
PEK_K01	K1AiR_K01	C.1 C.2 C.3 C.4	Lab1 Lab2 Lab3 Lab4 Lab5 Lab7 Lab8 Lab9 Lab10 Lab11 Lab12 Lab13 Lab14 Lab15	N.1 N.2