Integrated production systems

Faculty of	**Mechanical and Power Engineering**
Name in English	**Integrated production systems**
Name in Polish	**Zintegrowane systemy produkcji**
Main field of study	**Power Engineering**
Specialization	**-**
Level of studies	**II level**
Form of studies	**full-time**
Kind of subject	**wybieralny**
Subject code	**W09ENG-SM2347**
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)	25		50		
Form of crediting	Credit		Credit		
For group of courses mark final course with (X)					
Number of ECTS points	1		1		
including number of ECTS points for practical (P) classes			1		
including number of ECTS points for direct teacher-student contact (BU) classes	0.68		1.36		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1.	Knowledge of basic issues related to manufacturing processes.
2.	Ability to use the CATIA system in the generation of parametric models and assemblies.
3.	Knowledge of the basics of machine construction, strength and technical drawing

SUBJECT OBJECTIVES

C1	To familiarize students with CIM (Computer Integrated Manufacturing) - integrated manufacturing environment.
C2	To familiarize students with the development directions of technologies such as: CAD, CFD, MES, CAM, CAPP, MRP, ERP.
C3	Presentation of so-called methods Rapid Prototyping and the so-called Reverse Engineering.
C4	To develop the skills to integrate of the engineering activities into one CAD/CAM system

SUBJECT LEARNING OUTCOMES

relating to knowledge:	
PEU_W01	Knows the basic production processes and the principles of their integration within the enterprise IT platform.
PEU_W02	Has basic knowledge of CAD, CAE, CAPP, CAM.
PEU_W03	Knows the methods of rapid prototyping and reverse engineering.
relating to skills:	

PEU_U01	Is able to elaborate a complete machine part design in one integrated CATIA package from the concept stage to simulation of the manufacturing process using MES and CAM.
PEU_U02	Is able to use online knowledge resources to select and obtain models of machine parts and is able to prepare a coherent presentation regarding the implemented project.

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Wy1	Introduction to classes. The essence of CIM.	2
Wy2	Overview of manufacturing techniques.	2
Wy3	Introduction to CAD.	2
Wy4	Introduction to FEM	2
Wy5	Introduction to CFD.	2
Wy6	Introduction to CAM and CNC.	2
Wy7	Rapid prototyping. Reverse engineering	2
Wy8	Credit	1
Total hours		15

laboratory		Number of hours
La1	Organizational matters. The issue of topics.	2
La2	Conducting of the necessary calculations. Development of the necessary calculation sheets.	2
La3	Conducting of the necessary calculations. Development of the necessary calculation sheets.	2
La4	Conducting of the necessary calculations. Development of the necessary calculation sheets.	2
La5	Conducting of the necessary parametric models in the CATIA system and their integration with calculation sheets.	2
La6	Conducting of the necessary parametric models in the CATIA system and their integration with calculation sheets.	2
La7	Conducting of the necessary parametric models in the CATIA system and their integration with calculation sheets.	2
La8	Conducting of the necessary FEM calculations in the CATIA system and optimization of designed parts.	2
La9	Conducting of the necessary FEM calculations in the CATIA system and optimization of designed parts.	2
La10	Conducting of the necessary FEM calculations in the CATIA system and optimization of designed parts.	2
La11	Preparation of the technical drawings in the CATIA system.	2
La12	Preparation of the technical drawings in the CATIA system.	2
La13	Elaboration of the manufacturing process of the selected part and familiarization with the CATIA CAM module.	2
La14	Elaboration of the manufacturing process of the selected part and familiarization with the CATIA CAM module.	2
La15	Presentation of results and defense of the project	2
Total hours		30

TEACHING TOOLS USED	
N1	Informative lecture using multimedia technologies.
N2	Lecture using blackboard
N3	Consultations
N4	Own work

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F– forming (during semester), C– concluding (at semester end)	Educational effect number	Way of evaluating educational effect achievement
F1	PEU_W01	Final test
F2	PEU_W02	Final test
F3	PEU_W03	Final test
F4	PEU_U01	Presentation of results and defense of the project
F5	PEU_U02	Presentation of results and defense of the project

PRIMARY AND SECONDARY LITERATURE

Primary literature	
1	Dorf R. „Handbook of Design, Manufacturing and Automation", John Wiley & Sons, Inc., Toronto 1994
2	Khan W. Raouf A. „Standards for Engineering Design and Manufacturing", Taylor & Francis Group, LLC, London 2006
3	Saaksvuori A., Immonen A. „Product Lifecycle Management", Springer, Berlin, 2008.
4	Xun Xu „Integrating Advanced Computer-Aided Design, Manufacturing, and Numerical Control: Principles and Implementations", IGI Global New York 2009.
5	Wu B. „Handbook of Manufacturing and Supply Systems Design", Taylor&Francic, London 2002.
6	Dorf R. „Handbook of Design, Manufacturing and Automation", John Wiley & Sons, Inc., Toronto 1994
Secondary literaturę	
1	Leondes C. „Computer-Aided Design, Engineering, and Manufacturing Systems Techniques And Applications VOLUME 2. Computer Integrated Manufacturing", CRC Press LLC, New York 2001.
2	Leondes C. „Computer-Aided Design, Engineering, and Manufacturing Systems Techniques And Applications VOLUME 5. The Design of Manufacturing Systems", CRC Press LLC, New York 2001.
3	Leondes C. „Computer-Aided Design, Engineering, and Manufacturing Systems Techniques And Applications VOLUME 6. Manufacturing Systems Processes", CRC Press LLC, New York 2001.
4	Leondes C. „Computer Aided and Integrated Manufacturing Systems. Volume 2. Intelligent Systems Technologies", World Scientific Publishing Co. Pte. Ltd. , Singapure 2003.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

Imię i nazwisko:	Janusz Skrzypacz
E-mail:	janusz.skrzypacz@pwr.edu.pl