

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Automation and industrial measurements		Code
Field of study Chemical and Process Engineering	Profile of study (general academic, practical) general academic	Year /Semester 3 / 5
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 30 Classes: - Laboratory: 30 Project/seminars: -		No. of credits 4
Status of the course in the study program (Basic, major, other) basic		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 4 100% 4 100%
Responsible for subject / lecturer: dr hab. inż. Marek Ochowiak e-mail: marek.ochowiak@put.poznan.pl tel. 61 665 2147 Wydział Technologii Chemicznej ul. Piotrowo 3, 60-965 Poznań tel.: 61 665 2652		Responsible for subject / lecturer:
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	- basics of chemical and process engineering, - basics of electronics and electrotechnics, - basic knowledge of construction and operating principles of process equipment.
2	Skills	- analysis of the measurement data obtained in the field of chemical and process engineering, - performing mathematical calculations.
3	Social competencies	- the graduate is aware of the advantages and limitations of individual and group work in solving industrial problems, - in addition, the graduate knows the limitations of his knowledge and sees the necessity of its deepening.
Assumptions and objectives of the course: Knowledge in the field of technological measurements, control and measurement equipment in the chemical industry as well as elements of industrial automation and process control.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. The graduate has a knowledge of automatics and industrial measurements to the extent necessary to formulate and solve simple calculating to choose the equipment to conduct experimental research [K_W06] 2. The graduate knows the principles of control and measurement systems [K_W07] 3. The graduate has a knowledge of control of technological processes and measurements in chemical technology and engineering [K_W07]		
Skills:		
1. The graduate can acquire information from literature, databases and other sources. [K_U01] 2. The graduate can conduct experiments in automation and industrial measurement, interpret their results and draw conclusions. [K_U08]		
Social competencies:		
1. The graduate understands the need to develop and improve his/her professional and personal competencies and systematically reports on laboratory exercises [K_K01]		

Assessment methods of study outcomes	
<p>Knowledge: Test: 1, 2,3</p> <p>Skills: Test: 1 Reports on laboratory exercises: 2</p> <p>Social competencies: Written test and oral test: 1</p>	
Course description	
<p>During the course are discussed:</p> <ul style="list-style-type: none"> • Introduction, • Automatic regulation systems. • Setting and executive elements. • The role of executive systems in industrial control systems. • Regulators. • Stability and quality of control. • Signalization, blockades and security. • Measurement sensors. • Measurements, measuring instruments and transducers. • Control of quantities and technological processes in chemical technology and engineering. • Automation in the plant (video presentation). 	
<p>Basic bibliography:</p> <ol style="list-style-type: none"> 1. Piekarski M., Poniewski M.: Dynamika i sterowanie procesami wymiany ciepła i masy, WNT, Warszawa 1994. 2. Senczyna S.: Modelowanie sterowania procesów przemysłowych, Wyd. Politechniki Śląskiej, Gliwice 1997. 3. Blachuta M.: Laboratorium teorii sterowania i podstaw automatyki, Wyd. Politechniki Śląskiej, Gliwice 1999. 4. Gessing R.: Podstawy automatyki, Wyd. Politechniki Śląskiej, Gliwice 2001. 5. Mikulski J.: Podstawy automatyki – liniowe układy regulacji, Wyd. Politechniki Śląskiej, Gliwice 2001. 6. Urbaniak A.: Podstawy automatyki, Wyd. Politechniki Poznańskiej 2001. 7. Kuźnik J.: Regulatory i układy regulacji, Wyd. Politechniki Śląskiej, Gliwice 2003. 8. Kostro J.: Elementy, urządzenia i układy automatyki, Wydawnictwa Szkolne i Pedagogiczne, Warszawa 2006. 	
<p>Additional bibliography:</p> <ol style="list-style-type: none"> 1. Pasko M., Walczak J.: Teoria sygnałów, Wyd. Politechniki Śląskiej, Gliwice 2003. 2. Kacperski W., Kruszewski J., Marcinkowski R.: Inżynieria systemów procesowych. Elementy syntezy procesów technologicznych, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2002. 3. Trybus L.: Regulatory wielofunkcyjne, WNT, Warszawa 1995. 4. Metzger R.: Mikroprocesorowe urządzenia i układy automatyki, Wyd. Politechniki Śląskiej, Gliwice 2000. 	
Result of average student's workload	
Activity	Time (working hours)

1. Participation in lectures	30	
2. Consultations	5	
3. Test preparation	15	
4. Preparation for laboratory	10	
5. Laboratory	30	
6. Reports preparation	10	
Student's workload		
Source of workload	hours	ECTS
Total workload	100	4
Contact hours	65	3
Practical activities	30	1