STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Diploma section**			Code **1010331271010335472**
Field of study **Automatic Control and Robotics**	Profile of study (general academic, practical) **(brak)**		Year /Semester **4 / 7**
Elective path/specialty **Robotics**	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: **-** Classes: **-** Laboratory: **30** Project/seminars: **90**			No. of credits **8**
Status of the course in the study program (Basic, major, other) **(brak)**	(university-wide, from another field) **(brak)**		
Education areas and fields of science and art **technical sciences**			ECTS distribution (number and %) **8 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	K_W10: He has structured knowledge about selected algorithms and data structures, as well as methodology and techniques of procedural and object-oriented programming. K_W13: He has structured knowledge about computer architectures, systems and computer networks, as well as operating systems (including real time operating systems). K_W15: He has a basic knowledge about architectures and microprocessor systems programming; He knows languages of high- and low-level programming of microprocessors.
2	**Skills**	K_U03: He is able to prepare the documentation and give a presentation regarding the results of engineering task. K_U11: He is able to build an algorithm for solution of a simple measuring task, compute-control task. He is able to implement, test and
3	**Social competencies**	K_K01: He understands the need and knows the possibilities of lifelong learning - to improve professional, personal and social competencies.

Assumptions and objectives of the course:

The aim of the course is to familiarize students with the methodology and the practical aspects of engineering design and preparation of project documentation rules as well as scientific research in the Institute of Control, Robotics and Information Engineering. The goal is the acquisition of the practical application of skills previously acquired knowledge and skills independently solving problems encountered.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. He has a structured knowledge about the construction, application and control of automation and robotics systems. - [K_W19]
2. He knows and understands typical engineering technologies, principles and techniques of constructing simple automation and robotics systems; He knows and understands the rules of selection of actuators, computational units, components and control-measurement equipment. - [K_W20]
3. He has the knowledge about the current state of the art and recent R&D trends in the area of automation and robotics - [K_W21]

Skills:

1. He can build, launch, and test a simple electronics and electromechanical system - [K_U20]
2. He can plan, prepare and conduct the simulation of simple automation and robotics systems - [K_U21]
3. He is able to formulate and solve the tasks of automation and robotics systems design; He is able to see their non-technical aspects, including environmental, economic and law aspects - [K_U22]

Social competencies:

1. He has awareness of the responsibility for own work and a willingness to submit to principles of teamwork and responsibility for jointly implemented tasks; He is able to manage a small team, set goals and define priorities necessary to solve the task - [K_K03]

Assessment methods of study outcomes

Project: Evaluation of the presentation of projects related to the implementation of elements of the thesis.

Laboratory: Assessing the progress in implementing the thesis and preparing the final raport

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Course description

Update 2017:

Applied methods of learning: laboratory, project.

Laboratory: Develop skills in analysis and design of some of electromechanical and microprocessor used in control engineering and robotics (and its programming). Evaluation of project results.

Project: Review of practical skills in the design resulting from the topic of the thesis. Analysis / discussion of various methods (including unconventional) of problem solving and preparation of engineering works. Detailed analysis of sample design works and discussion of comments. Multimedia presentation on the principles of bibliography preparation and formal requirements for conducting diploma theses. Case study.

Basic bibliography:

1. 1) Wrycza-Bekier J., Kreatywna praca dyplomowa: jak stworzyć fascynujący tekst naukowy, Gliwice, Wydawnictwo Helion, 2011.

2. 2) Detyna B., Matuszek J., Szołtysek J, Praca dyplomowa inżynierska : poradnik metodyczny, Wałbrzych, Wydawnictwo Państwowej Wyższej Szkoły Zawodowej im. Angelusa Silesiusa, 2015.

3. 3) Świsulski D. E-technologie w kształceniu inżynierów : otwarci na nowe wyzwania - wybieramy MOOC?, Zeszyty Naukowe Wydziału Elektrotechniki i Automatyki Politechniki Gdańskiej 41

4. 4) Giernacki W. E-learning and comprehensive education of engineers in the EU, International Journal of Information and Education Technology, vol. 2, no. 6, pp. 587-590, December 2012

Additional bibliography:

1. 1) Giernacki W., Skwierczyński M., Witwicki W., Wroński P., Kozierski P.: Crazyflie 2.0 Quadrotor as a Platform for Research and Education in Robotics and Control Engineering, In: 21st International Conference on Methods and Models in Automation and Robotics (MMAR), Międzyzdroje, Poland pp. 37-42, 2017

2. 2) Giernacki W., D. Horla, and T. Sadalla, Mathematical Models Database (MMD ver. 1.0). Non-Commercial Proposal for Researchers, In: 21st International Conference on Methods and Models in Automation and Robotics (MMAR), Międzyzdroje, Poland pp. 555-558, 2016, DOI: 10.1109/MMAR.2016.7575196, http://mathematicalmodels.put.poznan.pl

Result of average student's workload

Activity	Time (working hours)
1. Pracownia dyplomowa	90
2. Laboratorium	30
3. Realizacja pracy dyplomowej	80

Student's workload

Source of workload	hours	ECTS
Total workload	200	8
Contact hours	120	5
Practical activities	200	8