

**Program ramowy studiów II stopnia ROBOTICS
na kierunku
Automatyka i Robotyka**

Warszawa, kwiecień 2014

Automatic Control & Robotics
Robotics

Graduate Program

The duration of the study is 4 semesters (2 academic years) with 120 ECTS. Obligatory courses cover 77 ECTS and 43 ECTS is assigned to elective courses. The semesters are equally loaded with 30 ECTS each.

The program is designed as a high-quality educational offer in the area of advanced and intelligent robotics. After graduation the students will have mastered the diverse areas of robotics (mathematical modeling, control engineering, computer engineering, mechanical design) to an extent to be able to deal with robotics systems as a whole rather than just to focus on one particular area. The future career prospects for graduates are very good as the proposed courses are relevant to today's advanced technology society and because the current output of universities is insufficient to meet the demand of industry and research programmes. Students may take the master as a professional terminal degree, or join PhD programmes afterwards.

The graduate of the *Robotics* studies will demonstrate both the knowledge and abilities necessary for creative work in design, construction, programming and analysis of automation and control systems, as well as industrial and service robot systems. He/she will be capable of solving complex, interdisciplinary problems dealing with control and robotics. The graduate will have general and engineering knowledge at the level enabling him/her to conduct research in RTD centres. The graduate can be employed as senior management in mechanical, electrotechnical, chemical and related industrial sectors. He/she will be capable of designing and analysing complex robotics systems with the use of modern advanced design and analytical tools. He/she will be provided with the theoretical background enabling the solution of research problems in the field of control and robotics.

Nomenclature

L - lecture

T - tutorial

La – laboratory

P – project

^{*)} – denotes total number of hours in semester

E - end-of-semester exam

CA – continuous assessment, class works

For example: 2L2T means 2 lectures and 2 tutorials in every week

20^{*)}L means 20 lecturing hours during whole semester

1st semester

The student will take 5 obligatory modules - 26 ECTS and modules from elective list for 4 ECTS

Modules	Plan: hrs per week	ECTS	Passing method
Obligatory courses			
Modeling and control of manipulators	2L 2T	6	CA+E
Real-time systems	2L 2La 1P	5	CA+E
Signal processing	2L 1T	5	CA+E
Computer vision	2L 1T	5	CA+E
Neural networks	2L 1T	5	CA+E
Elective courses can be selected from visiting courses, the 2nd semester of Power Engineering, or Aerospace Engineering programs			
Example suggestions			
Local/foreign language	2T	4	CA
ANS647 Attitude and navigation systems	1L1T1P	4	CA
ANK371 Business Law	2L1T	2	CA
ANS535 Future Power Technologies	2T	2	CA

2nd semester

The student will take 6 obligatory modules - 25ECTS, and elective topic within Group project (5ECTS).

Modules	Plan: hrs per week	ECTS	Passing method
Obligatory			
Mechanical design methods in robotics	2L 2P	5	CA+E
Robot programming methods	2L 2T	4	CA+E
Mobile robots	2L 2T	4	CA+E
Artificial intelligence	2L 1C	4	CA+E
Optimisation techniques	1L 1T	4	CA+E
Embedded systems	2L 1T	4	CA+E
Elective topic			
Group project	1L	5	CA

3rd semester courses

The student will take 5 obligatory modules for 26ECTS and elective courses for 4 ECTS

Modules	Plan: hrs per week	ECTS	Passing method
Obligatory			
Bio-robotics	2L 1P	5	CA+P
Dynamics of multi-body systems	2L 1T	5	CA+E
Biomechanics	2L 1T	5	CA+E
Advanced mechanical design	2L 1T	5	CA+E

Research methodology	10 ^{*)} L	6	P
*) Total number of teaching hours per semester			
Elective courses can be selected from visiting courses, the 2nd semester of Power Engineering, or Aerospace Engineering programs			
Example suggestions			
ANS511 Sensors and measurements systems	1L 1T	3	CA
ANS534 Advanced Renewable Energy Sources	2L 1T	3	E
ANK371 Business Law	2L 1T	2	CA
ANS535 Future Power Technologies	2T	2	CA
ANS647 Attitude and navigation systems	1L 1T 1P	4	Ca
Local language/foreign language	3T	4	Ca

4th semester

This semester is mainly devoted to the work on the Master Thesis, valued at 30 ECTS credits. Each student will be supervised by elected advisor. The research work is finalised by a written dissertation of the Masters Thesis, which must be done individually and contain an element of original work. The dissertation must be defended in the presence of a committee of experts.

Modules	Plan: hrs per week	ECTS	Passing method
Obligatory with elective topic			
MSc thesis		30	Diploma exam