

| STUDY MODULE DESCRIPTION FORM | | |
|---|--|--|
| Name of the module/subject Automatics and Automatic Control | | Code 1010324361010314773 |
| Field of study Electrical Engineering | Profile of study (general academic, practical) general academic | Year /Semester 3 / 6 |
| Elective path/specialty - | Subject offered in: Polish | Course (compulsory, elective) obligatory |
| Cycle of study: First-cycle studies | Form of study (full-time, part-time) part-time | |
| No. of hours Lecture: 20 Classes: - Laboratory: 20 Project/seminars: - | | No. of credits 3 |
| Status of the course in the study program (Basic, major, other) other | | (university-wide, from another field) university-wide |
| Education areas and fields of science and art technical sciences Technical sciences | | ECTS distribution (number and %) 3 100% 3 100% |
| Responsible for subject / lecturer: dr inż. Andrzej Kwapisz email: andrzej.kwapisz@put.poznan.pl tel. +48 616 652 559 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań | | Responsible for subject / lecturer: dr inż. Jacek Handke email: jacek.handke@put.poznan.pl tel. +48 616 652 559 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań |
| Prerequisites in terms of knowledge, skills and social competencies: | | |
| 1 | Knowledge | Has knowledge about mathematics and selected physics sections (optics, mechanics, electricity, magnetism). Has knowledge about signal theory and methods of its processing in time and frequency domain. |
| 2 | Skills | Is able to describe selected physical phenomena with mathematical apparatus |
| 3 | Social competencies | Is able to approve himself in new knowledge acquisition |
| Assumptions and objectives of the course: Getting knowledge about basic automatics components, automatic system and regulation, knowledge of regulator selection and its parameters adjustment for different types of regulation objects. Knowledge about synthesis methods and analysis of continuous automatic systems with application of different analytic methods and numerical modeling. | | |
| Study outcomes and reference to the educational results for a field of study | | |
| Knowledge: | | |
| 1. Has general knowledge about use and operation of automatic systems. - [K_W01 +++] | | |
| 2. Understands the principles and methods of mathematical modeling and practical application of automatic control systems - [K_W14 +++] | | |
| Skills: | | |
| 1. Is able to identify basic automatic components and automatic control systems on the basis of its specific features. - [K_U01 +++] | | |
| 2. Is able to use software tools for research of automatic system features and it - [K_U09 +++] | | |
| 3. Is able to design and evaluate the results of a simple automatic control system operation - [K_U13 +++] | | |
| Social competencies: | | |
| 1. Is aware of the significant impact of engineering and automatic control systems on the environment - [K_K02 ++] | | |
| 2. Understands the need for continuous professional development, personal and group cooperation - [K_K03 ++] | | |
| Assessment methods of study outcomes | | |

| | |
|--|-----------------------------|
| <p>Lecture evaluation of the knowledge and skills on the basis of written tests, classroom activity rewarding.</p> <p>Laboratory: tests and written tests, evaluation of knowledge and skills related to the accomplishment practice task, evaluation of report from performed exercise.</p> <p>Obtainment of extra points for the activity in the classroom, in particular for: effectiveness of the application of acquired knowledge during studies, ability to work within a team performing the detailed practice task in the laboratory, contribution to the achievement of the tasks.</p> | |
| Course description | |
| <p>Basic concepts of control theory, the division of control systems. Mathematical description of linear control systems, transfer and spectral function, examples. Description of the control system state variables. Properties of the basic elements of automation. Time and frequency characteristics. Block diagrams of automatic control systems, flowchart conversion. Properties of regulators, tuning and examples. The stability of continuous linear systems, the general conditions of stability, algebraic and graphical criteria. Correction in control systems. Linear discrete systems, system stability. Nonlinear systems (static characteristics, dynamics analysis methods, examples). Quality of control, static accuracy, description of the properties of dynamic systems.</p> | |
| <p>Basic bibliography:</p> <ol style="list-style-type: none"> 1. Brzózka J., Regulatory i układy automatyki, MIKOM 2004 2. Byrski W., Obserwacja i sterowanie w systemach dynamicznych, UWND AGH Kraków 2007 3. Dębowski A., Automatyka - Podstawy teorii, WNT 2008 4. Dorf R.C. Bishop R.H., Modern Control Systems, Addison - Wesley & Sons, 1998 5. Findeisen W., Technika regulacji automatycznej, PWN 1969 6. Kowal J., Podstawy automatyki. Tom I, UWND AGH Kraków 2004 7. Kowal J., Podstawy automatyki. Tom II, UWND AGH Kraków 2004 8. Mazurek J. Vogt H. Żydanowicz W., Podstawy automatyki, OWPW 2002 9. Nise N.S., Control System Engineering. 3th edition, John Wiley & Sons, 2000 10. Ogata K., Modern Control Engineering. 4th edition, Prentice Hal 2002 11. Rumatowski K., Podstawy automatyki. Część 1. Układy liniowe o działaniu ciągłym, WPP 2004 12. Rumatowski K., Podstawy regulacji automatycznej, WPP 2008 13. Węgrzyn S., Podstawy automatyki, PWN 1976 14. Zabczyk J., Zarys matematycznej teorii sterowania, PWN 1991 15. Żelazny M., Podstawy automatyki, PWN 1976 | |
| <p>Additional bibliography:</p> <ol style="list-style-type: none"> 1. Amborski K., Marusak A. Teoria sterowania w ćwiczeniach, PWN 1978 2. Baron K. Latarnik M. Skrzywan-Kosek A. Świerniak A. , Zbiór zadań z teorii liniowych układów regulacji, WPS 1999 3. Holecjko D. Kościelny W. Niewczas W., Zbiór zadań z podstaw automatyki, OWPW 1985 4. Horla D, Podstawy automatyki - ćwiczenia laboratoryjne, WPP 2009 5. Mrozek B. Mrozek Z., Matlab i Simulink. Poradnik użytkownika. Wydanie II, HELION 2004 6. Próchnicki W., Dzida M. Zbiór zadań z podstaw automatyki, WPG 1993 | |
| Result of average student's workload | |
| Activity | Time (working hours) |

| | | |
|---|--------------|-------------|
| 1. participation in class lectures | 20 | |
| 2. participation in laboratory classes | 20 | |
| 3. participate in the consultations on the lecture | 4 | |
| 4. participate in the consultations on the laboratory | 4 | |
| 5. preparation laboratory reports | 7 | |
| 6. preparation to the laboratory classes | 4 | |
| 7. preparation of home work | 4 | |
| 8. prepare for the completion of laboratory | 3 | |
| 9. completion of laboratory classes | 2 | |
| 10. prepare for the completion of class lectures | 4 | |
| 11. completion of class lectures | 2 | |
| 12. student`s selfmanaged work | 15 | |
| Student's workload | | |
| Source of workload | hours | ECTS |
| Total workload | 89 | 3 |
| Contact hours | 55 | 2 |
| Practical activities | 59 | 2 |