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| **WSB University Branch/Department of Jaworzno** | | | | | | | | | | |
| **Field of study: Computer Science** | | | | | | | | | | |
| **Subject: Programming of computer calculations** | | | | | | | | | | |
| **Educational profile: practical** | | | | | | | | | | |
| **Level of education: undergraduate studies** | | | | | | | | | | |
| **Number of hours per semester** | | 1 | | | 2 | | | 3 | | 4 |
| I | II | | III | | IV | V | VI | VII |
| **Full-time studies**  (w/w/lab/pr/e)\* | |  |  | |  | |  | **12w /**  **16ćw** |  |  |
| **Part-time studies**  (w/æw/lab/pr/e) | |  |  | |  | |  | **10w /**  **12ćw** |  |  |
| **LANGUAGE OF**  **INSTRUCTION** | | Polish | | | | | | | | |
| **LECTURER** | | Dr.-Ing. Buchwald Paweł, M.Sc. Popławski Krzysztof | | | | | | | | |
| **FORM OF ACTIVITIES** | | Lecture, exercises, consultations | | | | | | | | |
| **SUBJECT OBJECTIVES** | | The aim of the course is to familiarise students with the programming of selected computer calculation methods used in engineering practice. | | | | | | | | |
| **Reference to learning outcomes** | | | | **Description of learning outcomes** | | | | **Means of verification of the effect learning** | | |
| **Directional effect** | **PRK** | | |
| **NEWS** | | | | | | | | | | |
| INF\_W02 | P6S\_WG | | | Students will be familiar with methods of implementing selected computer calculations | | | | Test in the form of a test | | |
| INF\_W10 | P6S\_WG | | | The student is familiar with methods, techniques and tools for solving simple engineering problems in the field of programming computer calculations | | | | Test in the form of a test | | |
| **SKILLS** | | | | | | | | | | |
| INF\_U11 | P6S\_UW | | | Students will be able to critically analyse the functioning of the software | | | | Test in the form of a test | | |
|  |  | | |  | | | |  | | |
| **SOCIAL COMPETENCES** | | | | | | | | | | |
| INF\_K01 | P6S\_KK | | | Students are able to critically evaluate their knowledge | | | | Observation of students during classes | | |
| **Student workload (in teaching hours 1h =45 minutes)\*\*** | | | | | | | | | | |
| **Stationary** attendance at lectures = 12 participation in exercises = 16 preparation for exercise = 5 lecture preparation = 5 exam preparation =4 implementation of project tasks = e-learning =  Pass/examination = 4 other (consultation) = 4  **TOTAL: 50h**  **Number of ECTS credits: 2** | | | | | | **Part-time** attendance at lectures = 10 participation in exercises = 12 preparation for exercise = 8 lecture preparation = 8 exam preparation = 4 implementation of project tasks = e-learning =  Pass/examination = 4 other (consultation) = 4  **TOTAL: 50h**  **Number of ECTS credits: 2** | | | | |
| **including in practical classes: 1** | | | | | | **including in practical classes: 1** | | | | |
| **PREREQUISITES** | Knowledge of the basics of mathematical analysis and have programming skills in any language, e.g. C, python. | | | | | | | | | |
| **SUBJECT CONTENT**  (broken down into face-to-face and elearning classes) | **Lecture**  Content delivered in a face-to-face format:   * Methods for solving systems of linear equations: Cramer's formulae, Gauss elimination method, iterative methods. * Linear programming: formulation, interpretation and example of the task, simplex method, linear programming dual task. * Square programming. * Dynamic programming. * The linear-quadratic problem. * PID control algorithm. * Fourier transform. * Kalman filtration: extended Kalman filter, practical applications. * The discrete Bayes filter algorithm.     **Exercises**   * Methods for solving systems of equations. * Linear programming. * Practical implementation of the PID algorithm. * Filtering algorithms. | | | | | | | | | |
| **LITERATURE**  **COMPULSORY** | * Klamka J., Ogonowski Z.: Numerical methods. Silesian University of Technology Publishing House, Gliwice 2013. * Majchrzak E., Mochnacki B.: Numerical methods. Theoretical bases, practical aspects and algorithms. Wydawnictwo Politechniki Śląskiej, Gliwice 2004. * Świerniak, A., Gałuszka, A. Optimization Methods and Decision Making. Wydawnictwo Politechniki Śląskiej, Gliwice 2003. | | | | | | | | | |
| **LITERATURE**  **SUPPLEMENTARY**  (including min. 2 items in English; book publications or articles) | * Choset, H. M., Hutchinson, S., Lynch, K. M., Kantor, G., Burgard, W., Kavraki, L. E., (2005).   Principles of robot motion: theory, algorithms, and implementation. MIT press.   * Burgard, W., Thrun, S., Fox, D., (2005). Probabilistic robotics. MIT press. | | | | | | | | | |
| **TEACHING**  **METHODS**  (broken down into face-to-face and e-learning classes) | In direct form:  Multimedia lecture with numerous examples.  Use of laboratory instructions.  E-learning: Moodle platform and MS Teams application | | | | | | | | | |
| **LEARNING AIDS** | Moodle platform and MS Teams application | | | | | | | | | |
| **PROJECT**  (insofar as it is carried out as part of a course module) | Not applicable | | | | | | | | | |
| **FORM AND**  **CONDITIONS OF**  **PASSING**  (broken down into face-to-face and elearning classes) | Lecture: Written test  Exercises: Credit for the course is based on completed laboratory exercises. | | | | | | | | | |