



Subject card

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| Subject name and code | Automatics of Transportation Systems, PG_00031756 | | | | | | |
| Field of study | Automation, Robotics and Control Systems | | | | | | |
| Date of commencement of studies | February 2022 | Academic year of realisation of subject | | | 2022/2023 | | |
| Education level | second-cycle studies | Subject group | | | | | |
| Mode of study | Full-time studies | Mode of delivery | | | at the university | | |
| Year of study | 2 | Language of instruction | | | Polish | | |
| Semester of study | 3 | ECTS credits | | | 4.0 | | |
| Learning profile | general academic profile | Assessment form | | | assessment | | |
| Conducting unit | Department of Electrical Engineering of Transport -> Faculty of Electrical and Control Engineering | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Jacek Skibicki | | | | | |
| | Teachers | | | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 30.0 | 0.0 | 30.0 | 0.0 | 0.0 | 60 |
| | E-learning hours included: 0.0 | | | | | | |
| Learning activity and number of study hours | Learning activity | Participation in didactic classes included in study plan | | Participation in consultation hours | | Self-study | SUM |
| | Number of study hours | 60 | | 15.0 | | 25.0 | 100 |
| Subject objectives | The aim of the subject is to master the knowledge of widely understood automation in transport systems. The student learns the rules, systems and devices for controlling the railway traffic, urban transport and road traffic, as well as the possibilities of their automation. In addition, basic issues related to the automation of electric vehicle operation will be presented. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | | Method of verification | |
| Subject contents | Traffic and railway traffic control devices: railway signaling. Techniques of railway traffic protection, track occupation control systems. Railway traffic management, the concept of linear and semi-automatic interlocking, transmission of information between the track and the vehicle. European rail traffic control system ETCS, definition, standards, technical equipment. Railway radio systems. Composition continuity control systems. Methods of traffic control on low-loaded lines. Railway crossing protection systems, categories of railway line intersections with vehicular roads, automatic crossing signaling, computer control, methods of detecting the presence of vehicles at the crossing. Automation of marshalling yards, goals and rules of timing, track brakes, steering. Motion control in metro systems. Full automation of rail transport, unmanned and unattended systems, automatic freight transport, Cargomover system. Automatic systems used in urban transport. Methods of controlling traffic lights. Variable traffic signs and signaling devices, traffic detectors. Methods of vehicle location, automatic reading of license plates, dynamic traffic control systems. Traffic control in large urban agglomerations. Control of pedestrians movements. Full automation of traffic. Control of power supply and vehicle operation. Controlling transport behaviors and habits. Unconventional transportations systems | | | | | | |
| Prerequisites and co-requisites | Knowledge of the basics of electrical engineering and electronics. | | | | | | |
| Assessment methods and criteria | Subject passing criteria | | Passing threshold | | | Percentage of the final grade | |
| | Exam from the lecture | | 60.0% | | | 60.0% | |
| | Reports from laboratory exercises | | 60.0% | | | 40.0% | |

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| Recommended reading | Basic literature | <ol style="list-style-type: none"> 1. Vuhic V.: Urban transit, systems and technology. Wiley 2007. 2. Rojek A.: Tabor i trakcja kolejowa. Warszawa: KOW 2010. 3. Bergiel K., Karbowski H.: Automatyka prowadzenia pociągu. Łódź, EMI-PRESS 2005. 4. Dyduch J., Pawlik M.: Systemy automatycznej kontroli jazdy pociągu. Radom, Wyd. PR 2002. 5. Dyduch J., Kornaszewski M.: Systemy sterowania ruchem kolejowym. Radom, Wyd. PR 2004. 6. Dąbrowa-Bajon M.: Podstawy sterowania ruchem kolejowym. Warszawa, OWPW 2002. 7. Leśło M., Guzik J.: Sterowanie ruchem drogowym cz. I i II. Gliwice, WPS 2000. 8. Praca zbiorowa: Interoperacyjność systemu kolei Unii Europejskiej. Warszawa: KOW 2015. 9. Pawlik M.: Europejski system zarządzania ruchem kolejowym. Warszawa: KOW 2015. 10. Chromański W., Grabarek I., Kozłowski M., Czerepicki A., Marczuk K.: Pojazdy autonomiczne i systemy transportu autonomicznego. Warszawa: PWN 2020. 11. Modelewski K.: Inteligentny transport. Brzezina Łąka: Poligraf 2018. 12. Mężyk A., Zamkowska S.: Problemy transportowe miast, stan i kierunki rozwiązań. Warszawa: PWN 2019. 13. Wesołowski J.: Miasto w ruchu, dobre praktyki w organizowaniu transportu miejskiego. Łódź: Instytut Spraw Obywatelskich 2008. 14. Żurkowski A., Pawlik M.: Ruch i przewozy kolejowe, sterowanie ruchem. Warszawa: KOW 2010. 15. Dyduch J., Kornaszewski M.: Komputerowe systemy sterowania ruchem kolejowym. Radom: UTH 2014. 16. Barański S., Karbowski H.: Teoria i aplikacje systemów bezpiecznego prowadzenia pociągu. Łódź: WPŁ 2016. |
| | Supplementary literature | Periodics: Technika Transportu Szynowego; Transport Miejski i Regionalny |
| | eResources addresses | |
| Example issues/ example questions/ tasks being completed | Traffic control in cities; Control of traffic on railway lines; Work of an autonomous vehicle; | |
| Work placement | Not applicable | |