



## Subject card

|                                             |                                                                                                                                                                                                                 |                                                          |                                                                                                                                                                                                                                                                         |                                     |                                                                                                                                                                                                                                                                                                |            |     |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----|
| Subject name and code                       | , PG_00069815                                                                                                                                                                                                   |                                                          |                                                                                                                                                                                                                                                                         |                                     |                                                                                                                                                                                                                                                                                                |            |     |
| Field of study                              | Planowanie inteligentnych systemów transportu                                                                                                                                                                   |                                                          |                                                                                                                                                                                                                                                                         |                                     |                                                                                                                                                                                                                                                                                                |            |     |
| Date of commencement of studies             | February 2025                                                                                                                                                                                                   |                                                          | Academic year of realisation of subject                                                                                                                                                                                                                                 |                                     | 2025/2026                                                                                                                                                                                                                                                                                      |            |     |
| Education level                             | second-cycle studies                                                                                                                                                                                            |                                                          | Subject group                                                                                                                                                                                                                                                           |                                     |                                                                                                                                                                                                                                                                                                |            |     |
| Mode of study                               | Full-time studies                                                                                                                                                                                               |                                                          | Mode of delivery                                                                                                                                                                                                                                                        |                                     | at the university                                                                                                                                                                                                                                                                              |            |     |
| Year of study                               | 1                                                                                                                                                                                                               |                                                          | Language of instruction                                                                                                                                                                                                                                                 |                                     | Polish                                                                                                                                                                                                                                                                                         |            |     |
| Semester of study                           | 2                                                                                                                                                                                                               |                                                          | ECTS credits                                                                                                                                                                                                                                                            |                                     | 2.0                                                                                                                                                                                                                                                                                            |            |     |
| Learning profile                            | general academic profile                                                                                                                                                                                        |                                                          | Assessment form                                                                                                                                                                                                                                                         |                                     | assessment                                                                                                                                                                                                                                                                                     |            |     |
| Conducting unit                             | Department of Transportation Engineering -> Faculty of Civil and Environmental Engineering -> Faculties of Gdańsk University of Technology                                                                      |                                                          |                                                                                                                                                                                                                                                                         |                                     |                                                                                                                                                                                                                                                                                                |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor                                                                                                                                                                                              |                                                          | dr hab. inż. Jacek Oskarbski                                                                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                                |            |     |
|                                             | Teachers                                                                                                                                                                                                        |                                                          |                                                                                                                                                                                                                                                                         |                                     |                                                                                                                                                                                                                                                                                                |            |     |
| Lesson types                                | Lesson type                                                                                                                                                                                                     | Lecture                                                  | Tutorial                                                                                                                                                                                                                                                                | Laboratory                          | Project                                                                                                                                                                                                                                                                                        | Seminar    | SUM |
|                                             | Number of study hours                                                                                                                                                                                           | 15.0                                                     | 15.0                                                                                                                                                                                                                                                                    | 0.0                                 | 0.0                                                                                                                                                                                                                                                                                            | 0.0        | 30  |
|                                             | 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                                                                                                                                                                                           | 30                                                       |                                                                                                                                                                                                                                                                         | 0.0                                 |                                                                                                                                                                                                                                                                                                | 0.0        | 30  |
| Subject objectives                          | Acquiring knowledge in the field of Intelligent Transportation Systems service planning.                                                                                                                        |                                                          |                                                                                                                                                                                                                                                                         |                                     |                                                                                                                                                                                                                                                                                                |            |     |
| Learning outcomes                           | Course outcome                                                                                                                                                                                                  |                                                          | Subject outcome                                                                                                                                                                                                                                                         |                                     | Method of verification                                                                                                                                                                                                                                                                         |            |     |
|                                             | [K7_K01] recognizes the importance of knowledge related to the field of study in solving cognitive and practical problems                                                                                       |                                                          | The student is able to apply the acquired knowledge in the field of ITS service planning to solve real-life problems related to sustainable development and the efficiency of transport systems, demonstrating its importance in both cognitive and practical contexts. |                                     | [SK1] Ocena umiejętności pracy w grupie<br>[SK5] Ocena umiejętności rozwiązywania problemów występujących w praktyce<br>[SK4] Ocena umiejętności komunikacji, w tym poprawności językowej<br>[SK3] Ocena umiejętności organizacji pracy<br>[SK2] Ocena postępów pracy                          |            |     |
|                                             | [K7_U05] cooperates with other people in the implementation of team work, both as a leader and a team member, effectively achieving set goals                                                                   |                                                          | The student can effectively work with others in a team to carry out projects related to ITS planning, taking on different roles (leader and member), and can apply the knowledge they've gained to solve practical problems, achieving the set goals.                   |                                     | [SU5] Ocena umiejętności zaprezentowania wyników realizacji zadania<br>[SU4] Ocena umiejętności korzystania z metod i narzędzi<br>[SU3] Ocena umiejętności wykorzystania wiedzy uzyskanej w ramach przedmiotu<br>[SU2] Ocena umiejętności analizy informacji<br>[SU1] Ocena realizacji zadania |            |     |
|                                             | [K7_W01] identifies in an in-depth way phenomena related to the field of study as well as theories describing them and possible methods of analyzing processes occurring in the life cycle of technical systems |                                                          | The student is able to identify and analyze phenomena related to ITS systems, using appropriate theories and methods of analyzing processes in the life cycle of systems, which allows for solving complex problems and making informed decisions.                      |                                     | [SW3] Ocena wiedzy zawartej w opracowaniu tekstowym i projektowym<br>[SW2] Ocena wiedzy zawartej w prezentacji<br>[SW1] Ocena wiedzy faktograficznej                                                                                                                                           |            |     |

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| Subject contents                                               | Course content – lecture                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |
|                                                                | Definitions, history of the creation and development of ITS. Role and objectives of ITS application. Conditions for ITS implementation. ITS planning process, ITS system architecture. ITS services. Functional structure. Physical structure taking into account equipment and devices. Logical structure. Organizational structure taking into account links between institutions and transport elements, as well as communications. Testing the effectiveness of ITS services. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |
|                                                                | Course content – exercises<br>ITS architecture design. Planning an ITS system in a selected area of the street layout.                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |
| Prerequisites and co-requisites                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |
| Assessment methods and criteria                                | Subject passing criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Passing threshold                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Percentage of the final grade |
|                                                                | Passing the exercises                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 100.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 50.0%                         |
|                                                                | Passing the lecture                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 60.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 50.0%                         |
| Recommended reading                                            | Basic literature                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Lawrence A. Klein, Sensor technologies and Data requirements for ITS. Boston : Artech House, ©2001. Artech House ITS library. ISBN: 158053077X 9781580530774<br>Thill Jean-Claude, Geographical Information Systems in Transportation Research, Pergamon, 2000.<br>J.M. Sussman, Perspectives on Intelligent Transportation Systems (ITS), Springer, 2005<br>M.A. Chowdhury and A. Sadek, Fundamentals of Intelligent Transportation Systems Planning, Artech House, 2003<br>ITS Hand Book 2000: Recommendations for World Road Association (PIARC) by Kan Paul Chen, John Miles                                                                                                                                             |                               |
|                                                                | Supplementary literature                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Websites and journals:<br>IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, IEEE TRANSPORTATION RESEARCH, PART C: EMERGING TECHNOLOGIES, PERGAMON-ELSEVIER SCIENCE LTD JOURNAL OF INTELLIGENT TRANSPORTATION SYSTEMS, TAYLOR & FRANCIS INC INTERNATIONAL JOURNAL OF VEHICLE INFORMATION AND COMMUNICATION SYSTEMS, INDERSCIENCE ENTERPRISES IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY, IEEE <a href="http://frame-online.eu/">http://frame-online.eu/</a> <a href="https://www.its.dot.gov/research_archives/arch/architecture_plan.htm">https://www.its.dot.gov/research_archives/arch/architecture_plan.htm</a> <a href="https://local.iteris.com/arc-it/index.html">https://local.iteris.com/arc-it/index.html</a> |                               |
|                                                                | eResources addresses                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |
| Example issues/<br>example questions/<br>tasks being completed | ITS architecture for a selected group of services.<br>Characteristics of a hierarchical traffic management structure using ITS.<br>Objectives of Intelligent Transport Systems.<br>Logical structure of a road incident management system.<br>Advantages and disadvantages of homogeneous and heterogeneous structures of advanced traffic management systems.<br>Logical structure of the traffic management module on inter-junction sections, modes of operation.              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |
| Practical activities within the subject                        | Not applicable                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |

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