



Subject card

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| Subject name and code | Information Transport Systems, PG_00048337 | | | | | | |
| Field of study | Electronics and Telecommunications | | | | | | |
| Date of commencement of studies | February 2023 | | Academic year of realisation of subject | | 2022/2023 | | |
| Education level | second-cycle studies | | Subject group | | Optional subject group Subject group related to scientific research in the field of study | | |
| Mode of study | Full-time studies | | Mode of delivery | | at the university | | |
| Year of study | 1 | | Language of instruction | | Polish | | |
| Semester of study | 1 | | ECTS credits | | 2.0 | | |
| Learning profile | general academic profile | | Assessment form | | assessment | | |
| Conducting unit | Department of Teleinformation Networks -> Faculty of Electronics, Telecommunications and Informatics | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr inż. Magdalena Młynarczuk | | | | |
| | Teachers | | dr inż. Magdalena Młynarczuk | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 15.0 | 0.0 | 15.0 | 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 | | 4.0 | | 16.0 | 50 |
| Subject objectives | Learning of the structure, operation principles and standardization of optical networks, which are used for the transport of information. Practical knowledge of configuration and protection for WDM devices. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | [K7_W03] Knows and understands, to an increased extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum. | | Student knows methods of transport and concentration of data in optical systems, construction and standardization of the optical transport network, functions of the transport and control layers in ASON, techniques of resource discovery and routing. | | [SW1] Assessment of factual knowledge | | |
| | [K7_W05] Knows and understands, to an increased extent, methods of process and function support, specific to the field of study. | | Student knows and understands the principles of configuration of WDM nodes, data concentration on the edge of the transport network, methods of configuration and protection of transport services in OTN. | | [SW1] Assessment of factual knowledge | | |
| | [K7_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of advanced technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment | | Student can make a critical analysis of the functioning of optical networks, used to transport of information. | | [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information | | |
| | [K7_U06] can analyse the operation of components, circuits and systems related to the field of study; measure their parameters; examine technical specifications; interpret obtained results and draw conclusions | | Student is able to analyze the configuration and security in WDM devices, functioning of the transport layer and control in ASON, resource discovery and routing techniques | | [SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment | | |

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| Subject contents | <ol style="list-style-type: none">1. Working principles of the optical transport network (OTN).2. Cooperation of SDH systems with OTN optical network.3. Ethernet standard in the optical transport network.4. Standardization of OTN network interfaces recommendation G.709.5. Functions of optical channels OCh, optical multiplexing sections OMS, optical transport sections OTS.6. Connection points, network elements and tributary signals in the OTN optical layer.7. Clocks synchronization in the optical transport network.8. GMPLS (Generalized Multiprotocol Label Switching) network - Generalized Multiprotocol Label Switching.9. Architecture, functionality and elements of Automatically Switched Optical Network (ASON).10. Reliability of information transport in the optical network.11. Comparison of protection techniques in optical transport networks.12. Elements of DWDM line transmission system.13. Principles of telecommunications fibre-optics parameters selection for DWDM systems in OTN.14. Elastic Optical Networks.15. Long distance optical transmission systems (transoceanic and continental) specificity of solutions.16. METRO networks specifics requirements and optical layer realization. | | |
| Prerequisites and co-requisites | | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Practical exercise | 50.0% | 40.0% |
| | Midterm colloquium | 50.0% | 60.0% |
| Recommended reading | Basic literature | Kula S.: Systemy teletransmisyjne; WKL Warszawa 2004 Material prepared by the lecturer available in electronic form. Manuals available in electronic form. | |
| | Supplementary literature | Simmons J. M.: Optical Network Design and Planning, Springer, 2014 ITU-T: Rec. G.7703/Y.1304, Architecture for the automatically switched optical network. 05/2021 ITU-T: Rec. G.709/Y.1331, Interfaces for the Optical Transport Network (OTN), 06/2020 Mannie E., Generalized Multi-Protocol Label Switching (GMPLS) Architecture, IETF, RFC 3945, 10/2004 | |
| | eResources addresses | Adresy na platformie eNauczenie: Systemy transportu informacji - wykład - 2022/23 - Moodle ID: 24582 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=24582 Systemy transportu informacji - wykład - 2022/23 - Moodle ID: 24582 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=24582 | |
| Example issues/ example questions/ tasks being completed | <ol style="list-style-type: none">1. Configuration of WDM nodes for GMPLS control plane2. Data concentration on edges of transport network3. Procedures of resources discovery on ASON.4. Routing in ASON.5. Reliability of information transmission in OTN.6. Configuration of LSP transport services in DWDM layer7. Protection methods of transport services for LSP8. Passive optical network distribution of multimedia services | | |
| Work placement | Not applicable | | |