GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|---|---|---|---|
| Subject name and code | Advanced Web Tools and Applications, PG_00067292 | | | | | | |
| Field of study | Informatics | | | | | | |
| Date of commencement of studies | October 2026 | | Academic year of realisation of subject | 2029/2030 | | | |
| Education level | first-cycle studies | | Subject group | Optional subject group<br>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 | 4 | | Language of instruction | Polish | | | |
| Semester of study | 7 | | ECTS credits | 4.0 | | | |
| Learning profile | general academic profile | | Assessment form | exam | | | |
| Conducting unit | Department of Computer Architecture -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Joanna Szłapczyńska | | | | | |
| | Teachers | dr hab. inż. Joanna Szłapczyńska | | | | | |

| Lesson types | 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 | 5.0 | 35.0 | 100 |

| Subject objectives | The objective of the course is to teach the fundamentals of designing and implementing complex web applications using modern technological standards. The course covers the correct division of a complex application into architectural layers, selection and implementation of appropriate components for individual layers, implementation and utilization of authentication and authorization processes, implementation of standard data sharing mechanisms and use of advanced data persistence mechanisms. |
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| Learning outcomes | Course outcome | Subject outcome | Method of verification |
|---|---|---|---|
| | [K6_W04] knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices | The student knows and understands the principles of creating complex Internet applications and is able to prepare the correct implementation of components on individual architectural layers. | [SW1] Assessment of factual knowledge |
| | [K6_W44] knows and understands, to an advanced extent, architecture, design principles and methods of hardware and software support for local and distributed information systems, including computing systems, databases, computer networks and information applications, as well as the principles of human-computer interaction, the operation and evaluation criteria of data processing, storage and transfer methods, including computational algorithms, artificial intelligence and data mining as well as standards and methods of IT systems administration, monitoring of processes and robustness to undesirable phenomena and activities | The student knows and understands the principles of designing complex web applications and is able to select appropriate technological solutions for individual functionalities. | [SW1] Assessment of factual knowledge |
| | [K6_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study and perform tasks, in an innovative way, in not entirely predictable conditions, by:n- appropriate selection of sources and information obtained from them, assessment, critical analysis and synthesis of this information,n- selection and application of appropriate methods and toolsn | Student understands what complex internet applications are.<br>Is able to name architectural layers typical of internet applications.<br>Knows the different types of components used in each layer.<br>Understands how the components work together.<br>Can describe the life cycle of individual components.<br>Is able to list and describe the individual stages of processing user requests.<br>Understands what authentication and authorization processes are.<br>Knows standard data sharing mechanisms.<br>Knows advanced data persistence mechanisms. | [SU1] Assessment of task fulfilment<br>[SU4] Assessment of ability to use methods and tools |
| | [K6_U02] can perform tasks related to the field of study in an innovative way as well as solve complex and nontypical problems, applying knowledge of physics, in changing and not fully predictable conditions | The student is able to prepare a complex web application using appropriate tools.<br>Is able to choose the right components for individual architectural layers.<br>Is able to implement and use authentication and authorization processes.<br>Is able to implement standard data sharing mechanisms.<br>Is able to use advanced data persistence mechanisms. | [SU4] Assessment of ability to use methods and tools<br>[SU1] Assessment of task fulfilment |

<table>
<tr><td>Subject contents</td><td>Course content – lecture<br>1. Complex web applications.<br>2. Dividing applications into architectural layers.<br>3. Inversion of control and dependency injection.<br>4. Basic client request handling mechanisms.<br>5. Standard data sharing mechanisms.<br>6. Authentication and authorization mechanisms.<br>7. Advanced data persistence mechanisms.<br>8. Data validation.<br>9. Synchronous and asynchronous events.<br>10. Asynchronous messaging.<br>11. User interface.<br>Course content – laboratory<br>1. Client request handling.<br>2. Dependency injection.<br>3. Authentication and authorization.<br>4. Data validation.<br>5. Asynchronous processing.<br>6. User interface.<br>7. Data persistence.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>It is required to complete the Creating Internet Applications course and to learn the following topics:<br>• Internet protocols, Internet architecture (DNS servers, HTTP protocols, URI, URL, URN).<br>• Client side - browsers (JavaScript, DOM, jQuery).<br>It is required to complete the Technological Platforms (Java part) course and to learn the following topics:<br>• Java Platform.<br>• Conventions and running.<br>• Project building - Maven.<br>• Collections and objects comparison.<br>• Threading.<br>• Input/Output.<br>• Network sockets.<br>• Java Persistence API.<br>• Software testing.<br>• Parallelization of operations.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Practical exercise</td><td>50.0%</td><td>50.0%</td></tr><tr><td>Written exam</td><td>50.0%</td><td>50.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>• Jakarta EE Specification.<br>• Spring Projects Documentation.</td></tr><tr><td>Supplementary literature</td><td>No requirements.</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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