



## Subject card

Subject name and code	Advanced Web Tools and Applications, PG_00067292						
Field of study	Informatics						
Date of commencement of studies	October 2025	Academic year of realisation of subject			2028/2029		
Education level	first-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	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.						

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 tools	Student understands what complex internet applications are. Is able to name architectural layers typical of internet applications. Knows the different types of components used in each layer. Understands how the components work together. Can describe the life cycle of individual components. Is able to list and describe the individual stages of processing user requests. Understands what authentication and authorization processes are. Knows standard data sharing mechanisms. Knows advanced data persistence mechanisms.	[SU1] Assessment of task fulfilment [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. Is able to choose the right components for individual architectural layers. Is able to implement and use authentication and authorization processes. Is able to implement standard data sharing mechanisms. Is able to use advanced data persistence mechanisms.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment

Subject contents	<p>Course content – lecture</p> <ol style="list-style-type: none"> <li>1. Complex web applications.</li> <li>2. Dividing applications into architectural layers.</li> <li>3. Inversion of control and dependency injection.</li> <li>4. Basic client request handling mechanisms.</li> <li>5. Standard data sharing mechanisms.</li> <li>6. Authentication and authorization mechanisms.</li> <li>7. Advanced data persistence mechanisms.</li> <li>8. Data validation.</li> <li>9. Synchronous and asynchronous events.</li> <li>10. Asynchronous messaging.</li> <li>11. User interface.</li> </ol> <hr/> <p>Course content – laboratory</p> <ol style="list-style-type: none"> <li>1. Client request handling.</li> <li>2. Dependency injection.</li> <li>3. Authentication and authorization.</li> <li>4. Data validation.</li> <li>5. Asynchronous processing.</li> <li>6. User interface.</li> <li>7. Data persistence.</li> </ol>											
Prerequisites and co-requisites	<p>It is required to complete the Creating Internet Applications course and to learn the following topics:</p> <ul style="list-style-type: none"> <li>• Internet protocols, Internet architecture (DNS servers, HTTP protocols, URI, URL, URN).</li> <li>• Client side - browsers (JavaScript, DOM, jQuery).</li> </ul> <p>It is required to complete the Technological Platforms (Java part) course and to learn the following topics:</p> <ul style="list-style-type: none"> <li>• Java Platform.</li> <li>• Conventions and running.</li> <li>• Project building - Maven.</li> <li>• Collections and objects comparison.</li> <li>• Threading.</li> <li>• Input/Output.</li> <li>• Network sockets.</li> <li>• Java Persistence API.</li> <li>• Software testing.</li> <li>• Parallelization of operations.</li> </ul>											
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Subject passing criteria</th> <th style="width: 30%;">Passing threshold</th> <th style="width: 30%;">Percentage of the final grade</th> </tr> </thead> <tbody> <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> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Practical exercise	50.0%	50.0%	Written exam	50.0%	50.0%
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Recommended reading	<p>Basic literature</p> <hr/> <p>Supplementary literature</p> <hr/> <p>eResources addresses</p>	<ul style="list-style-type: none"> <li>• Jakarta EE Specification.</li> <li>• Spring Projects Documentation.</li> </ul> <p>No requirements.</p>										
Example issues/ example questions/ tasks being completed												
Practical activities within the subject	Not applicable											

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