

Description of course			
Code of course	1160-TR000-MSA-0202		
Name of course	Modern Programming Techniques		
Version of course	2021/22		
A. Place of the course in system of studies			
Level of education	Second-cycle degree		
Form and mode of studies	Full-time studies		
Field of studies	Transport		
Profile of studies	General academic profile		
Specialization	Subject common for the studies		
Place of teaching of course	Warsaw University of Technology, Faculty of Transport, Division of Information and Mechatronic Systems in Transport		
Place of realization of course	Not applicable		
Coordinator of course	Andrzej Czerepicki, PhD, Dsc, Assistance Professor, Division of Information and Mechatronic Systems in Transport, Faculty of Transport, Warsaw University of Technology		
B. General characteristic of the course			
Group/Block of courses	Basic subjects		
Level of course	Basic level		
Type of course	Przedmiot obowiązkowy		
Language of course	English		
Location of the course in the study plan – nominal semester	2		
Location of the course in the academic year	Summer semester		
Preliminary requirements - formal	None		
Limit of students	Lecture: 100 people, Computer classes (labs): 15 people.		
C. Effects of education and manner of teaching			
Purpose of course	The student is familiarized with modern technologies and methods of programming multiplatform computer applications using network, parallel and distributed processing. The student acquires practical skills of application implementation in multilayer architecture through integration of application interface, business logic layer, network services and data layer, using modern network protocols.		
Effects of education with reference to the learning outcomes for the area and field of study			
No. effect	Description of the effect	Reference to the characteristics of learning outcomes	Reference to the learning outcomes in the program
Assumed learning outcomes in terms of knowledge			
W01	Knows the classification, operating principles, architectures, and protocols of networked and distributed applications.	I.P7S_WG.o	Tr2A_W02
W02	Knows the basics of web application programming in terms of interface design, client-side and server-side processing.	I.P7S_WG.o	Tr2A_W02
W03	Knows the principles of building computer applications using distributed network components and services	I.P7S_WG.o	Tr2A_W02
Assumed learning outcomes in terms of skills			
U01	Be able to select the type of architecture and individual program components for a formulated engineering task in the field of web application programming.	I.P7S_UW.o III.P7S_UW.o	Tr2A_U05
U02	Be able to implement the client layer of a web application in terms of interface, user input and data validation using a scripting programming language.	I.P7S_UW.o III.P7S_UW.o	Tr2A_U05
U03	Be able to implement the server layer of a network application in terms of reading and processing the data sent by the client application, storing them and sending a response.	I.P7S_UW.o III.P7S_UW.o	Tr2A_U05

<i>Assumed learning outcomes in the field of social competences</i>						
KS01	Is ready to identify and resolve issues related to transportation information technology, taking into account changing societal needs.	I.P7S_KR	Tr2A_K05			
<i>Form of didactic studies and number of hours</i>		<i>Lecture</i>	<i>Exercise</i>	<i>Laboratory</i>	<i>Project</i>	<i>Other</i>
<i>On a weekly plan</i>		1	0	0	0	1
<i>Throughout the semester</i>		15	0	0	0	15
<i>Contents of education - separately for each form of didactic studies</i>		<p><i>Lecture:</i> Introduction to contemporary programming technologies. Multilayer architectures of computer applications. Client-server architecture. Concept and types of network applications. Network protocols and their use in programs. Multithreaded data processing. Services, applications and protocols of Internet global network. WWW service and its components. Designing application interface with use of HTML language. Data processing technologies on the client side. JavaScript basics. HTTP protocol. Methods of downloading and transferring data to a remote server. Server-side data processing. Dynamic WWW applications. Web services. Programming applications using distributed components. Data layer implementation of a web application using different data storage methods. Modern programming languages, platforms and frameworks. Trends and perspectives of web applications development.</p> <p><i>Labs:</i> Integrated Development IDE environment. Environment and web services server configuration. Basics of network application distribution. Designing application interface with use of HTML language. Data exchange between client and server using TCP/IP and HTTP protocols. Data processing on the client side. Data validation using JavaScript. Server-side dynamic application code programming. Reading and processing a request from the client side application. Generating and sending the processing result. Implementation of storing the application state. Programming the web service. Integrating distributed components in a multilayer application.</p>				
<i>Teaching methods</i>		<p>Lectures: Classes in the form of a problem-based lecture conducted with the use of presentations.</p> <p>Computer classes (labs): Classes in the computer laboratory, solving programming tasks together with the lecturer and individually.</p>				
<i>Methods of verification of effects of education</i>						
<i>No. effect</i>	<i>Methods of verification</i>					
<i>Assumed learning outcomes in terms of knowledge</i>						
W01	Between 5 and 10 closed-ended questions on a computer-based test, correct answers to at least 50% of these questions are required.					
W02	Between 5 and 10 closed-ended questions on a computer-based test, correct answers to at least 50% of these questions are required.					
W03	Between 5 and 10 closed-ended questions on a computer-based test, correct answers to at least 50% of these questions are required.					
<i>Assumed learning outcomes in terms of skills</i>						
U01	Individual colloquium assignment completed on the computer, at least 50% of the effect score is required.					
U02	Individual colloquium assignment completed on the computer, at least 50% of the effect score is required.					
U03	Individual colloquium assignment completed on the computer, at least 50% of the effect score is required.					
<i>Assumed learning outcomes in the field of social competences</i>						
KS01	Evaluation of activity during classes - it is required to solve at least 50% of tasks performed during practical classes.					
<i>Methods of evaluation</i>		<p><i>Lecture:</i> The grade is given on the basis of the number of points obtained by the student on the credit; the credit is carried out in the form of a closed computer test consisting of 15..30 questions on the issues discussed in the lectures. Questions cover each of the learning</p>				

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	<p>outcomes in knowledge. In order to pass the lectures it is necessary to obtain a positive (> 50% correct answers) grade for each of the effects.</p> <p>Computer classes: The grade is given on the basis of the sum of points obtained on the credit colloquium. The test is graded on a scale from 0 to 100 points. Points are awarded in accordance with the established list covering all learning outcomes in the skills area, which includes the name of the assessed characteristic of the solution and the number of points awarded. A passing grade (>50% of points possible) must be obtained for each of the outcomes in order to pass the computer classes.</p> <p>Integrated Assessment: The final grade for the course is the arithmetic mean of the grades from the lecture and the computer classes, provided that both are positive.</p>
<i>Exam</i>	<i>No</i>
<i>Literature</i>	<p><i>Basic literature:</i> 1) Rychlicki-Kicior K.: Java EE 6. WWW application programming. 2nd edition. Helion, 2015.</p> <p><i>Supplementary literature:</i> 1) Burns B.: Designing distributed systems. Helion, 2018. 2) Sochacki T.: JavaScript. Interactive web applications. Helion, 2020.</p>
<i>Website of the course</i>	http://epw.pw.edu.pl
D. Student's activity	
<i>Number of ECTS credits</i>	2
<i>Number of hours of student's work to achieve effects of education</i>	60 hours, including: the work at the lectures 15 hours, work at the computer classes 15 hours, reading the indicated literature within the scope of the lecture 5 hours, preparation to pass the lecture 5 hours, consultations within the scope of the lecture 1 hour, participation in passing the lecture 1 hour, preparation for colloquia of computer classes 15 hours, consultations within the scope of computer classes 3 hours.
<i>Number of ECTS credits on the course with direct participation of academic teacher</i>	1.5 points. ECTS (35 hrs, including: work at the lectures 15 hrs, work at the computer classes 15 hrs, consultations within the scope of the lecture 1 hour, participation in assessment of lecture 1 hour, consultations within the scope of computer classes 3 hours).
<i>Number of ECTS credits on practical activities on the course</i>	1.5 points. ECTS (33 hours, including: work in the computer classes - 15 hours, preparation for the colloquium - 15 hours, consultations in the field of computer classes - 3 hours).
E. Additional information	
<i>Notes</i>	<i>As long as it does not cause changes in the relationship of a given subject with the directional effects in the content of education, changes may be introduced on an ongoing basis, taking into account the latest scientific achievements.</i>
<i>Date of last edition</i>	2021-08-23 16:00