



Subject card

Subject name and code	Maintenance and modernization of engineering structures, PG_00046051						
Field of study	Transport						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2023/2024		
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	2	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Katedra Wytrzymałości Materiałów -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Mikołaj Miśkiewicz				
	Teachers						
Lesson types and methods of instruction	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		10.0		35.0	75
Subject objectives	The aim of the course is to familiarize students with the principles of maintaining and modernizing engineering structures.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U14] able to solve detailed problems of transport infrastructure to an extent required of the specialty		The student knows and understands the principles of maintaining engineering structures.		[SU1] Assessment of task fulfilment		
	[K7_W14] has advanced knowledge of transport infrastructure maintenance and management to an extent required of the specialty		The student is able to perform periodic inspection of the bridge.		[SW3] Assessment of knowledge contained in written work and projects		
	[K7_W02] has broad knowledge of applied mechanics used to understand and describe physical phenomena which occur in transport facilities and means of transport		The student is able to assess the static scheme of the engineering object and identify damage associated with exceeding the limit states		[SW3] Assessment of knowledge contained in written work and projects		
Subject contents	Lecture. 1. Engineering objects - basic definitions and materials. 2. Damages and failures of engineering objects. 3. Maintenance of road and railway engineering facilities. 4. Diagnostics of engineering structures. 5. Modernization of engineering structures. Exercises. 1. Performing diagnostic tests of the structure. 2. Periodic review of the engineering object.						
Prerequisites and co-requisites	Required completion of the subject "Engineering objects in transport" (1st degree)						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Odpowiedź na pytania dot. treści prezentowanych na wykładzie.	60.0%	50.0%
	Execution of the extended bridge inspection	60.0%	50.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. A. Jarominiak, Podstawy utrzymania mostów, OWPRz, Rzeszów, 1999. 2. A. Madaj, W. Wolowicki, Budowa i utrzymanie mostów. WKŁ, Warszawa, 2001. 3. J. Bień, Uszkodzenia i Diagnostyka Obiektów Mostowych, WKŁ, Warszawa, 2010. 4. H. Czudek, A. Wysokowski: Trwałość mostów drogowych. WKŁ, Warszawa, 2005. 5. GDDKiA, Instrukcje przeprowadzania przeglądów drogowych obiektów inżynierskich. Zarządzenie nr 14 z dnia 7 lipca 2005 r. 6. PKP PLK, Instrukcja utrzymania kolejowych obiektów inżynierskich na liniach kolejowych do prędkości 200/250 km/h, Id-16, 2014 	
	Supplementary literature	<ol style="list-style-type: none"> 1. K. Flaga, Diagnostyka obiektów mostowych z betonu. Mosty, Warszawa, 2015. 2. E. Zabawa, Nowaligiczny element. Utrzymanie drogowych obiektów mostowych. Autostrady, 2012. 3. A. Jarominiak, A. Rosset, Katastrofy i awarie mostów. WKŁ, Warszawa, 1986. 	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. What is the assessment of the suitability for use of a bridges? 2. What factors have influence on the technical condition of the bridges? 3. What are the strategies of managing the engineering infrastructures? 4. List the strain measurement methods used in the diagnostics of the engineering infrastructures. 		
Work placement	Not applicable		