Annex No. 9
to the Rector's Decision No. 35/19
as amended by Decision No. 12/22

COURSE SPECIFICATION

Course code	full-time:	**B1-4-411a**
	part-time:	**BN1-3-311a**
Course title in Polish	**Specjalne technologie w drogownictwie**	
Course title in English	**Special Technologies of Highway Engineering**	
Valid from academic year	**2023/2024**	

CURRICULAR ALIGNMENT

Programme	**CIVIL ENGINEERING**
Level	**first-cycle**
Programme profile	**academic**
Mode of attendance	**full-time; part-time**
Specialism	**all**
Academic unit responsible for the course	**Department of Transport Engineering**
Course coordinator	**dr inż. Piotr Ramiączek, dr inż. Mateusz Iwański**
Approved by	**prof. dr hab. inż. Grzegorz Świt**

COURSE DESCRIPTION

Teaching block		**major**
Course status		**elective**
Language of instruction		**Polish**
Semester of delivery	full-time	**semester IV**
	part-time	**semester III**
Prerequisites		**Fundamentals of Transport Engineering, Transport Engineering.**
Exam (YES/NO)		**NO**
ECTS		**2**

Mode of instruction		**lecture**	**class**	**lab**	**project**	**other**
No. of hours per semester	full-time	**15**			**15**	
	part-time	**10**			**10**	

LEARNING OUTCOMES

Category of outcome	Outcome code	Course learning outcomes	Corresponding programme outcome code
Knowledge	W01	Students know geosynthetics, their categorization and application.	B1_W18
	W02	Students know technology principles for repairing wearing course pavement structures.	B1_W13
	W03	Students know the design principles for mineral and asphalt mixes.	B1_W12
	W04	Students know the basics of sections design and construction and of road pavement structure.	B1_W09
	W05	Students know materials used in mineral and asphalt mixes design.	B1_W18
Skills	U01	Students are able to determine all the loads exerted on a road embankment.	B1_U03
	U02	Students are able to use basic standards and catalogues related to road construction.	B1_U13
	U03	Students are able to design flexible and semi-rigid pavements.	B1_U14
	U04	Students are able to identify subgrade and assess its conditions for road structures foundation.	B1_U17
Competence	K01	Students can work independently.	B1_K01
	K02	Students are responsible for the reliability of the results obtained.	B1_K02
	K03	Students can formulate conclusions and describe the results of their own work.	B1_K04

COURSE CONTENT

Teaching mode*	Topics covered
lecture	Application of geosynthetics in road pavement construction.
	Modified asphalt binders. Classification of polymers. Asphalt modifiers and stabilizers. Characteristics of asphalt emulsion. Modified asphalt emulsions.
	Modern technologies of producing and embedding mineral-asphalt mixes at lowered temperatures.
	Repair technologies for wearing course pavement structures. Thin “cold" and "hot" mats.
	Special road pavements. Characteristics of drainage pavement, mastic-grit mix, discontinuous grain mix.
	Special road pavement recycling technologies.
project	Road embankment on low-bearing subsoil reinforced with geosynthetics.
	Drainage design - drainage of the road on the subgrade with a specified grain size.
	Design of the flexible and semi-rigid road pavement structure according to the "Catalogue of typical constructions of flexible and semi-rigid pavements".

METHODS OF LEARNING OUTCOMES VERIFICATION

Learning outcome	Verification methods					
	Oral examination	Written examination	Test	Project	Report	other
W01			X	X		
W02				X		
W03			X	X		
W04			X			
U01				X		
U02			X	X		
U03				X		
U04				X		
K01			X	X		
K02			X	X		
K03			X			

ASSESSMENT

Teaching mode	Assessment type	Assessment criteria
lecture	mark-based	*Obtaining at least 50% of the points from the written test*
Project	mark-based	*Attaining a passing grade on the project and obtaining at least 50% of the points from the written test*

STUDENT WORKLOAD

ECTS weighting												
	Activities	Student workload										
		full-time					part-time					
1.	Scheduled contact hours	W	C	L	P	S	W	C	L	P	S	h
		15			15		10			10		
2.	Other (office hours, exams)	2			2		2			2		
3	**Total number of contact hours**	**34**					**24**					
4.	**Number of ECTS credits for contact hours**	**1,4**					**1**					**2**
5.	**Independent study hours**	**16**					**26**					**24**
6.	**Number of ECTS credits for independent study**	**0,6**					**1**					**1,0**
7.	**Practical hours**	**25**					**25**					**25**
8.	**Number of ECTS credits for practical hours**	**1**					**1**					**1**
9.	**Total workload**	**50**					**50**					**75**

10.	**ECTS credits for the course** *1 ECTS credit =25 student learning hours*	**2**	**3**

READING LIST

1. Bugajski M., Grabowski W.: Geosyntetyki w budownictwie drogowym, Wydawnictwo Politechniki Poznańskiej, Poznań, 1999.
2. Judycki J., Alenowicz J.: Nowe metody renowacji nawierzchni asfaltowych, Wydawnictwo WKŁ, Warszawa, 1988.
3. Kazimierowicz-Frankowska K.: Wzmacnianie konstrukcji dróg geosyntetykami, Wydawnictwo WKŁ, Warszawa, 2014.
4. Piłat J., Radziszewski P.: Nawierzchnie asfaltowe, Wydawnictwo WKŁ, Warszawa, 2008.
5. Rolla S.: Badania materiałów i nawierzchni drogowych, Wydawnictwo WKŁ, Warszawa 1979.
6. Sybilski D.: Polimeroasfalty drogowe. Jakość funkcjonalna, metodyka i kryteria oceny, Wydawnictwo IBDiM, Warszawa, 1996.
7. Stypułkowski B.: Zagadnienia utrzymania i modernizacji dróg i ulic, Wydawnictwo WKŁ, Warszawa, 1995.
8. Czasopisma naukowo-techniczne: Drogownictwo, Drogi i Mosty.
9. GDDKiA: Katalog Typowych Konstrukcji Nawierzchni Podatnych i Półsztywnych, Warszawa, 2014.
10. GDDKiA: Zalecenia Dotyczące Stosowania Geosyntetyków w Odwodnieniach Dróg, Warszawa 2009.
11. IBDiM: Zastosowanie Geosyntetyków w Budowlach Ziemnych, Warszawa, 2003.