

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Technology of materials and pavements		Code 1010102111010128609
Field of study Civil Engineering second-cycle studies	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 1
Elective path/specialty Road, bridge and railway engineering	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 15 Classes: - Laboratory: 30 Project/seminars: -		No. of credits 2
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 100 2% 100 2%
Responsible for subject / lecturer: dr hab. inż. Mieczysław Słowik email: Mieczyslaw.Slowik@put.poznan.pl tel. 61 665 24 78 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	<ul style="list-style-type: none"> - Student has advanced knowledge of mathematics, physics and chemistry, which is the basis of the theory of materials and buildings, processes and organizational strategies of investment (in the area of road engineering) - Student knows the rules of analysis, design and dimensioning of components and connections in the works (in the area of road engineering) - Student has knowledge of solid mechanics, knows the rules of the analysis of issues of statics, stability and dynamics of structures (in the area of road engineering)
2	Skills	<ul style="list-style-type: none"> - Student is able to classify roads - Student knows how to design elements and connections in complex road construction projects - Student can design complicated construction details of roads
3	Social competencies	<ul style="list-style-type: none"> - Performing specified tasks Student can work individually, or in a team - Student is responsible for safety of himself and a team - Student acts in accordance with the ethical principles
Assumptions and objectives of the course: 1) To familiarize the students with technological solutions currently used in civil engineering in the field of materials and pavements 2) Developing the ability to identify and solve important technological problems, especially solutions that ensure a sufficient service life conditions of the roads and taking into account the requirements of environment protection 3) Developing skills of independent learning about new issues and development trends in the field of road technology		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student knows the rules of production of materials and products used in civil engineering - [K_W05] 2. Student knows the materials and construction products and construction technologies (in the area of civil engineering) - [K_W07] 3. Student has knowledge of the impact of the implementation of road projects and existing roads on the environment - [K_W13]		
Skills:		

<p>1. Student is able to plan and carry out laboratory experiments leading to the evaluation of the quality of construction materials - [K_U11]</p> <p>2. Student knows how in accordance with scientific principles, using scientific workshop to formulate and carry out preliminary work on a research to resolve technological problems arising in pavement construction - [K_U17]</p> <p>3. Student can make the researches that preparing him to start his scientific work - [K_U18]</p>
<p>Social competencies:</p> <p>1. Student is responsible for the accuracy of the results of his work - [K_K02]</p> <p>2. Individually complements and extends knowledge of modern processes and technologies concerning pavement construction - [K_K03]</p> <p>3. Student is aware of the need to enhance his professional and personal competence - [K_K06]</p>

Assessment methods of study outcomes	
<p>Knowledge of students is assessed by the written test.</p> <p>Grading Scale:</p> <p>Percentage of points scored / rating</p> <p>91 to 100 very good (A)</p> <p>81 to 90 good plus (B)</p> <p>71 to 80 good (C)</p> <p>61 to 70 satisfactory plus (D)</p> <p>51 to 60 satisfactory (E)</p> <p>50 or less unsatisfactory (F)</p> <p>Students' skills are tested by evaluating the developed individual reports concerning laboratory exercises.</p>	
Course description	
<p>The development of technology and construction of road pavements and their impact on the environment.</p> <p>Durability of road pavements. Resistance against permanent deformation, low temperature cracking and fatigue cracking.</p> <p>Porous, drainage and retention pavements - advantages and disadvantages.</p> <p>Evaluation of the usefulness of selected road pavements technologies.</p> <p>Bridge Pavements.</p> <p>Pavement Recycling.</p> <p>Pavement maintenance technologies.</p> <p>Asphalt thin layers.</p> <p>Designing the composition of asphalt mixtures.</p> <p>Advanced methods for investigation of bituminous binders and asphalt mixtures</p>	
Basic bibliography:	
<p>1. Piłat J., Radziszewski P., Nawierzchnie asfaltowe, WKŁ 2010</p> <p>2. Szydło A., Nawierzchnie drogowe z betonu cementowego, Polski Cement 2004</p> <p>3. Gaweł I., Kalabińska M., Piłat J., Asfalty drogowe, WKŁ, Warszawa 2014</p> <p>4. Piłat J., Radziszewski P., Król J., Technologia materiałów i nawierzchni asfaltowych, WKŁ, Warszawa 2015</p> <p>5. Radziszewski P., Piłat J., Sarnowski M., Król J., Kowalski K.J., Nawierzchnie asfaltowe na obiektach mostowych, OWPW, Warszawa 2016</p>	
Additional bibliography:	
<p>1. Bugajski M., Grabowski W., Geosyntetyki w budownictwie drogowym, Wydawnictwo Politechniki Poznańskiej 1999.</p> <p>2. Stefańczyk B., Mieczkowski P., Mieszanki mineralno-asfaltowe, wykonawstwo i badania, WKŁ 2008.</p> <p>3. Wymagania Techniczne WT-1 2014, Kruszywa do mieszanek mineralno-asfaltowych i powierzchniowych utwaleń na drogach krajowych, GDDKiA Warszawa 2014</p> <p>4. Wymagania Techniczne WT-2 2014, Nawierzchnie asfaltowe na drogach krajowych, GDDKiA Warszawa 2014</p> <p>5. Wymagania Techniczne WT-4 2010, Mieszanki niezwiązane do dróg krajowych, GDDKiA Warszawa 2010</p> <p>6. Wymagania Techniczne WT-5 2010, Mieszanki związane spoiwem hydraulicznym do dróg krajowych, GDDKiA Warszawa 2010</p>	
Result of average student's workload	
Activity	Time (working hours)

1. Participation in lectures and laboratory exercises	45	
2. Preparing to laboratory exercises and execution of laboratory test reports	10	
3. Preparing for the test	15	
Student's workload		
Source of workload	hours	ECTS
Total workload	70	2
Contact hours	45	1
Practical activities	30	1