

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Road Maintenance and Operation		Code 1010102121010120236
Field of study Civil Engineering Second-cycle Studies	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 2
Elective path/specialty Roads and Highways	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: 30 Classes: - Laboratory: 30 Project/seminars: -		No. of credits 5
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 %) 5 100% 5 100%
Responsible for subject / lecturer: dr inż. Agnieszka Płatkiewicz email: agnieszka.platkiewicz@put.poznan.pl tel. 061 6652-486 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge of design, construction and maintenance of road.
2	Skills	The ability to acquire information from literature, databases and other sources and to integrate obtained data. The ability to interpret and draw conclusions The ability to critically analyze and to evaluate of existing road construction technologies
3	Social competencies	The ability to work independently and in a team The awareness of the non-technical effects of engineering activities, including its impact on the environment and responsibility for the decisions
Assumptions and objectives of the course: The aim of the course is to introduce students to the issues of maintenance and operation of road as a very important area of highway engineering, concerning issues related to the use of roads, road management, diagnostics of road surfacing and impact of roads on the environment.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. The student knows the rules and conditions of use of roads - [K_W16] 2. The student knows the elements of road management systems in the full cycle of life - [K_W19] 3. The student knows the classification and scope of computer programs supporting the management of roads and traffic - [K_W08] 4. The student has knowledge of the impact of the use of roads on the environment - [K_W13]		
Skills:		
1. The student is able to identify the road pavement faults and determine the probable cause of them - [K_U12] 2. The student is able to determine repair needs of road pavement and suggest the proper maintenance works for roads - [K_U12, K_U13] 3. The student is able to predict the change in time of the parameter describing the pavement condition - [K_U13]		
Social competencies:		

1. The student is able to work independently and as a team on the specific task - [K_K01]
2. The student is able to formulate opinions on the pavement diagnostics, technical and technological processes in the road engineering - [K_K07]
3. The student understands the need to sharing knowledge on the road pavement condition and to educate the society in the field road pavements management systems - [K_K08]

Assessment methods of study outcomes

Lectures - students' knowledge is assessed on the basis of a written exam which takes place during last lecture (according to the timetable). The exam consists of 4 questions and lasts 30 minutes.

Students are informed about exam's date, form and time during the first lecture.

Grading scale:

- 16 points - A (very good)
- 14-15 points - B (good plus)
- 12-13 points - C (good)
- 10-11 points - D (satisfactory plus)
- 8-9 points - E (satisfactory)
- below 8 points - F (fail)

Laboratory - students' skills are assessed on the basis of a projects which must be handed on last classes. The projects must be done according to the topic assigned during the first classes. The projects are assessed in terms of content and aesthetics.

Course description

Lectures:

Issues related to the use of roads, including the characteristics of road users, traffic, traffic management systems, ITS traffic management, road safety;

The impact of exploitation of roads on the environment, traffic noise, air pollution, water pollution and soil, threats to fauna and flora;

Road management, tasks road administration, rules for keeping records of roads, reference systems, road management system elements including road data banks, systems of assessment of road elements, models and analysis, criteria and optimization, analysis of the consequences;

Pavement management system (PMS), kinds and aims of the road pavement diagnostics, factors influencing the road pavement condition, genesis of the road pavement faults, diagnosis of the road pavement technical condition, prediction of the road pavement condition, diagnostics of roads pavement in the existing legislation, assessment systems of pavement condition - SOSN i i SOSN-B, assessment system of roadsides and drainage condition - SOPO and system HDM-4;

Laboratory:

Part I - description of the road pavement faults, which affect the given parameter of the technical road pavement condition with giving the probable causes of their origin (genesis)

Part II - term of the class of the road pavement condition for the given parameter and identification of the required repairs for the given section of road (diagnosis)

Part III - appointment of trend model of changes of the given parameter and choice of the term of repair (prediction)

Basic bibliography:

1. Praca zbiorowa: Eksploatacja dróg, Instytut Badawczy Dróg i Mostów, Warszawa 2011
2. Podemska M., Utrzymanie dróg - Technologia robót i sprzęt, Wydawnictwo KaBe, Krosno 2015
3. Gaca S., Suchorzewski W., Tracz M.: Inżynieria ruchu drogowego, Wydawnictwa Komunikacji i Łączności, Warszawa 2008
4. Praca zbiorowa: Zasady uspokajania ruchu na drogach za pomocą fizycznych środków technicznych, Biuro Ekspertyz i Projektów Budownictwa Komunikacyjnego ?EKKOM? Sp. z o.o., 2008
5. Praca zbiorowa: Zasady ochrony środowiska w drogownictwie, Generalna Dyrekcja Dróg Publicznych, (opracowanie IBDiM), Warszawa, 1999
6. Praca zbiorowa: Podręcznik dobrych praktyk wykonywania opracowań środowiskowych dla dróg krajowych, EEKOM sp. z o.o., Kraków, 2008

Additional bibliography:

1. Praca zbiorowa: Zagadnienia utrzymania i modernizacji dróg i ulic, Wydawnictwa Komunikacji i Łączności, Warszawa 1995
2. Płatkiewicz A., Sztukiewicz R., Zastosowanie metody prognozowania szeregów czasowych do przewidywania zmian równości poprzecznej nawierzchni asfaltowej, Pięćdziesiąta Konferencja Naukowa KILiW PAN - KN PZITB, Krynica 2004, t. V, s. 217 - 224
3. Płatkiewicz A., Sztukiewicz R., Określenie horyzontu prognozy dla wybranych modeli zmian równości poprzecznej nawierzchni asfaltowej, Zeszyty Naukowe Politechniki Gdańskiej, Nr 603/2006, Pięćdziesiąta Druga Konferencja Naukowa KILiW PAN - KN PZITB, Gdańsk-Krynica 2006, t. IV, s. 239-245.
4. Sztukiewicz R., Diagnostyka warstwy wierzchniej podatnej nawierzchni drogowej, Drogownictwo, 1991, nr 7-8, s.113-115.
5. Rydzewski P., Sztukiewicz R., Diagnoza nawierzchni jako podstawa wyboru zabiegów utrzymaniowych, Autostrady, Nr 5/2007, s. 110-113.

Result of average student's workload

Activity	Time (working hours)
1. Participation in lecture	30
2. Participation in laboratory	30
3. Participation in consultation	10
4. Project realization	25
5. Preparation for the exam	30

Student's workload

Source of workload	hours	ECTS
Total workload	125	5
Contact hours	70	3
Practical activities	30	1