

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Motorways and expressways		Code 1010102121010126031
Field of study Civil Engineering Second-cycle Studies	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 2
Elective path/specialty Road and Motorway 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: 30 Classes: - Laboratory: - Project/seminars: 30		No. of credits 3
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 %) 3 100% 3 100%
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	Student knows classification and scope of computer software supporting the analysis and design of roads. Student knows the standards and conditions for the design of roads and their components Student knows the principles of design, construction and operation of roads.
2	Skills	Student knows how to make a classification of roads. Student uses specialized tools in order to obtain useful information, communication and acquisition software to support the work of the designer and organizer of the road construction process. Student is able to develop the project and draw up the technical documentation concerning road construction in a selected CAD.
3	Social competencies	Carrying out certain tasks Student can work individually. Student is responsible for the accuracy of the results of his work. Student proceeds in accordance with the rules of ethics.
Assumptions and objectives of the course: Familiarize Students with the technical rules concerning the design and construction of highways and expressways. Overview of legislation on toll motorways. Acquisition of skills in the field of motorways design in the foreground, in the longitudinal and transverse cross-section, items of equipment, service areas and toll stations.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student knows the principles of analysis and design of the elements of motorways and expressways - [K_W02]		
2. Student has knowledge about the impact of the investment and existing motorways and expressways on the environment - [K_W13]		
3. Student knows the principles of design, construction and operation of motorways and expressways - [K_W16]		
Skills:		
1. Student is able to assess loads on motorways and expressways - [K_U01]		
2. Student can design elements and connections in complex construction projects (concerning highways and expressways) - [K_U03]		
3. Student can dimension complicated construction details of motorways and expressways) - [K_U09]		

Social competencies:
1. Student can Individually complement and extend the knowledge of modern processes and technologies in road engineering - [K_K03]
2. Student is aware of the need for sustainable, energy-efficient development in road construction - [K_K04]
3. Student is aware of the need to enhance his professional and personal competence - [K_K06]

Assessment methods of study outcomes
Assessment of lectures in the form of written test conducted in the last (15th) week of semester. Grading Scale: Percentage of points scored - rating 91 to 100 very good (A) 81 to 90 good plus (B) 71 to 80 good (C) 61 to 70 satisfactory plus (D) 51 to 60 satisfactory (E) 50 or less unsatisfactory (F) Students' skills are tested through the assessment of exercise in designing performed individually.

Course description
The development of motorways and expressways in Poland and over the world. Directional system of motorways and expressways in Poland. Technical rules concerning construction of toll motorways. Technical parameters of the design of motorways and expressways in the plan, longitudinal and cross sections. Elements of a road lane of motorway. Technical Equipment of motorways. Drainage facilities. Service areas. Toll systems. Equipment for traffic organizations and safety. Technical Equipment of motorways and expressways. Safety motorways and expressways operation. Evaluation of technical state of motorways and expressways pavements. Capacity and stability earth objects and pavement construction of motorways and expressways. Act on Toll Motorways and the National Road Fund. Act on special rules for the preparation and implementation of investment in public roads. The tender procedure for construction and operation of toll motorways. The contract for the construction and operation of toll motorways. Systems for collecting paid on toll Motorways. Environmental Protection Law. The Natura 2000 Program. Assess for the impact of the motorways on the environment. Green bridges.

Basic bibliography:
1. Piłat J., Radziszewski P., Nawierzchnie asfaltowe, WKŁ 2010 2. Szydło A., Nawierzchnie drogowe z betonu cementowego, Polski Cement 2004. 3. Piłat J., Radziszewski P., Król J., Technologia materiałów i nawierzchni asfaltowych, WKŁ, Warszawa 2015 4. USTAWA z dnia 27 października 1994 r. o autostradach płatnych oraz o Krajowym Funduszu Drogowym 5. USTAWA z dnia 12 stycznia 2007 r. o drogowych spółkach specjalnego przeznaczenia 6. ROZPORZĄDZENIE MINISTRA INFRASTRUKTURY z dnia 16 stycznia 2002 r. w sprawie przepisów techniczno-budowlanych dotyczących autostrad płatnych. 7. ROZPORZĄDZENIE MINISTRA INFRASTRUKTURY z dnia 29 kwietnia 2004 r. w sprawie opłat za przejazd autostradą. 8. ROZPORZĄDZENIE RADY MINISTRÓW z dnia 20 października 2009 r. zmieniające rozporządzenie w sprawie sieci autostrad i dróg ekspresowych.

Additional bibliography:

Result of average student's workload		
Activity	Time (working hours)	
1. Participation in lectures and exercises in designing	60	
2. Developing design exercises	25	
3. Preparation for the test	25	
Student's workload		
Source of workload	hours	ECTS
Total workload	90	3
Contact hours	60	2
Practical activities	30	1