

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Technology and Maintenance of Railway Superstructure		Code 1010101171010124819
Field of study Civil Engineering First-cycle Studies	Profile of study (general academic, practical) general academic	Year /Semester 4 / 7
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) elective
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 30 Classes: - Laboratory: - Project/seminars: -		No. of credits 4
Status of the course in the study program (Basic, major, other) major		(university-wide, from another field) from field
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 4 100% 4 100%
Responsible for subject / lecturer: Michał Pawłowski, DSc Eng email: MICHAL.PAWLOWSKI@PUT.POZNAN.PL tel. +48 61 665 2407 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań		Responsible for subject / lecturer: Włodzimierz Bednarek, PhD Eng email: wlodzimierz.bednarek@PUT.POZNAN.PL tel. +48 61 665 2638 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Knowledge from mathematics and physics required to solve tasks dealing with railroad construction. Knowledge and skills for reading construction drawings. Knowledge of properties, scope of utilisation and investigations of construction materials. Principles of design and analysis of railway construction.
2	Skills	Ability to design railway lines. Ability to read construction drawings. Ability to conduct experiments leading to assessment construction materials quality.
3	Social competencies	Competency of individual and group work under a given task. Being responsible for reliability of the executed work and the work's interpretation. Responsibility for personal and group safety. Cognition of a need to increase one's professional and personal competencies.
Assumptions and objectives of the course: Acquiring by the students basic knowledge and skills in the field of technology of construction and maintenance of railways.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. has knowledge about rules of planning maintenance of railway lines - [K_W14] 2. knows the technologies of construction and maintenance of railways - [K_W14] 3. knows way of organizing the construction process and carrying out works safely - [K_W15]		
Skills:		
1. is able to plan maintenance works - [K_U16] 2. is able to apply the appropriate technology according to the needs of the railway line maintenance, - [K_U21] 3. is able to assess the risks during maintenance works - [K_U16] 4. is able to organize railway maintenance works of railway lines according to the principles of technology and organization - [K_U21]		
Social competencies:		
1. is competent to work individually and in a group under a given task - [K_K01] 2. is responsible for reliability of work done and of the work's results interpretation - [K_K02] 3. states conclusions and describes results of own work - [K_K09]		

Assessment methods of study outcomes		
Outcome of the lectures ? a written colloquium - checking master the knowledge presented in the lectures. Graduation from 51%.		
Course description		
Lectures: Learning method - lecture / problem lecture / lecture with multimedia presentation Maintenance, current and main repairs of railway superstructure and subgrade; Machinery and equipment for track works; Basic technological processes of repairs of railway superstructure and subgrade; Technology of construction of railway lines; Safety rules during works on open railway lines..		
Basic bibliography:		
1. Bałuch H.: Diagnostyka nawierzchni kolejowej. WKiŁ, Warszawa 1978. 2. Batko M.: Budowa i utrzymanie dróg kolejowych. WKiŁ, Warszawa 1985. 3. Bernaś M., Koktysz B.: Maszyny i urządzenia do robót torowych. WKiŁ, Warszawa 1990. 4. Bogdaniuk B., Towpik K.: Budowa, modernizacja i naprawy dróg kolejowych. KOW, Warszawa 2010. 5. Id-1. Warunki techniczne utrzymania nawierzchni na liniach kolejowych. PKP Polskie Linie Kolejowe S.A., Warszawa 2005. 6. Id-3. Warunki techniczne utrzymania podtorza kolejowego. PKP Polskie Linie Kolejowe S.A., Warszawa 2009. 7. Klonowski P., Kulczycki B., Lenkiewicz W., Wasilewski Z., Wyszyński K.: Technologia zmechanizowanych robót kolejowych. Wydawnictwa Politechniki Warszawskiej, Warszawa 1983. 8. Koktysz, M. Bernaś: Maszyny i urządzenia do robót torowych, tom I, WKiŁ, Warszawa 1990. 9. Matylla S.: Technologia zmechanizowanych robót kolejowych. Wydawnictwo Politechniki Poznańskiej, Poznań 1981. 10. Semrau A., Zamięcki H.: Budowa i utrzymanie dróg kolejowych, tom II,, WKiŁ, Warszawa 1975. 11. Skrzyński E., Sikora R.: Kolejowe budowle ziemne. Tom II. WKiŁ, Warszawa 1987. 12. Sysak J. (red.): Drogi kolejowe. PWN, Warszawa 1986. 13. Towpik K.: Utrzymanie nawierzchni kolejowej. WKiŁ, Warszawa 1990.		
Additional bibliography:		
1. Dyżewski A.: Technologia i organizacja budowy. Arkady, Warszawa 1965. 2. Lewinowski C., Zimnoch S.: Ogólne zasady projektowania robót ziemnych dróg samochodowych i kolejowych. PWN, Warszawa 1987. 3. Infrastruktura Transportu, ELAMED, Katowice 4. Przegląd Komunikacyjny, Stowarzyszenie Inżynierów i Techników Komunikacji Rzeczpospolitej Polskiej, Warszawa 5. Technika Transportu Szynowego, EMI-PRESS, Łódź		
Result of average student's workload		
Activity	Time (working hours)	
1. participation in lectures	30	
2. current preparation to the lectures (replays)	10	
3. own study using the indicated literature and online resources	45	
4. consultations	1	
5. preparation to lectures colloquium	14	
Student's workload		
Source of workload	hours	ECTS
Total workload	100	4
Contact hours	31	1
Practical activities	1	1