

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Railway construction		Code 1010104191010121738
Field of study Civil Engineering First-cycle Studies	Profile of study (general academic, practical) (brak)	Year /Semester 5 / 9
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) elective
Cycle of study: First-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 18 Classes: - Laboratory: - Project/seminars: -		No. of credits 1
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 %) 1 100% 1 100%
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: Jeremi Rychlewski, DSc Eng email: jeremi.rychlewski@put.poznan.pl tel. +48 61 647 58 16 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Has knowledge of managing business in the construction sector, knows the standards and guidelines for the design of linear structures; knows and applies acts of law, standards and guidelines
2	Skills	Uses specialized tools in order to find useful information, software supporting the work of the designer and organizer of the construction process; knows how to prepare a schedule of construction works, manage the construction process; is able to analyze the risks during the performance of projects and operation of building
3	Social competencies	Can work individually and in a group on a given task or eventually manage a team; Takes responsibility for solidity of own and team work's results; complements and enhances knowledge about railway construction; Takes responsibility for own and team's safety; Consciousness about a need to improve professional skills and personal competence
Assumptions and objectives of the course: Getting to know the technologies in the repair and maintenance works of railway superstructure and subgrade. The influence of a rolling stock and temperature on the work of continuous welded track.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student knows maintenance and repair works of the railway superstructure and subgrade - [K_W11] 2. Student knows machineries and processes using in the maintenance and repair works of the railway superstructure and subgrade - [K_W14] 3. Student knows the technologies used for the maintenance of the railway line - [K_W17]		
Skills:		
1. Student is able to choose an appropriate technology for subgrade and superstructure repairs - [K_U05] 2. Student is able to choose an appropriate method of rail stressing process - [K_U10] 3. Student is able to analyze creep of rails and their impact on the work of continuous welded track - [K_U12]		
Social competencies:		
1. Student is responsible for solidity of own work's results - [K_K02] 2. Student alone complements and enhances knowledge about railway construction - [K_K03] 3. Student in conscious about a need to improve professional skills and personal competence - [K_K06]		

Assessment methods of study outcomes		
Verification of knowledge: class participation and colloquium at the end of semester. Getting points for: active participation in the classes, knowledge presented at the colloquium. Graduation from 51%.		
Course description		
Lecture: learning method - lecture / problem lecture / lecture with multimedia presentation Shaping of a railroad. Selection of machines for railway works - capacity of machines. Strengthening of subgrade. Modernization and maintenance of a railway line. Technology of subgrade and superstructure repair works. Machinery for track works and elements of health and safety at railway works.		
Basic bibliography:		
1. Bałuch. H., Bałuch M.: Układy geometryczne toru i ich deformacje. KOW, Warszawa 2010. 2. Bałuch H.: Diagnostyka nawierzchni kolejowej. WKiŁ, Warszawa 1978. 3. Batko M.: Budowa i utrzymanie dróg kolejowych, WKiŁ, Warszawa 1985. 4. Bernaś M., Koktysz B.: Maszyny i urządzenia do robót torowych. WKiŁ, Warszawa 1990. 5. Bogdaniuk B., Towpiak K.: Budowa, modernizacja i naprawy dróg kolejowych. KOW, Warszawa 2010. 6. Kędra Z.: Technologia robót torowych. Wydawnictwo Politechniki Gdańskiej, Gdańsk 2015. 7. Klonowski P., Kulczycki B., Lenkiewicz W., Wasilewski Z., Wyszynski 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. Mazur J.: Roboty torowe. Państwowa Inspekcja Pracy . Warszawa 2014. 11. PKP PLK S.A.: Id-1. Warunki techniczne utrzymania nawierzchni na liniach kolejowych. PKP Polskie Linie Kolejowe S.A., Warszawa 2005. 12. PKP PLK S.A.: Id-3. Warunki techniczne utrzymania podtorza kolejowego. PKP Polskie Linie Kolejowe S.A., Warszawa 2009. 13. PKP PLK S.A.: Informacje o zagrożeniach dla bezpieczeństwa i zdrowia w zakresie wykonywania prac na terenie kolejowym PKP Polskie Linie Kolejowe S.A. Warszawa 2014. 14. PKP PLK S.A.: Poradnik dla wykonawców w zakresie bezpiecznego wykonywania prac na terenie kolejowym PKP Polskie Linie Kolejowe S.A. Warszawa 2013. 15. Semrau A., Zamięcki H.: Budowa i utrzymanie dróg kolejowych, tom II,, WKiŁ, Warszawa 1975. 16. Skrzyński E., Sikora R.: Kolejowe budowle ziemne. Tom II. WKiŁ, Warszawa 1987. 17. Sysak J. (red.): Drogi kolejowe. PWN, Warszawa 1986. 18. Towpiak 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. Wiłun Z.: Zarys geotechniki, WKiŁ, Warszawa 2005. 4. Infrastruktura Transportu, ELAMED, Katowice 5. Technika Transportu Szynowego, EMI-PRESS, Łódź 6. Transport Miejski i Regionalny, Stowarzyszenie Inżynierów i Techników Komunikacji Rzeczpospolitej Polskiej, Warszawa		
Result of average student's workload		
Activity	Time (working hours)	
1. Student's attendance to lectures	18	
2. Current preparation to lectures	4	
3. Preparation to final exam and student's attendance to exam	3	
Student's workload		
Source of workload	hours	ECTS
Total workload	25	1
Contact hours	19	1
Practical activities	1	1