Faculty of Civil and Environmental Engineering

Name the module/subject Maintenance and Technology of Railroad Works Profile of study (greened academic prescriptor) Profile of study (gre	STUDY MODULE DESCRIPTION FORM								
Profile of study Profile of									
Elective path/specialty Railways Railways Polish Polish Course (compulsory, elective) obligatory Cycle of study: Second-cycle studies Four of study! (full-time, part-time)	Field of	study		Profile of study (general academic, practical)	Year /Semester				
Cycle of study: Second-cycle studies Railways Second-cycle studies Roull-time No. of hours Lecture: 45 Classes: - Laboratory: - Project/seminars: - 7 Status of the course in the study program (Basic, major, other) major Form field Functional sciences Responsible for subject / lecturer: DSc Eng. Włodzimierz Bednarek email: włodzimierz bednarek @put.poznan.pl tel. 2407 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznan Prerequisites in terms of knowledge, skills and social competencies Knowledge Skills Uses specialized tools in order to find useful information, software supporting work of a designer and of construction process organiser; knows how to prepare a schedule of construction works and manage a construction; process; is able to analyze risks during the performance of projects and operation of building stock and temperature on the work of continuous welded track Study outcomes and repair works of the maintenance of the railway superstructure and subgrade. Tk. U12 Student knows maintenance and repair works of the maintenance of the railway superstructure and subgrade. Tk. U12 Student knows maintenance and propriate technologies used for the maintenance of the railway superstructure and subgrade. Tk. U12 Student knows maintenance and appropriate technologies used for the maintenance of the railway superstructure and subgrade. Tk. U15 Student is able to choose an appropriate technology for subgrade and superstructure repairs - [K_U05] Student is able to choose an appropriate method of rail stressing process. (K_U12] Social competencies:	Civil	Engineering Se	cond-cycle Studies	general academic	-				
Second-cycle studies Full-time	Elective	path/specialty	Railways	1 -					
No. of hours Lecture: 45 Classes: - Laboratory: - Project/seminars: - 7 Status of the course in the study program (Basic, major, other) major from field Education areas and fields of science and art technical sciences	Cycle o	f study:		Form of study (full-time,part-time)					
Lecture: 45 Classes: - Laboratory: - Project/seminars: - 7 Status of the course in the study program (Basic, major, other) major from field Education areas and fields of science and art technical sciences Responsible for subject / lecturer: DSc Eng. Wlodzimierz Bednarek email: włodzimierz bednarek @put.poznan.pl tel. 2407 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Prerequisites in terms of knowledge, skills and social competencies Skills Skills Social competencies Scocial competencies Study outcomes and objectives of the course: Assumptions and objectives of the course: Study outcomes and reference to the educational results for a field of study Knowledge: 1. Student is able to choose an appropriate technologies used for his maintenance of the railway line - [K. W17] Skills: Student is able to choose an appropriate method of rail stressing process - [K. U12] Social competencies: - Project/seminars: - 7 Prom field Cuniversity-wide, from another field) ECTS distribution (number and %)) Cuniversity-wide, from another field) ECTS distribution (number and %)) Cuniversity-wide, from another field) ECTS distribution (number and %)) Consciousnesse Pago		Second-c	ycle studies	full-	full-time				
Status of the course in the study program (Basic, major, other) major Education areas and fields of science and art technical sciences Responsible for subject / lecturer: DSc Eng. Wlodzimierz.bednarek email: wlodzimierz.bednarek @put.poznan.pl tel. 2407 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznan Fererequisites in terms of knowledge, skills and social competencies Knowledge Skills Social competencies Assumptions and objectives of the course: Assumptions and objectives of the course: Study outcomes and repair works of the railway superstructure and subgrade - [K_W11] Student knows maintenance and repair works of the railway superstructure repairs - [K_U05] Stulent is able to choose an appropriate technology for subgrace and process - [K_U10] Student is able to choose an appropriate method of rails and their impact on the work of continuous welded track - [K_U12] Social competencies Study outcomes and apporpriate method of rails subgrace and superstructure repairs - [K_U05] Student is able to choose an appropriate method of rails and their impact on the work of continuous welded track - [K_U12] Social competencies Student is able to choose an appropriate method of rails and their impact on the work of continuous welded track - [K_U12] Social competencies Study outcomes and repair works of the railway superstructure and subgrade - [K_W17] Skills: Student is able to choose an appropriate technology for subgrade and superstructure repairs - [K_U05] Student is able to choose an appropriate technology for subgrade and superstructure repairs - [K_U05] Student is able to choose an appropriate method of rail stressing process - [K_U10] Social competencies:	No. of h	iours		ı	No. of credits				
Education areas and fields of science and art technical sciences Responsible for subject / lecturer: DSc Eng. Wilodzimierz Bednarek email: wilodzimierz. bednarek @put.poznan.pl tel. 2407 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznan Prerequisites in terms of knowledge, skills and social competencies: Knowledge Bas specialized tools in order to find useful information, software supporting work of a designer and of construction process organiser; knows how to prepare a schedule of construction works and manage a construction process; is able to analyse risks during the performance of projects and operation of building Social competencies Assumptions and objectives of the course. 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 repairs - [K_U05] 2. Student is able to choose an appropriate technology for subgrade and superstructure repairs - [K_U12] 3. Student is able to choose an appropriate technology for subgrade and superstructure repairs - [K_U12] 5. Student is able to choose an appropriate technology for subgrade and superstructure repairs - [K_U12] 5. Student tis able to choose an appropriate technology for subgrade and superstructure repairs - [K_U12] 5. Student shouse the technologies used for the maintenance of the railway library is able to choose an appropriate technology for subgrade and superstructure repairs - [K_U12] 5. Student is able to choose an appropriate method of rail stressing process - [K_U10] 5. Student to subject / [K_U12] 5. Student is able to choose an appropriate technology for subgrade and superstructure repairs - [K_U12] 5. Student is able to choose an appropriate technology for subgrade and superstructure repairs - [K_U12] 5. Student is able to choose an appropriate technology for subgrade and	Lectu	re: 45 Classes	s: - Laboratory: -	Project/seminars:	- 7				
Education areas and fields of science and art technical sciences Responsible for subject / lecturer: DSc Eng. Wiodzimierz Bednarek email: wiodzimierz bednarek @put.poznan.pl tel. 2407 Faculty of Civil and Environmental Engineering ul. Piotrows 5 60-965 Poznan Prerequisites in terms of knowledge, skills and social competencies: Knowledge Responsible for subject / lecturer: DSc Eng. Michał Pawłowski email: michał.pawlowski@put.poznan.pl tel. 2407 Faculty of Civil and Environmental Engineering ul. Piotrows 5 60-965 Poznan Prerequisites in terms of knowledge, skills and social competencies: Knowledge Knowledge Skills Uses specialized tools in order to find useful information, software supporting work of a designer and of construction process organiser; knows how to prepare a schedule of construction works and manage a construction process; is able to analyse risks during the performance of projects and operation of building Social competencies 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 roiling stock and temperature on the work of continuous welded track Study outcomes and repair works of the railway superstructure and subgrade - [K_W11] S. Student knows maintenance and repair works of the railway superstructure and subgrade - [K_W11] S. Student knows machineries and processes using in the maintenance and repair works of the railway superstructure repairs - [K_U05] S. Student s able to choose an appropriate technology for subgrade and superstructure repairs - [K_U05] S. Student is able to choose an appropriate method of rail stressing process - [K_U10] S. Student is able to choose an appropriate method of rail stressing process - [K_U10] S. Student lis able to choose an appropriate method of rail stressing process - [K_U10]	Status	of the course in the study	program (Basic, major, other)		· ·				
technical sciences Responsible for subject / lecturer: DSc Eng. Wlodzimierz Bednarek email: wlodzimierz bednarek @put.poznan.pl tel. 2407 Faculty of Civil and Environmental Engineering ul. Plotrowo 5 60-965 Poznan ul. Plotrowo 5 80-965 Poznan ul.			major	fro	om field				
Responsible for subject / lecturer: DSc Eng. Wlodzimierz Bednarek emait: wlodzimierz bednarek @put.poznan.pl tel. 2407 feaculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznari Feaculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznari Feaculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznari Feaculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznari Pererequisites in terms of knowledge, skills and social competencies: Knowledge	Educati	on areas and fields of sci	ence and art						
DSc Eng. Wlodzimierz Bednarek email: wlodzimierz.bednarek@put.poznan.pl tel. 2407 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Enginearing ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Enginearing ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Enginearing ul. Piotrowo 5 60-965 Poznań Faculty of Civil and Environmental Enginearing ul. Piotrowo 5 60	techr	nical sciences							
email: Modzimierz.bednarek @put.poznan.pl tel. 2407 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Prerequisites in terms of knowledge, skills and social competencies: Knowledge	Resp	onsible for subj	ect / lecturer:	Responsible for subject	ct / lecturer:				
tel. 2407 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Prerequisites in terms of knowledge, skills and social competencies: Knowledge		•		<u> </u>					
Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań Prerequisites in terms of knowledge, skills and social competencies: Recompetencies Has knowledge of managing business in the construction sector, knows standards and guidelines for design of linear structures; knows and applies acts of law, standards and guidelines Uses specialized tools in order to find useful information, software supporting work of a designer and of construction process organiser; knows how to prepare a schedule of construction works and manage a construction process; is able to analyse risks during the performance of projects and operation of building pCan 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] Student knows machineries and processes using in the maintenance and repair works of the railway superstructure and subgrade - [K_W17] Student knows the technologies used for the maintenance of the railway line - [K_W17] Student is able to choose an appropriate technology for subgrade and superstructure repairs - [K_U05] Student is able to choose an appropriate method of rail stressing process - [K_U10] Student is able to analyze creep of rails and their impact on the work of continuous welded track - [K_U12] Social competencies:			rek@put.poznan.pl	•	put.poznan.pl				
Prerequisites in terms of knowledge, skills and social competencies: Record Has knowledge of managing business in the construction sector, knows standards and guidelines for design of linear structures; knows and applies acts of law, standards and guidelines for design of linear structures; knows and applies acts of law, standards and guidelines are specialized tools in order to find useful information, software supporting work of a designer and of construction process organiser; knows how to prepare a schedule of construction works and manage a construction process; is able to analyse risks during the performance of projects and operation of building pCan 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:		-	onmental Engineering		nmental Engineering				
Has knowledge of managing business in the construction sector, knows standards and guidelines for design of linear structures; knows and applies acts of law, standards and guidelines Skills Uses specialized tools in order to find useful information, software supporting work of a designer and of construction process organiser; knows how to prepare a schedule of construction works and manage a construction process; is able to analyse risks during the performance of projects and operation of building Social pcan 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]				•	0 0				
Skills Skills Sucial competencies Such assumptions and objectives of the course: Assumptions and objectives of the course 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: Student knows maintenance and processes using in the maintenance of the railway superstructure repairs - [K_W14] Student knows the technologies used for the maintenance of the railway line - [K_W17] Stills: Student is able to choose an appropriate method of rail stressing process - [K_U10] Student is able to analyze creep of rails and their impact on the work of continuous welded track - [K_U12] Social competencies:	Prere	equisites in term	s of knowledge, skills an	d social competencies:	:				
designer and of construction process organiser; knows how to prepare a schedule of construction works and manage a construction process; is able to analyse risks during the performance of projects and operation of building Social performance of projects and operation of building pCan 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	Knowledge	guidelines for design of linear st	idelines for design of linear structures; knows and applies acts of law, standards and					
Social competencies pCan 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:	2	Skills	designer and of construction pro construction works and manage	tion process organiser; knows how to prepare a schedule of nanage a construction process; is able to analyse risks during the					
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:	3		pCan 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;						
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:	Assu	mptions and obj	•	mprovo protocolonial cismo and	porodinal competence				
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:	Getting to know the technologies in the repair and maintenance works of railway superstructure and subgrade. The influence								
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:	Study outcomes and reference to the educational results for a field of study								
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:	·								
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:									
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:	2. Student knows machineries and processes using in the maintenance and repair works of the railway superstructure and								
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:			logies used for the maintenance of	of the railway line - [K_W17]					
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:									
3. Student is able to analyze creep of rails and their impact on the work of continuous welded track - [K_U12] Social competencies:				•	irs - [K_U05]				
Social competencies:				• • • • • • • • • • • • • • • • • • • •	Line of LIAON				
·				tne work of continuous welded	track - [K_U12]				
1. Student is responsible for solidity of own work?'s results - [N_KUZ]		•		. K03]					
2. Student alone complements and enhances knowledge about railway construction - [K_K03]									

Assessment methods of study outcomes

3. Student in conscious about a need to improve professional skills and personal competence - [K_K06]

Faculty of Civil and Environmental Engineering

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. Verification of skills: active participation in the projects; completing 3 projects, oral defense of the projects and studies; discussion of the solutions used in projects. Getting points for: activity in the classroom, knowledge of the issues presented in the projects, substantive quality of the projects.

Course description

- 1. Shaping of a railroad.
- 2. Selection of machines for railway works? capacity of machines.
- 3. Strengthening of subgrade.
- 4. Modernization and maintenance of a railway line.
- 5. Technology of subgrade and superstructure repair works.
- 6. Machinery for track works.
- 7. Elements of health and safety at railway works

Basic bibliography:

- 1. Maszyny i urządzenia do robót torowych, tom I, Koktysz, M. Bernaś, WKiŁ, Warszawa, 1990
- 2. Budowa i utrzymanie dróg kolejowych, M. Batko, WKiŁ, Warszawa, 1985
- 3. Budowa i utrzymanie dróg kolejowych, tom II, Semrau, H. Zamięcki, WKiŁ, Warszawa, 1975
- 4. Budowa, modernizacja i naprawy dróg kolejowych, Bogdaniuk B., Towpik K., KOW, Warszawa 2010
- 5. Praca zbiorowa pod red. J. Sysak: Drogi Kolejowe. PWN, Warszawa 1986
- 6. Podstawy dróg kolejowych, J. Sysak, WKiŁ, Warszawa 1982
- 7. Kolejowe budowle ziemne, Skrzyński E., Sikora R., Tom II. WKiŁ, Warszawa 1987
- 8. Utrzymanie nawierzchni kolejowej, K. Towpik, WKiŁ, Warszawa, 1990
- 9. Wpływ temperatury na pracę toru kolejowego, Łoś M, WKiŁ, Warszawa 1974

Additional bibliography:

- 1. Modern Railway Track, C. Esveld, Delft, 2001
- 2. Stability of continuous welded rail track, M. A. Van, Delft, 1995
- 3. Dziennik Ustaw Rzeczypospolitej Polskiej, Warszawa, dnia 15 grudnia 1998 r., Nr 151, Poz. 987: Rozporządzenie Ministra Transportu i Gospodarki Morskiej z dnia 10 września 1998 r. w sprawie warunków technicznych, jakim powinny odpowiadać budowle kolejowe i ich usytuowanie
- 4. Przepisy Id-1 (D-1) Warunki techniczne utrzymania nawierzchni na liniach kolejowych, Warszawa, 2005
- 5. Przepisy Id-3 (D-4), Warunki techniczne utrzymania podtorza kolejowego, Warszawa, 2004

Result of average student's workload

Activity	Time (working hours)
1. Student?s attendance to lectures	30
2. Current preparation to lectures	30
3. Preparation to final exam and student?s attendance to exam	40

Student's workload

Source of workload	hours	ECTS		
Total workload	175	7		
Contact hours	55	2		
Practical activities	125	5		