

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Dimensioning of railway track structure</b>		Code <b>1010125131010126036</b>
Field of study <b>Structural Engineering</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>2 / 3</b>
Elective path/specialty <b>Road-Train Engineering</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>Second-cycle studies</b>	Form of study (full-time, part-time) <b>part-time</b>	
No. of hours Lecture: <b>10</b> Classes: <b>-</b> Laboratory: <b>-</b> Project/seminars: <b>8</b>		No. of credits <b>3</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art		ECTS distribution (number and %)
<b>Responsible for subject / lecturer:</b>  DSc Eng. Włodzimierz Bednarek email: wlodzimierz.bednarek@put.poznan.pl tel. 2407 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	K_W06. Has knowledge about rules governing design of railroads K_W07. Knows rules for dimensioning of railway superstructure elements K_W10. Has basic knowledge about designing elements of railway superstructure
2	<b>Skills</b>	K_U01. Has an ability to classify railways. K_U07. Has an ability to design chosen railway?s superstructure elements
3	<b>Social competencies</b>	K_K01. Can work individually and in a group on a given task. K_K10. Behaves with regard to rules of ethics.
<b>Assumptions and objectives of the course:</b> 1) Deliver engineering knowledge about railway superstructure construction. 2) The static and kinematic analysis of deflections and stress values in the railway superstructure elements. 3) Geometrical and geometric-kinematical state assessment of railway track. 4) Strength of railway superstructure taking into account irregularity of track geometry. 5) Stress distribution in the railway superstructure. 6) Diagnostics and maintenance of the railway track.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b> 1. Knows rules of the calculations of railway superstructure construction - [K_W05] 2. Knows rules of the dimensioning of railway superstructure elements - [K_W07]		
<b>Skills:</b> 1. . Has an ability to dimension basic elements of railway track - [K_U08]		
<b>Social competencies:</b> 1. Is able to work independently - [K_K01] 2. Own complements and extends knowledge of the railway superstructure - [K_K03] 3. Is aware of the need of improving professional competences - [K_K06]		
<b>Assessment methods of study outcomes</b>		

Students' knowledge and abilities assessed on the basis of oral colloquium and written calculations. Examination consists of 2 theoretical questions and 1 computational task. Information about the form, term and duration of a test is given on the first lecture in the semester

**Course description**

1. Influence of the temperature on the continuous welded track and stresses in the railway track.
2. Strength of railway superstructure elements taking into account factors that significantly increase the stresses.
3. Imperfections in railway track.
4. Stability of the railway continuous welded track.
5. Conditions for the safe operation of the continuous welded track.

**Basic bibliography:**

1. Basiewicz T.: Nawierzchnia kolejowa z podkładami betonowymi. Wydawnictwa Komunikacji i Łączności, Warszawa 1969
2. Czyczuła Wł.: Tor bezстыkowy. Wydawnictwo Politechniki Krakowskiej, Kraków 2002
3. Sancewicz St.: Nawierzchnia kolejowa. PKP Polskie Linie Kolejowe S.A., Warszawa 2010
4. Grulkowski S., Kędra Z., Koc Wł., Nowakowski M. J.: Drogi szynowe. Wydawnictwo Politechniki Gdańskiej, Gdańsk 2013
5. Szcześniak W.: Statyka, dynamika i stateczność nawierzchni i podtorza kolejowego. Przegląd podstawowych pozycji literatury. Prace Naukowe Politechniki Warszawskiej. Seria Budownictwo, z. 129, Warszawa 1995
6. Czyczuła Wł.: Eksploatacyjna stabilność drogi kolejowej. Monografie Politechniki Krakowskiej, nr 126, Kraków 1992

**Additional bibliography:**

1. Esveld C.: Modern Railway Track. Delft, 2001
2. Siewczyński Ł.: Zagadnienia współpracy nawierzchni kolejowej z podtorzem gruntowym. Wydawnictwo Politechniki Poznańskiej, Poznań 1974
3. Van M. A.: Stability of continuous welded rail track. Delft 1995
4. Czyczuła W., Towpik K.: Problemy modelowania oraz identyfikacji modeli toru bezстыkowego. Problemy Kolejnictwa, z. 128, 1998
5. Towpik K.: Infrastruktura drogi kolejowej. Obciążenia i trwałość nawierzchni. Biblioteka Problemów Eksploatacji, Warszawa?Radom 2006

**Result of average student's workload**

Activity	Time (working hours)	
1. Student's attendance to lectures	29	
2. Student's preparation to colloquium	46	
3. Colloquium	1	
Student's workload		
Source of workload	hours	ECTS
Total workload	75	3
Contact hours	32	1
Practical activities	48	2