Tadeusz Kosiuszko Cracow University of Technology
Faculty of Civil Engineering
Division of Bridge, Metal and Timber Structures L-3

Field of study: CIVIL ENGINEERING
First-cycle studies – full-time studies

DIPLOMA PROFILES

I.	**Metal structures**
II.	**Bridges and underground structures**

SUBJECTS RELATED TO DIPLOMA PROJECTS

	Semester VI	W	P	Semester VII	W	P
L-3	**Profile: METAL STRUCTURES**					
	Thin-walled steel structures	1	2	Metal structures II	1	2
	Profile: BRIDGES AND UNDERGROUND STRUCTURES					
	Selected issues of bridge design	0,67	1	Composite structures for bridges	1	2
	Tunnels, car-parks, underground passages	0,33	1			

SUBJECTS RELATED TO DIPLOMA PROJECTS - SYLLABUSES
Profile: METAL STRUCTURES

<table>
<tr><td colspan="2">Field of study: CIVIL ENGINEERING</td><td colspan="5">First-cycle studies – full-time studies
Diploma profile: Metal structures</td></tr>
<tr><td colspan="7">Course name: THIN-WALLED STEEL STRUCTURES</td></tr>
<tr><td rowspan="2">Semester 6</td><td>Class type:</td><td>Lecture</td><td>Class exercise</td><td>Laboratory</td><td>Design exercise</td></tr>
<tr><td>Number of hours per semester:</td><td>15</td><td></td><td></td><td>30</td></tr>
<tr><td colspan="2">Preceding courses:</td><td colspan="5">Strength of materials, Structural mechanics, Metal structures (semester 5)</td></tr>
<tr><td colspan="2">Learning outcomes - skills and competences</td><td colspan="5">Skills and competences in the design of lightweight steel halls without supported transport.</td></tr>
<tr><td colspan="7">EDUCATIONAL CONTENTS</td></tr>
<tr><td colspan="7"><u>Lectures:</u>
Steel products from strips and sheets, cold-formed and drawn sections, steel skeleton casing systems. Geometric characteristics of class 4 thin-walled cross-sections without stiffeners and with intermediate or edge stiffeners. Issues of general, local and distortion stability of thin-walled elements. Load capacity of thin-walled steel bars compressed axially and eccentrically. Dimensioning of roof purlins from cold-formed sections. The influence of light housing on the redistribution of cross-sectional forces of the steel hall skeleton. Structural issues of large-scale halls - design of tubular truss nodes.</td></tr>
<tr><td colspan="7"><u>Design exercise:</u> Lightweight steel hall of large size without supported transport.</td></tr>
<tr><td colspan="7"><u>List of basic and supplementary literature:</u>
1. Biegus A.: Stalowe budynki halowe. Arkady, Warszawa 2003
2. Bogucki W., Żyburtowicz M.: Tablice do projektowania konstrukcji metalowych. Arkady, Warszawa 1996.
3. Bródka J., Broniewicz M.: Konstrukcje stalowe z rur. Arkady, Warszawa 2001.
4. Łubiński M., Filipowicz A., Żółtowski W.: Konstrukcje metalowe. Arkady, Warszawa, cz. I 2003, cz. II – 2004.
5. Pałkowski Sz.: Konstrukcje stalowe. Wybrane zagadnienia obliczania i projektowania. Wydawnictwo Naukowe PWN, Warszawa 2001.
6. Włodarczyk W.: Konstrukcje stalowe. Podstawy projektowania. WSiP, Warszawa 1997.
7. Ziółko J.: Konstrukcje stalowe. Wytwarzanie i montaż. WSiP, Warszawa 1995.
8. Eurokod 1993-1-3: Reguły uzupełniające dla konstrukcji z kształtowników i blach profilowanych na zimno. Listopad 2006.</td></tr>
<tr><td colspan="7"><u>Conditions for passing the course:</u> positive evaluation of the final test, positive evaluation of the project</td></tr>
<tr><td colspan="7"><u>Author:</u> dr hab. inż. Mariusz Maślak, prof. PK</td></tr>
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Field of study: **CIVIL ENGINEERING**	First-cycle studies – full-time studies Diploma profile: **Metal structures**

Course name: **METAL STRUCTURES II**

Semester 7	Class type:	Lecture	Class exercise	Laboratory	Design exercise
	Number of hours per semester:	15			30
Preceding courses:	Strength of materials, Structural mechanics, Metal structures (semester 5)				
Learning outcomes - skills and competences	Skills and competences in the design of steel crane trestle bridges.				

EDUCATIONAL CONTENTS

Lectures:
Actions caused by the work of cranes and machines. Designing steel plate girders supporting overhead travelling crane runways, including steel fatigue problems. Bracing of steel gantries. Designing full-wall and lattice columns supporting crane beams. Anchorages for columns in footings..

Design exercise: Design of steel crane trestle bridges.

List of basic and supplementary literature:

1. Biegus A.: Stalowe budynki halowe. Arkady, Warszawa 2003
2. Bogucki W., Żyburtowicz M.: Tablice do projektowania konstrukcji metalowych. Arkady, Warszawa 1996.
3. Łubiński M., Filipowicz A., Żółtowski W.: Konstrukcje metalowe. Arkady, Warszawa, cz. I – 2003, cz. II – 2004.
4. Pałkowski Sz.: Konstrukcje stalowe. Wybrane zagadnienia obliczania i projektowania. Wydawnictwo Naukowe PWN, Warszawa 2001.
5. Ziółko J.: Konstrukcje stalowe. Wytwarzanie i montaż. WSiP, Warszawa 1995.
6. Eurokod 1: 1991 -3: Oddziaływania wywołane przez pracę dźwigów i maszyn.
7. Eurokod 3: 1993-1-5: Projektowanie konstrukcji stalowych. Blachownice.
8. Eurokod 3: 1993-1-9: Projektowanie konstrukcji stalowych. Zmęczenie.
9. Eurokod 3: 1993-6: Projektowanie konstrukcji stalowych. Konstrukcje wsporcze dźwignic.

Conditions for passing the course:
Positive evaluation of the final test, positive evaluation of the project

Author: dr hab. inż. Mariusz Maślak, prof. PK

SUBJECTS RELATED TO DIPLOMA PROJECTS - SYLLABUSES
Profile: BRIDGES AND UNDERGROUND STRUCTURES

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<tr><td colspan="3">Field of study: CIVIL ENGINEERING</td><td colspan="4">First-cycle studies – full-time studies
Diploma profile: Bridges and underground structures</td></tr>
<tr><td colspan="7">Course name: SELECTED ISSUES OF BRIDGE DESIGN</td></tr>
<tr><td rowspan="2">Semester 6</td><td colspan="2">Class type:</td><td>Lecture</td><td>Class exercise</td><td>Laboratory</td><td>Design exercise</td></tr>
<tr><td colspan="2">Number of hours per semester:</td><td>10</td><td></td><td></td><td>15</td></tr>
<tr><td>Preceding courses:</td><td colspan="6">Strength of materials, Structural mechanics, Concrete structures (semester 5), Metal structures (semester 5),</td></tr>
<tr><td>Learning outcomes - skills and competences</td><td colspan="6">Skills and competences in the design of the bridge structures – assessment of bridge load capacity, methods of strengthening, reconstruction and repair of bridge structures.</td></tr>
<tr><td colspan="7">EDUCATIONAL CONTENTS</td></tr>
<tr><td colspan="7"><u>Lectures:</u>
Basic definitions, principles and methods of reconstruction and renovation of bridge structures. Determining the load capacity of bridge structures together with examples of calculations. Strengthening of the concrete and steel bridges. Strengthening of the bridge supports. Expanding steel and concrete bridges. Failures of bridge structures.</td></tr>
<tr><td colspan="7"><u>Design exercise:</u> Design of steel crane trestle bridges.</td></tr>
<tr><td colspan="7"><u>List of basic and supplementary literature:</u>
1. Biegus A.: Stalowe budynki halowe. Arkady, Warszawa 2003
2. Bogucki W., Żyburtowicz M.: Tablice do projektowania konstrukcji metalowych. Arkady, Warszawa 1996.
3. Łubiński M., Filipowicz A., Żółtowski W.: Konstrukcje metalowe. Arkady, Warszawa, cz. I – 2003, cz. II – 2004.
4. Pałkowski Sz.: Konstrukcje stalowe. Wybrane zagadnienia obliczania i projektowania. Wydawnictwo Naukowe PWN, Warszawa 2001.
5. Ziółko J.: Konstrukcje stalowe. Wytwarzanie i montaż. WSiP, Warszawa 1995.
6. Eurokod 1: 1991 -3: Oddziaływania wywołane przez pracę dźwigów i maszyn.
7. Eurokod 3: 1993-1-5: Projektowanie konstrukcji stalowych. Blachownice.
8. Eurokod 3: 1993 -1-9: Projektowanie konstrukcji stalowych. Zmęczenie.
Eurokod 3: 1993-6: Projektowanie konstrukcji stalowych. Konstrukcje wsporcze dźwignic.</td></tr>
<tr><td colspan="7"><u>Conditions for passing the course:</u>
Positive evaluation of the final test, positive evaluation of the project</td></tr>
<tr><td colspan="7"><u>Author:</u> dr inż. Marek Pańtak</td></tr>
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<tr><td colspan="3">Field of study: CIVIL ENGINEERING</td><td colspan="4">First-cycle studies – full-time studies
Diploma profile: Bridges and underground structures</td></tr>
<tr><td colspan="7">Course name: TUNNELS, CAR-PARKS, UNDERGROUND PASSAGES</td></tr>
<tr><td rowspan="2">Semester 6</td><td colspan="2">Class type:</td><td>Lecture</td><td>Class exercise</td><td>Laboratory</td><td>Design exercise</td></tr>
<tr><td colspan="2">Number of hours per semester:</td><td>5</td><td></td><td></td><td>15</td></tr>
<tr><td>Preceding courses:</td><td colspan="6">Strength of materials, Structural mechanics, Concrete structures (semester 5), Metal structures (semester 5),</td></tr>
<tr><td>Learning outcomes - skills and competences</td><td colspan="6">Skills and competences in the construction and design of culverts, underground passages, shallow and deep tunnels.</td></tr>
<tr><td colspan="7">EDUCATIONAL CONTENTS</td></tr>
<tr><td colspan="7"><u>Lectures:</u>
Basic techniques for construction and design of culverts, underground passages, shallow and deep tunnels. Gauges and technical conditions for underground passages.</td></tr>
<tr><td colspan="7"><u>Design exercise:</u>
Project of the underground pedestrian crossing located in the city area.</td></tr>
<tr><td colspan="7"><u>List of basic and supplementary literature:</u>
1. Furtak K., Kędracki M.: Podstawy budowy tuneli. Podręcznik PK, Kraków 2005
2. Bartoszewski J., Lessaer S.: Tunele i przejścia podziemne w miastach. Wyd. Kom. i Łączności. Warszawa 1971 r.
3. Gałczyński St.: Podstawy budownictwa podziemnego. Oficyna Wydawnicza Politechniki Wrocławskiej. Wrocław 2001
4. Problemy podziemnej komunikacji miejskiej w Krakowie – materiały Konferencji Naukowo-Technicznej 26-27 listopada 2002 r.</td></tr>
<tr><td colspan="7"><u>Conditions for passing the course:</u>
Positive evaluation of the project, oral answer.</td></tr>
<tr><td colspan="7"><u>Author:</u> dr inż. Marek Pańtak</td></tr>
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Field of study: **CIVIL ENGINEERING**	First-cycle studies – full-time studies Diploma profile: **Bridges and underground structures**

Course name: **COMPOSITE STRUCTURES FOR BRIDGES**

Semester 7	Class type:	Lecture	Class exercise	Laboratory	Design exercise
	Number of hours per semester:	15			30
Preceding courses:	Strength of materials, Structural mechanics, Concrete structures (semester 5), Metal structures (semester 5),				
Learning outcomes - skills and competences	Skills and competences in the design of the composite bridge structures				

EDUCATIONAL CONTENTS

Lectures:
Principles of constructing composite elements. Calculations of geometric characteristics of composite cross-sections. Shaping and calculation of shear connectors. Load bearing capacity of composite elements. Technologies for building composite structures. Assembly conditions and their influence on the state of deformation and stress. Impact of creep and shrinkage of concrete. Deflections of composite structures. Cracks in concrete plate of composite elements. Examples of composite structures.

Design exercise:
Design of a plate-beam composite deck bridge. Creation of conceptual design and basic calculations regarding elements of bridge deck and main girders.

List of basic and supplementary literature:

1. Madaj A., Wołowicki W.: Podstawy projektowania budowli mostowych, Warszawa, 2007, WKŁ
2. Furtak K.: Mosty zespolone., Warszawa, Kraków, 1999, PWN.
3. Furtak K.: Podstawy mostów zespolonych. Podręcznik akademicki. Politechnika Krakowska, 1999 r.
4. Siwowski T. Turoń B.: Projektowanie mostów zespolonych według Eurokodu 4, Rzeszów, 2014, Wydawnictwo Politechniki Rzeszowskiej.
5. Wołowicki W., Ryżyński A. i inni: Mosty stalowe, Warszawa, Poznań, 1984, PWN.
6. Kmita K.: Mosty betonowe. Część I i II. Inżynieria komunikacyjna. WKiŁ, Warszawa 1984.

Conditions for passing the course:
Positive evaluation of the final test, positive evaluation of the project

Author: dr inż. Marek Pańtak