STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Steel Structures**		Code **1010102111010110073**
Field of study **Civil Engineering Second-cycle Studies**	Profile of study (general academic, practical) **(brak)**	Year /Semester **1 / 1**
Elective path/specialty **Bridges and Underground Engineering**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time) **full-time**	
No. of hours Lecture: **2** Classes: **-** Laboratory: **-** Project/seminars: **2**		No. of credits **5**
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**		ECTS distribution (number and %) **5 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Knowledge in structural mechanics of 1D, 2D and 3D structures. Knowledge in strength of materials. Knowledge in steel structures from previous semester.
2	**Skills**	Skills in: - determination of the deflections, strains and stresses - determination of geometrical characteristics of the cross sections - determination of the internal forces of 1D, 2D and 3D structures - designing of the bar elements according to steel codes - designing of welded and bolted connections - collecting action according to EN 1990/1991 - determination of combination of acctions according to EN 1990
3	**Social competencies**	Awareness of professional and personal needs to raise competence. Understanding the need of passing on to the knowledge society about technical and technological processes in the construction in the way universally understood.

Assumptions and objectives of the course:

Presenting methods of the steel portal hall design is a purpose of the course.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. The student has an advanced knowledge from mathematics, physics and chemistry which is a base of objects from the scope of the theory of materials and of civil structures, technological processes and organizational-investment strategies - [K_W01]
2. The student knows principles of analysis, constructing and dimensioning of elements of any civil structures: metal, reinforced concrete, united, wooden and murowych and road - [K_W02]
3. The student has a knowledge in analysis and the optimization of structural elements and building complex systems, methods of solving problems and performing non-linear calculations of engineering objects - [K_W09]
4. The student knows norms and guidelines of the civil structures design and their elements - [K_W14]
5. The student knows principles of constructing and designing objects of general, industrial and communications buildings - [K_W16]
6. The student has a knowledge about the facilities management building and transport in the full life cycle of objects - [K_W19]

Skills:

1. The student is able to make the evaluation and putting together any burdens working on civil structures. - [K_U01]
2. The student can make the ranking of any civil structures. - [K_U02]
3. The student can design elements and connections in metal, reinforced concrete, compressed complex structures with strings and cables, united, thin-walled and special (wsporczych, support, temporary). - [K_U03]
4. The student is able critically to assess results of the numerical analysis of engineering objects. - [K_U07]
5. The student can design complicated structural details in objects of general, industrial and communications buildings. - [K_U09]
6. The student is able to choose tools (analytical or numerical) for the problem solving engineering. - [K_U13]
7. The student is able to draw up a project and to draft the technical documentation of programs in the environment selected CAD. - [K_U16]

Social competencies:

1. The student is able - performing determined tasks - to work independently, to cooperate in the team and to manage the team.. - [K_K01]
2. The student is responsible for the reliability of get results of his works and the evaluation of works of team reporting to him. - [K_K02]
3. Studnet independently is supplementing and is expanding the knowledge in modern processes and the technology in the construction - [K_K03]
4. The student is aware of professional and personal needs to raise competence. - [K_K06]

Assessment methods of study outcomes

Illustrated lectures with transparencies and films. Design exercises - project of the industrial hall without the works transport encumbering the structure of the hall. Ranking the lecture - examination, design Exercises - defence of the project.

Grades scale:

5,0 - the student got above 90 % points from the exam or project defense,

4,5 - the student got 80 % to 90 % points from the exam or project defense,

4,0 - the student got 70 % to 80 % points from the exam or project defense,

3,5 - the student got 60 % to 70 % points from the exam or project defense,

3,0 - the student got 50 % to 60 % points from the exam or project defense,

2,0 - the student got below 50 % points from the exam or project defense.

Course description

1. Overall description of halls.
2. Main load-bearing systems.
3. Elements of roof and walls.

Secondary elements ie. side rails and purlins. Cladding systems.

4. Roof girders.
5. Columns.
6. Semi-rigid joints according to EN 1993-1-8.
7. Bracing systems.
8. Breakdowns, design faults.

Basic bibliography:

1. Thorton W.A. et., (1994), Manual of Steel Construction Vol. 1/2, American Institute of Steel Construction, pages: 1993
2. Owens G.W., Knowles P.R., (1994), Steel Designers Manual, Blackwell Science, Oxford, pages: 1294
3. Brockenbrought R.L., Merritt F.S. (1999), Structural Steel Designer's Handbook, McGRAW-HILL, pages: 1171
4. Giżejowski, Ziółko J., (2010), Budownictwo ogólne. Tom 5. stalowe konstrukcje budynków projektowane wg eurokodów z przykładami obliczeń, Wydawnictwo Arkady, Warszawa, s. 1085
5. Kozłowski A., (2012), Konstrukcje stalowe. Przykłady obliczeń wg PN-EN 1993-1. Część 1. Wybrane elementy i połączenia, Oficyna Wydawnicza Politechniki Rzeszowskiej, Rzeszów, s. 396
6. Kozłowski A., (2012), Konstrukcje stalowe. Przykłady obliczeń wg PN-EN 1993-1. Część 2. Stropy i pomosty, Oficyna Wydawnicza Politechniki Rzeszowskiej, Rzeszów, s. 498

Additional bibliography:

1. Biegus A., (1997), Nośność graniczna stalowych konstrukcji prętowych, Państwowe Wydawnictwo Naukowe, Warszawa-Wrocław, s. 183
2. Bogucki W., Żyburtowicz M., (2008), Tablice do projektowania konstrukcji metalowych, Wydawnictwo Arkady, Warszawa, s.399
3. Rykaluk K., (2006), Konstrukcje stalowe. Podstawy i elementy, Dolnośląskie Wydawnictwo Edukacyjne, Wrocław, s. 431

Result of average student's workload	
Activity	**Time (working hours)**
1. Participation in lectures	30
2. Current preparation oneself to lectures	5
3. Preparing to egazminu and presence at the examination	25
4. Participation in design exercises	30
5. Independent work on the project at home	30
6. Preparing for the defence of the project and the defence of the project	5

Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	125	5
Contact hours	60	3
Practical activities	0	0