COURSE DESCRIPTION CARD - SYLLABUS

Course name
Metal structures II [S1Bud1>KMET2]

Course

Field of study
Civil Engineering

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
30

Other (e.g. online)
0

Tutorials
15

Projects/seminars
0

Number of credit points

4,00

Coordinators

Lecturers

Prerequisites

Basic knowledge of building materials and mechanics, basics of construction, basics of building materials, .foundations of metal structures The ability to obtain information from the indicated sources, e.g. standards, manuals. Ability to use basic design aiding software. Świadomość konieczności poszerzania swoich kompetencji i podejmowania poważnej odpowiedzialności w przyszłej pracy zawodowej.

Course objective

Acquiring skills in the design (construction and dimensioning) of roof structure elements (lattice trusses, purlins, bracings), simple steel hall structures. Learning the basic principles of fire protection and corrosion protection of steel structures.

Course-related learning outcomes

Knowledge:
KB_W01 have the basics of general knowledge in mathematics, physics, theoretical mechanics, strength of materials and principles of general construction shaping, creating theoretical foundations useful for formulating and solving construction-related tasks - [P6S_WG (O)]
KB_W07 knows detailed rules of constructing and dimensioning elements and metal connections, P6S_WG (I)
KB_W09 know the rules of constructing and analysing civil engineering, P6S_WG (I)

KB_W11 have basic knowledge of the operation of algorithms used in selected software (including applications of BIM technology) supporting calculations, design of building structures, organisation of construction works P6S_WG (O/I)

Skills:
KB_U01 are able to gather information from literature, databases and other properly selected information sources; can synthesize the obtained information, interpret and evaluate it, P6S_UW (O/I)
KB_U02 are able to use advanced information and communication technologies (ICT) appropriate to perform typical engineering tasks. P6S_UW (O/I)
KB_U05 can classify buildings building structures. P6S_UW (O/I)
KB_U06 can prepare statements of strengths influencing the building units and perform static analysis of statically determinate and non-determinate bar structures. P6S_UW (I)
KB_U09 are able to use modern software supporting the design decisions in building engineering, including programs based on the BIM technology; are able to critically estimate the results of numerical analysis of building facilities. P6S_UW (O/I)
KB_U10 are able to design selected elements and simple metal,, working individually or as part of a team. P6S_UW (I)

Social competences:
KB_K02 take responsibility for the accuracy and reliability of work results and their interpretation. P6S_KK (O)
KB_K03 are ready to autonomously complete and broaden knowledge in the field of modern processes and technologies of building engineering. P6S_KR (O)
KB_K04 understand the need of team work, are responsible for the safety of their own work and team's work. P6S_KR (O)

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Written exam on the content of the lecture - grading scale (based on points):
63 to 70 very good (A)
56 to 62.9 good plus (B)
49 to 55.9 good (C)
42 to 48.9 sufficient plus (D)
35 to 41.9 sufficient (E)
below 34.9 insufficient (F)
Credit for design exercises on the basis of:
- substantive evaluation of the prepared design documentation,
- regular work (entries in the consultation card and attendance at exercises),
- project defense (written or oral form)
Credit for auditorium exercises on the basis of:

Programme content

Basic components of a steel roof structure on the example of a hall. Covering selection and purlin design. Basics of designing bar girders - trusses (assumptions, selection of the geometry of the grating, collection of loads, numerical modeling and calculation of internal forces, rules for selecting the cross-section of bars, shaping nodes and assembly connections). The function and types of bracings in the roof structure. Shaping the geometry of bracings and dimensioning. The structure of the hall building, components. Selection of the static scheme of the transverse and longitudinal structure of the hall. Hall building loads (including supported transport loads). Dimensioning of hall components (transoms, columns, bracings, anchors and connections, in short and encyclopedic terms, crane beams). Information on how to protect steel structures against corrosion and fire.

Course topics

Basic components of a steel roof structure on the example of a hall. Covering selection and purlin design. Basics of designing bar girders - trusses (assumptions, selection of the geometry of the grating, collection of loads, numerical modeling and calculation of internal forces, rules for selecting the cross-

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Teaching methods

Monographic lecture with a multimedia presentation with elements of a problem-solving lecture. Auditorium exercises based on the method of demonstration and instruction. Presentation and discussion of a computational example partly with the practical participation of students. Credit on the basis of systematic participation in classes and a positive assessment of the test.
Design exercises - practical implementation of an engineering task. Initial discussion of the task, gradual preparation of calculations and drawing documentation by students, consultation and approval of work stages, clarification of recurring doubts by the tutor to all students. The basis for passing the test is a systematically (confirmed entries from the consultations) correctly made project and its defense (oral or written form)

Bibliography

Basic
1. PN-EN 1990 Podstawy projektowania konstrukcji
2. PN-EN 1991-1 Oddziaływania na konstrukcje
3. PN-EN 1993-1 Projektowanie konstrukcji stalowych
Additional
. Kurzawa Z., Chybiński M., Projektowanie konstrukcji stalowych, Wydawnictwo PP, Poznań 2008
2. Kozłowski + zespół, Konstrukcje stalowe. Przykłady obliczeń wg PN-EN 1993-1 cz.1, cz.2., Rzeszów 2012
3. Giżejowski M., Ziółko J., Budownictwo ogólne tom 5, Arkady, Warszawa 2010
4. Goczek J. + zespoł, przyklady obliczeń konstrukcji stalowych, Politechnika Łódzka 2013
5. Bródka J.+ zespol, Projektowanie i obliczanie połączeń i węzłów konstrukcji stalowych, PWT 2013
6. Biegus A., Stalowe budynki halowe, Arkady 2003

Breakdown of average student's workload

	Hours	ECTS
Total workload	130	5,00
Classes requiring direct contact with the teacher	77	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	53	2,00