



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Modern designing of large-area halls [N2Bud1>NSPHW]

### Course

Field of study

Civil Engineering

Year/Semester

2/4

Area of study (specialization)

Construction Engineering and Management

Profile of study

general academic

Level of study

second-cycle

Course offered in

Polish

Form of study

part-time

Requirements

elective

### Number of hours

Lecture

10

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

10

### Number of credit points

2,00

### Coordinators

dr inż. Adam Uryzaj

adam.uryzaj@put.poznan.pl

### Lecturers

### Prerequisites

Basic knowledge of the strength of materials and building mechanics Knowledge of building structures design, including: 2 - collecting loads (permanent, utility, climatic) - interpretation of the results of static calculations - knowledge of the dimensioning of steel structures - knowledge of the design of reinforced concrete structures The student is able to independently carry out a static analysis of bar structures, knows how to use selected computer tools for structure analysis and design.

### Course objective

Presentation of the methods and solutions used in the design of modern halls with hybrid structures - a light, steel roof made of flat steel trusses with large spans based on prefabricated reinforced concrete columns (flat roofs braced by a trapezoidal sheet covering). Acquainting students with modern methods and tools of computer structure analysis. Acquiring the ability to model tasks and efficiently carry out calculations of structures supporting the design process

### Course-related learning outcomes

Knowledge

Knowledge in the field of:

- modern design of steel structures
- modern design of reinforced concrete structures
- optimization of steel structures
- optimization of reinforced concrete structures
- optimization of direct foundations

#### Skills

The ability to comprehensively design and optimize the construction of hybrid industrial halls and the use of computer programs such as Autodesk Robot Structural Analysis in the field of:

- static and stability analysis of rod structures
- uses advanced specialist tools to search for useful information, communication and acquiring software supporting the work of a designer and organizer of construction processes

#### Social competences

Awareness of the need to expand one's competences and take serious responsibility at work.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The credit for the lecture is based on the written answer given during the last lecture. During the answer, students answer 5 questions (tasks, derivation of dependencies or in the form of a description

3 of the procedure). In doubtful cases, an interview to check the results achieved may be used. Passing threshold: 50% of points

During the laboratory exercises, students are assessed on an ongoing basis based on the progress of work in modeling and calculating tasks. The assessment covers each of the issued issues. Passing threshold: 50% of points

### Programme content

#### Lecture program

- collecting loads (fixed, utility, climatic)
- execution of a computer model of a bar lattice girder
- execution of a computer model of a bar lattice replacement
- execution of a spatial computer model of a hybrid industrial hall

### Course topics

1. Introduction to computer methods of designing structural elements.
2. Presentation of selected programs for static analysis and dimensioning of bar and panel structural elements.
- 3 Modern methods of creating BIM construction documentation.
- 4 Presentation of selected programs for spatial modeling of structures and creating construction documentation.
5. Carrying out a design exercise regarding spatial modeling and data transfer between selected computer programs.

### Teaching methods

Multimedia presentation

### Bibliography

#### Basic

- PN-EN 1990:2004+A1:2008 Eurokod 0 - Podstawy projektowania konstrukcji  
 PN-EN 1991 (cz.1-1:2004, cz.1-2:2006, cz.1-3:2005, cz.1-4:2008, cz.1-5:2005, cz.1-6:2007, cz.1-7:2008, cz.3:2009 ) Eurokod 1 - Oddziaływania na konstrukcje.  
 PN-EN 1992-1-2:2008, Eurokod 2 – Projektowanie konstrukcji z betonu – Część 1-2: Reguły ogólne. Projektowanie z uwagi na warunki pożarowe.  
 PN-EN 1992 (cz.1-1:2008, cz.1-2:2008) Eurokod 2 - Projektowanie konstrukcji z betonu.  
 PN-EN 1993 ( cz.1-1:2006, cz.1-2:2007, cz.1-3:2008, cz.1-5:2008, cz.1-8:2006, cz.6:2009 ) Eurokod 3 - Projektowanie konstrukcji stalowych.

#### Additional

1. 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 201

### Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	20	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00