COMPUTER AIDED DESIGN W1/W2

Subject code: **11.9-WILŚ- BUD- KWP1- ID05**

Subject type: Selectable- selectable software

Language of instruction: English

Responsible for the subject: Department Director

Providing education: Department of Engineering Structures

Type of class	Number of classes per semester	Number of classes per week	Semester	Type of credit	ECTS points
Full time studies					2
Laboratory	30	2		credit with a grade	
Full time studies					
Laboratory	18	2		credit with a grade	

SUBJECT OBJECTIVE:

The objective of the course is to learn the principles of numerical modelling of building structures using available computer software.

INITIAL REQUIREMENTS:

Building mechanics. Strength of materials. Calculation methods

SUBJECT SCOPE:

Numerical modelling of disc and plate-column constructions. Defining the geometry of individual systems, defining material and cross-sections. Setting boundary conditions and applying load in the form of concentrated forces, uniformly distributed load and pressure. Conducting a static analysis of the structure. Interpretation of the results in the form of stress maps on finite elements and displacements.

Numerical modelling of bar structures. Listing, collecting and combining loads. Permanent loads. Snow load. Wind load. Defining geometry, materials, supports. Assigning design parameters to structural elements. Linear static analysis. Determination of the extreme values of internal forces. Verification of calculations. Editing calculation reports.

Dimensioning of reinforced concrete elements. Designing reinforced concrete elements, compression and bending using the EXPERT Reinforcement module. Designing foundations for reinforced concrete EXPERT foundations. Designing EXPERT retaining walls.

EDUCATIONAL METHODS:

Laboratory - laboratory exercises

EDUCATION RESULTS:

Results after completion of the course	Symbol	Verification method	Type of class
Abilities			
The student can model disc and plate-pole systems, define boundary conditions and apply a load to a specific structure. The student can calculate stresses and displacements in a modelled task. The student can display results in the form of contour maps of stresses on finite elements. The student can use available computer software to perform static analysis of uncomplicated construction using the finite element method	**K_U04** **K_U07**	credit for laboratory exercises	L
Social skills			
The student is aware of numerical modelling techniques. The student is aware of the benefits of using software but is also aware of the limitations. The student is eager and ready to learn new, more advanced tools	**K_K01** **K_K05**	conversation during lectures initiated by the teacher; checking competences during the introduction to classes	L

REQUIREMENTS TO OBTAIN A CREDIT:

Laboratory — The condition for passing is to obtain positive marks for all reports about laboratory exercises carried out as part of the laboratory programme and for a written test.

STUDENT WORK:

Interaction with the teacher	15lab+3cons , total	18 h.
Projects – individual work	2proj x 6h	12 h.
Total	18+12	30 h
ECTS for the subject	30/30	1 ECTS.

BASIC LITERATURE:

1. Robot Millenium, Instruction Manual
2. Cosmos/M – Instruction Manual
3. RM-Win – Instruction Manual

COMPLEMENTARY LITERATURE:

1. SofiStik – Instruction Manual

SYLLABUS PREPARED BY:

Team of the Department of Engineering Structures