SYLLABUS

Name: ***Advanced Computer Science Tools in Civil Engineering (BudB>SI8ADVCST19)***
Name in Polish:
Name in English: ***Advanced Computer Science Tools in Civil Engineering***

Information on course:

Course offered by department: Faculty of Civil Engineering
Course for department: Silesian University of Technology

Default type of course examination report:

ZAL

Language:

English

Course homepage:

https://platforma2.polsl.pl/rb/course/view.php?id=218

Short description:

Basis of computer algebra systems- CAS (Mathematica, Derive, Maple, Wolfram|Alpha etc.). Applications of CAS in civil and structural engineering. High level systems for dealing with numerical tasks (Matlab, Scilab, GNU Octave). Advanced software for scientific and enginering documents edition (LaTeX,, Overleaf, LyX, TeXmacs, TeXnic Center, etc.).

Description:

LECTURE: 30 h

1. Advanced software for scientific and enginering documents edition (LaTeX, Overleaf, LyX, TeXmacs, TeXnic Center, etc.)
2. Computer algebra systems- CAS (Mathematica, Derive, Maple, WolframAlpha etc.). Applications of CAS in civil and structural engineering.
3. High level systems for dealing with numerical tasks (Matlab, Scilab, GNU Octave)
4. Numerical analyses in Ansys.

Bibliography:

S. Rajasekaran: „Structural Dynamics and Eartquake Engineering; Theory and Application using Mathematica and Matlab”. CRC Press 2009
M. Asghar Bhatti: „Fundamental Finite Element Analysis and applications with Mathematica and Matlab Computations”.Wiley 2005
F. Mittelbach et al. : „The LaTeX Companion”. Adisson-Wesley 2004
a. other supplemental materials
M. Asghar Bhatti: „Advanced Finite Element Analysis and applications with Mathematica and Matlab Computations”.Wiley 2005
A.L. Tyree: „Self-publishing with LyX”. Sage Tutorial Systems 2007

Learning outcomes:

Knowledge about theoretical models of materials and principles of modelling and analysis of bar structures in the field of statics and knows selected software supporting design [K1A_W04];
Basic skills in using their knowledge - formulating and solving complex and unusual problems and performing tasks in conditions not fully predictable by:
- appropriate selection of sources and information derived from them,
evaluation, critical analysis and synthesis of this information,
- selection and application of appropriate methods and tools, including
advanced information and communication technologies [K1A_U14].

Assessment methods and assessment criteria:

Homework - a short document in LaTeX edited in Overleaf based on final project of a student. 100%

Prerequisite: completion of the course Strength of Materials and Structural Mechanics.

In order to transfer partial grades, the student should contact the instructor within the first two weeks of the semester.

The syllabus is valid from the summer semester of the 2025/2026 academic year, and its content is not subject to change during the semester.

Element of course groups in various terms:

Course group description	First term	Last term
missing group description in English (BudB-S1-2019-sem8OPC)	2024/2025-L	

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	2	2022/2023-L	