



Subject card

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|---|---|---|-------------------------|-------------------------------------|--|------------|-----|
| Subject name and code | Finite element method - applicatios, PG_00041526 | | | | | | |
| Field of study | Civil Engineering | | | | | | |
| Date of commencement of studies | October 2024 | Academic year of realisation of subject | | | 2025/2026 | | |
| Education level | second-cycle studies | Subject group | | | Optional subject group | | |
| Mode of study | Full-time studies | Mode of delivery | | | at the university | | |
| Year of study | 2 | Language of instruction | | | English | | |
| Semester of study | 3 | ECTS credits | | | 3.0 | | |
| Learning profile | general academic profile | Assessment form | | | assessment | | |
| Conducting unit | Katedra Wytrzymałości Materiałów -> Faculty of Civil and Environmental Engineering | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr inż. Bartosz Sobczyk | | | | |
| | Teachers | | | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 0.0 | 0.0 | 0.0 | 0.0 | 30.0 | 30 |
| | E-learning hours included: 0.0 | | | | | | |
| Learning activity and number of study hours | Learning activity | Participation in didactic classes included in study plan | | Participation in consultation hours | | Self-study | SUM |
| | Number of study hours | 30 | | 5.0 | | 40.0 | 75 |
| Subject objectives | Selected aspects of modern applications of FEM in civil engineering practice | | | | | | |
| Learning outcomes | Course outcome | Subject outcome | | | Method of verification | | |
| | [K7_W01] has knowledge of higher mathematics, physics and chemistry, which is a base of subjects, such as construction theory and advanced material technology | The student is able to analyze a specialist text concerning non-trivial problems in construction. | | | [SW3] Assessment of knowledge contained in written work and projects | | |
| | [K7_U06] is able to choose proper tools (measuring, analytical or numerical) to solve engineering problems, to acquire, filtrate, proces and analyse data | The student is able to find the literature (scientific article, monograph, textbook) concerning the issue of interest to him. | | | [SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools | | |
| | [K7_U04] is able (using Finite Element Method), to define a calculation model and to perform advanced numerical analysis of complex constructions in: linear range and elementary nonlinear range, can critically evaluate the results of calculations. | The student is able to identify the tools necessary to solve advanced engineering problems, in particular, is able to choose numerical programs based on FEM. | | | [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information | | |
| | [K7_W04] has knowledge on advanced strength of materials, modeling and optimisation of materials and constructions; has knowledge of fundamentals of Finite Element Method and general nonlinear analysis of engineering constructions and systems | The student is able to find common elements of his knowledge with the knowledge presented in the literature. | | | [SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge | | |
| | [K7_U01] can evaluate and list any loads acting on constructions | The student is able to critically assess the load state adopted by the authors of the analyzed study. | | | [SU2] Assessment of ability to analyse information | | |
| Subject contents | Modeling of advanced engineering structures - presentations based on journal papers. Remarks on commercial FEM codes. Students presentations of FEM analysis in MSc thesis. | | | | | | |
| Prerequisites and co-requisites | BSP020 or equivalent BSP021 or equivalent BSP022 or equivalent BSD048 or equivalent | | | | | | |

| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
|--|---|---|-------------------------------|
| | | Seminar work | 60.0% |
| Recommended reading | Basic literature | 1. RAKOWSKI G., KACPRZYK Z.: Metoda elementów skończonych w mechanice konstrukcji. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2005. 2. KLEIBER M (red): Komputerowe metody mechaniki ciał stałych. Mechanika Techniczna t. XI. PWN, Warszawa 1995. 3. DACKO M., BORKOWSKI W., DOBROCINSKI S., NIEZGODA T., WIECZOREK M.: Metoda elementów skończonych w mechanice konstrukcji. Arkady Warszawa 1994. 4. ZIENKIEWICZ O.C.: Metoda elementów skończonych. Arkady 1972, lub nowsze wydania w języku angielskim. 5. Selected scientific papers concerned with applications of FEM in practice | |
| | Supplementary literature | 1. CHRÓSCIELEWSKI J., MAKOWSKI J., PIETRASZKIEWICZ W.: Statyka i dynamika powłok wielopłatowych. Nieliniowa teoria i metoda elementów skończonych. PAN IPPT, Biblioteka Mechaniki Stosowanej Serii A, monografie, Warszawa 2004. 2. KREJA I.: Mechanika Osrodków Ciągłych. Wydawnictwo CURE, Politechnika Gdanska, Gdansk 2003. | |
| | eResources addresses | Adresy na platformie eNauczanie: | |
| Example issues/ example questions/ tasks being completed | Present the coverage of the paper chosen for presentation, in the light of FEM applications | | |
| Work placement | Not applicable | | |