



Subject card

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| Subject name and code | , PG_00056302 | | | | | | |
| Field of study | Ocean Engineering | | | | | | |
| Date of commencement of studies | October 2022 | Academic year of realisation of subject | | | 2024/2025 | | |
| Education level | first-cycle studies | Subject group | | | | | |
| Mode of study | Full-time studies | Mode of delivery | | | at the university | | |
| Year of study | 3 | Language of instruction | | | Polish | | |
| Semester of study | 6 | ECTS credits | | | 5.0 | | |
| Learning profile | general academic profile | Assessment form | | | assessment | | |
| Conducting unit | Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr inż. Wojciech Puch | | | | |
| | Teachers | | | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 0.0 | 0.0 | 30.0 | 15.0 | 0.0 | 45 |
| | 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 | 45 | | 5.0 | | 75.0 | 125 |
| Subject objectives | Becoming familiar with the formulation of structural computational models of stress state, buckling and frequency of vibrations of structural elements of the hull of the ship; familiarizing themselves with the methods of preparing the data and perform calculations using specialized programs and commercial FEA system. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | [K6_W06] has an organized knowledge on engineering methods and design tools allowing the conducting of projects within the construction and operation of ocean technology objects and systems | | Student identifies interactions between the elements hull structure of the ship and with environment and formulates boundary conditions. | | [SW3] Assessment of knowledge contained in written work and projects | | |
| | [K6_W05] has an organized knowledge on design, construction and operation of ocean technology objects and systems | | Student identifies the strength phenomena endangering safety of the structure and defines the necessary scope of the structural calculations. | | [SW1] Assessment of factual knowledge | | |
| | [K6_U06] in compliance with a formulated specification and with the aid of appropriate tools and methods, is able to complete a simple engineering task within the range of design, construction and operation of ocean technology objects and systems | | Student analyzes the state of stress, buckling and natural vibrations in beam and rod-shell models of hull structure of the ship. | | [SU4] Assessment of ability to use methods and tools | | |
| Subject contents | <p>Structural models of strength phenomena in loaded structure: elastic deformations and state of stress; yielding; buckling; fatigue; vibrations; ultimate limit state.</p> <p>Analysis process: identifying of demands, data acquisition, modelling, calculations, displaying and interpreting results, report.</p> <p>Finite Element model building: identification of strength phenomena and their parameters, assumptions and simplifications, geometric model, boundary conditions, meshing.</p> <p>Solving the model: methods, interpretation of messages.</p> <p>Results: visualization, quality inspection and verification.</p> <p>Report: common rules, contents, demands of Classification Societies.</p> <p>Exercises:</p> <p>Stress analysis of shells and stiffened panels.</p> <p>Buckling of panels.</p> <p>Modal analysis of ship hull.</p> | | | | | | |

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| Prerequisites and co-requisites | Basic technical English. Basics of Strength of Materials. Basics of Finite Element Analysis. | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Reports | 56.0% | 80.0% |
| | Test | 0.0% | 20.0% |
| Recommended reading | Basic literature | 1. Introductions to exercises accessible in student' computer network in folder "wspolny". 2. O.C.Zienkiewicz, R.L.Taylor, J.Z.Zhu: The Finite Element Method: Its Basis and Fundamentals. Elsevier, 2005. 3. P.M.Kurowski, Finite Element Analysis for Design Engineers, SAE International, 2004. | |
| | Supplementary literature | 1. R.D.Cook, Finite Element Modeling for Stress Analysis. Wiley, 1995. 2. V.Adams, A.Askenazi, Building Better Products with Finite Element Analysis. OnWord Press, 1999. | |
| | eResources addresses | Adresy na platformie eNauczenie: | |
| Example issues/ example questions/ tasks being completed | Stresses in double bottom primary supporting members, beam model. Stresses in stiffeners and primary supporting members of stiffened panel, shell model. | | |
| Work placement | Not applicable | | |