GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | Numerical Methods inHeat Technology, PG_00042139 | | |
| Field of study | Power Engineering, Power Engineering, Power Engineering, Power Engineering, Power Engineering | | |
| Date of commencement of studies | October 2020 | Academic year of realisation of subject | 2022/2023 |
| Education level | first-cycle studies | Subject group | Optional subject group<br>Subject group related to scientific research in the field of study |
| Mode of study | Full-time studies | Mode of delivery | at the university |
| Year of study | 3 | Language of instruction | Polish<br>none |
| Semester of study | 6 | ECTS credits | 2.0 |
| Learning profile | general academic profile | Assessment form | assessment |
| Conducting unit | Department of Energy and Industrial Apparatus -> Faculty of Mechanical Engineering and Ship Technology | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Tomasz Muszyński | |
| | Teachers | dr hab. inż. Tomasz Muszyński | |

**Lesson types and methods of instruction**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 15.0 | 0.0 | 15.0 | 0.0 | 0.0 | 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 | 3.0 | 17.0 | 50 |

**Subject objectives**

Presentation of the basics of computer modelling of processes from the area of heat technology so that the student could be able to understand and interprete the results obtained using commercial numerical codes.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| K6_U04 | The student is able to perform a basic analysis of energy systems using engineering computing applications. | |
| K6_U06 | The student is able to compare the operation of power devices and their model operating parameters in order to analyze the operation of the device. | |
| K6_W09 | The student is able to model the work of comparative work cycles of energy devices with the use of engineering computing applications. | |

**Subject contents**

Laboratory classes 1. Application of finite difference method for heat conduction in electronic radiator (3). 2. Application of interpolation and numerical differentation methods on the example of selected experimental data (3). 3. Application of Runge-Kutta methods for solving of the model of moisture detector (3). 4. Presentation of capabilities of commercial package (6).

**Prerequisites and co-requisites**

mathematics I, II, III, physics, fluid mechanics

**Assessment methods and criteria**

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| Lab task | 60.0% | 60.0% |
| Final test | 60.0% | 40.0% |

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|---|---|---|
| Recommended reading | Basic literature | 1.Patankar S.V. Numerical Heat Transfer and Fluid Flow, Taylor and Francis, 1980. 2.Bilicki Z., Cieśliński J., Doerffer S., Kwidziński R., Mikielewicz D., Metody komputerowe w technice cieplnej, Wydawnictwo IMP PAN, Gdańsk, 1996. 3.Minkowycz W. J., Sparrow E. M., Schneider G. E., Pletcher R. H., Handbook of Numerical Heat Transfer, Whiley, 1988 |
| | Supplementary literature | No requirements |
| | eResources addresses | Adresy na platformie eNauczanie:<br>Metody komputerowe w technice cieplnej, W/L ,Energetyka. sem 6, lato 22/23 PG_00042139 - Moodle ID: 29378<br>https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29378 |
| Example issues/ example questions/ tasks being completed | Modeling of transient heat transfer.Modeling of the iterative solution by Euler's method.Modeling of the a simple FEM model from equation system. | |
| Work placement | Not applicable | |