



Subject card

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| Subject name and code | Mathematics II, PG_00024116 | | | | | | |
| Field of study | Hydrogen Technologies and Electromobility | | | | | | |
| Date of commencement of studies | October 2022 | | Academic year of realisation of subject | | 2022/2023 | | |
| Education level | first-cycle studies | | Subject group | | Obligatory subject group in the field of study | | |
| Mode of study | Full-time studies | | Mode of delivery | | at the university | | |
| Year of study | 1 | | Language of instruction | | Polish | | |
| Semester of study | 2 | | ECTS credits | | 8.0 | | |
| Learning profile | general academic profile | | Assessment form | | exam | | |
| Conducting unit | Mathematics Center -> Vice-Rector for Education | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr Anita Dąbrowicz-Tlałka | | | | |
| | Teachers | | dr Anita Dąbrowicz-Tlałka | | | | |
| | | | mgr Karolina Lademann | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 45.0 | 60.0 | 0.0 | 0.0 | 0.0 | 105 |
| | 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 | 105 | | 10.0 | | 85.0 | 200 |
| Subject objectives | Students obtain competence in the range of using methods of mathematical analysis and knowledge to solve simple problems that can be found in the field of engineering | | | | | | |

| Learning outcomes | Course outcome | Subject outcome | Method of verification |
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| | [K6_U01] Is able to obtain information from literature, databases and other sources, integrate them, interpret them and draw conclusions and formulate opinions; has the ability to self-educate m.in. in order to improve professional competences | Student is able to process the acquired information, analyze and interpret it, draw conclusions and reason opinions. Student recognizes the importance of skillful use of basic mathematical apparatus in terms of study in the future. Student recognizes the importance of self-expanding knowledge. | [SU2] Assessment of ability to analyse information |
| | [K6_W01] has basic knowledge of mathematics – including linear algebra, mathematical analysis, numerical methods – necessary to describe physical and chemical phenomena, as well as the analysis of electrical circuits and automation and robotics systems | Student determines convergence of number series. Student calculates the radius of convergence and the interval of convergence of a power series. Student expands a function in Taylor and Maclaurin series. Student determines the Fourier series of a given function. Student examines functions of several variables, using the concept of a limit, continuity and derivatives. Student determines local and global extremes of functions of two variables. Student uses functions of many variables to study selected properties of scalar and vector fields. Students calculates double integrals, and explains the method of substitution in the double integral. Student applies double integrals in solving geometrical problems. Student demonstrates some techniques for solving ordinary differential equations. Student determines general and particular solutions of certain types of the first-order differential equations. Student finds the right method for solving the second - order ordinary differential equations. Student determines general and particular solutions of the second -order and n-order linear differential equations with constant coefficients. | [SW1] Assessment of factual knowledge |
| | [K6_K02] can work in a group taking on different roles in it | Student recognizes the importance of self-expanding knowledge and takes the challenge of working with a group to solve a problem. Student understands the need of lifelong learning. Student is able to inspire others and organize their learning process. | [SK2] Assessment of progress of work |
| Subject contents | <p>Number series.</p> <p>Power series, Taylors, Maclaurins and Fourier series.</p> <p>Functions of two variables, partial derivatives, applications (maxima and minima, gradient, divergence, rotation, potential field).</p> <p>Double integral, polar coordinates and generalized polar coordinates, applications.</p> <p>Ordinary differential equations - definition of the differential equation and its solution, general and particular solution, the Cauchy initial value problem. Variables separable equations. First order linear differential equations. Linear differential equations of order n with constant coefficients.</p> | | |
| Prerequisites and co-requisites | none | | |

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| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Activity during classes | 0.0% | 10.0% |
| | Midterms | 50.0% | 40.0% |
| | Final exam | 50.0% | 50.0% |
| Recommended reading | Basic literature | 1. Gewert M., Skoczylas Z.: Analiza matematyczna, GiS, Wrocław, 2004. 2. Gewert M., Skoczylas Z.: Równania różniczkowe zwyczajne, GiS, Wrocław, 2004. 3. Krysicki W., Włodarski L.: Analiza matematyczna w zadaniach, cz.I., cz.II. PWN, Warszawa 2006. 4. Jankowska K., Jankowski T.: Zadania z matematyki wyższej. Wyd. PG, Gdańsk, 1999. | |
| | Supplementary literature | 1. Leksiński W., Nabiałek I., Żakowski W.: Matematyka. Definicje, twierdzenia, przykłady, zadania. WNT, Warszawa, 2003. 2. Żakowski W., Kołodziej W.: Matematyka, cz.II. WNT, Warszawa, 1995. 3. Żakowski W, Leksiński W.: Matematyka, cz.IV. WNT, Warszawa, 1995. | |
| | eResources addresses | Uzupełniające Adresy na platformie eNauczanie: | |
| Example issues/ example questions/ tasks being completed | 1. Investigate the convergence of a number series ... and determine its type. 2. Using the appropriate power series, calculate the sum of the given series ... 3. Find the local extrema of the function $f(x,y)$. 4. Check if the field ... is potential, if so, determine its potential. 5. Using the double integral, calculate the volume of a solid bounded by surfaces.... 6. Find a solution to the differential equation. satisfying given initial conditions. 7. Solve the following second-order linear differential equations ... using the appropriate method. | | |
| Work placement | Not applicable | | |