



Subject card

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|---|---|--|--|-------------------------------------|--|------------|-----|
| Subject name and code | Mathematics II, PG_00038387 | | | | | | |
| Field of study | Electrical Engineering | | | | | | |
| Date of commencement of studies | October 2021 | | Academic year of realisation of subject | | 2021/2022 | | |
| Education level | first-cycle studies | | Subject group | | Obligatory subject group in the field of study | | |
| Mode of study | Part-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 Anna Niewulis | | | | |
| | Teachers | | dr Anna Niewulis mgr Katarzyna Kiepiela | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 30.0 | 30.0 | 0.0 | 0.0 | 0.0 | 60 |
| | E-learning hours included: 0.0 | | | | | | |
| | Adresy na platformie eNauczanie: | | | | | | |
| 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 | 60 | | 15.0 | | 125.0 | 200 |
| Subject objectives | Students obtain competence in the range of using methods of mathematical analysis and ordinary differential equations and knowledge how to solve simple problems that can be found in the field of engineering. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | K6_W01 | | Student tests convergence of number series. Student uses power series in order to compute sums of number series. Student determines a Fourier series of a given functions. Student analyses properties of a given function of two variables using differential calculus of several variables functions. Students calculates double integrals, and explains the metod of substitution of variables in the double integral. Student applies double integrals to solve geometrical problems. Student demonstrates some techniques of solving ordinary differential equations. | | [SW1] Assessment of factual knowledge | | |
| | K6_U01 | | Student is able to process the acquired information, analyze and interpret it, draw conclusions and reason opinions. Student understands the need of lifelong learning and improving their engineering knowledge. | | [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools | | |
| | K6_K02 | | Student is able to work individually and in a group, knows how to estimate the time needed to carry out the task, and is able to implement the work schedule. | | [SK3] Assessment of ability to organize work [SK1] Assessment of group work skills | | |

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| Subject contents | Elements of linear algebra: Matrices (definition, types of a matrix, matrix operations), determinants (definition and properties), rank of a matrix, system of linear equations (Cramer's rule, Kronecker-Capelli theorem, Gauss-Jordan elimination method). Number series and function series. Number series. Convergent and divergent series. Convergence tests of the number series. Function series. Region of convergence. Power series. Radius and interval of convergence. Taylor's and Maclaurin's series. Integration and differentiation of power series. Examples of applications - approximate calculation of integrals. Fourier series. Only sinus or only cosinus series. Functions of two or more variables. Domains, partial derivatives, increment of a function and total differential. Maxima and minima of a function of two variables. Directional derivative and gradient. Implicit functions. Double integral over a rectangle or a normal region. Change of variables in the double integral. Polar coordinates. Applications of double integrals. Ordinary differential equations. First order differential equations. General and particular solution. The Cauchy initial value problem. Variables separable, linear, Bernoulli's equations. Second order linear differential equations with constant coefficients - methods of solving. | | |
| Prerequisites and co-requisites | Knowledge of the subject: Mathematics I | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Midterm colloquium | 50.0% | 50.0% |
| | Written exam | 50.0% | 50.0% |
| Recommended reading | Basic literature | 1. Gewert M., Skoczylas Z "Analiza matematyczna 2." Wrocław: GiS, 2004. 2. Gewert M., Skoczylas Z "Równania różniczkowe zwyczajne" Wrocław: GiS, 2004. 3. Jurewicz T., Skoczylas Z. "Algebra liniowa 1, 2." Wrocław: GiS, 2004. 4. Krywicki W., Włodarski L. "Analiza matematyczna w zadaniach, cz. I i II." Warszawa: PWN, 2006. | |
| | Supplementary literature | 1. Lassak M. "Matematyka dla studiów technicznych." Warszawa: Supremum, 2004. 2. Leksiński W., Nabiałek I., Żakowski W. "Matematyka. Definicje, twierdzenia, przykłady, zadania." warszawa: WNT. 2003. | |
| | eResources addresses | | |
| Example issues/ example questions/ tasks being completed | 1. Solve matrix equation. 2. Solve the system of linear equations using the method of Gaussian elimination. 3. Check whether the given series is convergent using the ratio test, the root test.. the comparison test or the integral test. 4. Compute partial differentials of the second order for the given function $f(x,y)$. 5. Find extreme values of the function $f(x,y)$. 6. Compute the double integral of the given function $f(x,y)$ over the region D. 7. Find a particular solution of the differential equation ... satisfying the given initial conditions 8. Find the general solution of the differential equation by the method of variation of parameters. | | |
| Work placement | Not applicable | | |