



Subject card

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|--|--|--|---|-------------------------------------|--|------------|-----|
| Subject name and code | Precalculus, PG_00045351 | | | | | | |
| Field of study | Data Engineering | | | | | | |
| 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 | | | English | | |
| Semester of study | 1 | ECTS credits | | | 3.0 | | |
| Learning profile | general academic profile | Assessment form | | | assessment | | |
| Conducting unit | Mathematics Center -> Vice-Rector for Education | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr Magdalena Musielak | | | | |
| | Teachers | | dr Magdalena Musielak dr Ewa Kozłowska-Walania | | | | |
| Lesson type and method of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 15.0 | 15.0 | 0.0 | 0.0 | 0.0 | 30 |
| | E-learning hours included: 0.0 | | | | | | |
| WET1 (Data Engineering) - Mathematics 2022/23 (M.Musielak) - Moodle ID: 25005 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=25005 | | | | | | | |
| 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 | Student obtains knowledge in elementary mathematics necessary to understand calculus | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | [K6_U05] Uses matrix calculus in the theory of systems of linear equations, uses differential, integer and vector calculus, performs operations on complex numbers and determines polynomial elements. | | Student names the properties of elementary functions and plots their graphs. Solves equations and inequalities with elementary functions. Finds the inverse functions of exponential, logarithmic, and trigonometric functions. Solves problems connected to sequences. | | [SU4] Assessment of ability to use methods and tools | | |
| | [K6_K01] is aware of quickly changing trends and the resulting need for further education and self-improvement in the area of the performed profession of an engineer with IT and economic-financial skills. | | Student recognizes the importance of skillful use of basic mathematical apparatus in the context of engineering studies. | | [SK2] Assessment of progress of work | | |
| | [K6_W01] has basic knowledge in the field of mathematics, including mathematical analysis, algebra, geometry, probability calculus, statistics and numerical methods, necessary to formulate and solve simple tasks in the field of IT | | Student uses methods of precalculus to formulate and solve simple problems from other areas of mathematics. | | [SW1] Assessment of factual knowledge | | |

| Subject contents | <ul style="list-style-type: none"> • Review of polynomials, rational and power functions. • Exponential functions. Exponential equation and inequalities. Logarithmic function. Logarithms and their properties. Logarithmic equations and inequalities. • Trigonometric functions of any angle. Graphs of trig functions. Trig identities. Trigonometric equations and inequalities. Inverse trig functions. • Number sequences. Monotonicity, boundedness, limits. Properties of convergent sequences. Squeeze theorem. | | | | | | | | | |
|--|---|-------------------------------|--|-------------------------------|---|----------------------|-------|--------------------------|-------|-------|
| Prerequisites and co-requisites | No requirements | | | | | | | | | |
| Assessment methods and criteria | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Subject passing criteria</th> <th style="width: 25%;">Passing threshold</th> <th style="width: 25%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Class participation</td> <td>0.0%</td> <td>10.0%</td> </tr> <tr> <td>Final comprehensive test</td> <td>50.0%</td> <td>90.0%</td> </tr> </tbody> </table> | Subject passing criteria | Passing threshold | Percentage of the final grade | Class participation | 0.0% | 10.0% | Final comprehensive test | 50.0% | 90.0% |
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| Recommended reading | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Basic literature</td> <td style="width: 50%;"> <ul style="list-style-type: none"> • B.Sikora, E.Łobos, <i>A first course in calculus</i>, Wydawnictwo Politechniki Śląskiej, 2010 • K.Binmore, J.Davies, <i>Calculus</i>, Cambridge University Press, 2007 • Portal Mathematics, https://cnm.pg.edu.pl/mathematics/precalculus </td> </tr> <tr> <td>Supplementary literature</td> <td> <ul style="list-style-type: none"> • <i>Matematyka. Podstawy z elementami matematyki wyższej</i>, pod red. B.Wikieł, Wydawnictwo Politechniki Gdańskiej • K.Jankowska, T.Jankowski, <i>Zbiór zadań z matematyki</i>, Wydawnictwo PG, 2010 • W.Żakowski, <i>Algebra i analiza matematyczna dla licealistów i kandydatów na wyższe uczelnie</i>, WNT, Warszawa 1999 • M.Gewert, Z.Skoczylas, <i>Analiza matematyczna 1</i>, Oficyna wydawnicza GiS. </td> </tr> <tr> <td>eResources addresses</td> <td></td> </tr> </table> | Basic literature | <ul style="list-style-type: none"> • B.Sikora, E.Łobos, <i>A first course in calculus</i>, Wydawnictwo Politechniki Śląskiej, 2010 • K.Binmore, J.Davies, <i>Calculus</i>, Cambridge University Press, 2007 • Portal Mathematics, https://cnm.pg.edu.pl/mathematics/precalculus | Supplementary literature | <ul style="list-style-type: none"> • <i>Matematyka. Podstawy z elementami matematyki wyższej</i>, pod red. B.Wikieł, Wydawnictwo Politechniki Gdańskiej • K.Jankowska, T.Jankowski, <i>Zbiór zadań z matematyki</i>, Wydawnictwo PG, 2010 • W.Żakowski, <i>Algebra i analiza matematyczna dla licealistów i kandydatów na wyższe uczelnie</i>, WNT, Warszawa 1999 • M.Gewert, Z.Skoczylas, <i>Analiza matematyczna 1</i>, Oficyna wydawnicza GiS. | eResources addresses | | | | |
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| Example issues/ example questions/ tasks being completed | <ol style="list-style-type: none"> 1. Solve the inequality $(x^4+x^2-10x) / (1-\sin 2x) < 0$. 2. Solve the equations $9\log_3 \sin x - 4\frac{1}{2} + \log_2 \cos x - \log_2 0,5 = 0$. 3. Find the domain and range of the function and sketch its graph $f(x) = +\frac{1}{2} \arcsin(1-2x)$. Find the inverse function of f. 4. Evaluate $\operatorname{tg}(\arccos(2/3)) + \cos(\operatorname{arctg}(2/3))$. 5. Let $a_n = (3n)! / n^{3n}$. Find $\lim_{n \rightarrow \infty} (a_{n+1} / a_n)$. 6. Use the squeeze theorem to find the limit of the sequence $x_n = \frac{2}{(n+2)} + \frac{4}{(n+4)} + \frac{6}{(n+6)} + \dots + \frac{2n}{(n+2n)}$ | | | | | | | | | |
| Work placement | Not applicable | | | | | | | | | |