

# Mathematics - opis przedmiotu

| Informacje ogólne   |                                       |
|---------------------|---------------------------------------|
| Nazwa przedmiotu    | Mathematics                           |
| Kod przedmiotu      | 06.9-WM-MaPE-P-Mat-23                 |
| Wydział             | <a href="#">Wydział Mechaniczny</a>   |
| Kierunek            | Management and Production Engineering |
| Profil              | ogólnoakademicki                      |
| Rodzaj studiów      | pierwszego stopnia z tyt. inżyniera   |
| Semestr rozpoczęcia | semestr zimowy 2023/2024              |

| Informacje o przedmiocie        |                                                                      |
|---------------------------------|----------------------------------------------------------------------|
| Semestr                         | 1                                                                    |
| Liczba punktów ECTS do zdobycia | 6                                                                    |
| Typ przedmiotu                  | obowiązkowy                                                          |
| Język nauczania                 | angielski                                                            |
| Sylabus opracował               | <ul style="list-style-type: none"><li>dr Aleksandra Rzepka</li></ul> |

| Formy zajęć |                                         |                                        |                                            |                                           |                     |
|-------------|-----------------------------------------|----------------------------------------|--------------------------------------------|-------------------------------------------|---------------------|
| Forma zajęć | Liczba godzin w semestrze (stacjonarne) | Liczba godzin w tygodniu (stacjonarne) | Liczba godzin w semestrze (niestacjonarne) | Liczba godzin w tygodniu (niestacjonarne) | Forma zaliczenia    |
| Wykład      | 30                                      | 2                                      | -                                          | -                                         | Egzamin             |
| Ćwiczenia   | 30                                      | 2                                      | -                                          | -                                         | Zaliczenie na ocenę |

## Cel przedmiotu

To equip students with knowledge concerning basic algebraic structures and with basic notions of mathematical analysis.

## Wymagania wstępne

Secondary school mathematics.

## Zakres tematyczny

Lecture

- 1.Elements of mathematical logic and set theory. (1h)
- 2.Complex numbers. Operations on complex numbers. Fundamental theorem of algebra. (2h)
3. Matrices. Operations on matrices. Determinant of the matrix. Inverse matrix. (2h)
4. Systems of linear equations. Cramer's theorem. Rank of a matrix . Kronecker Capelli's theorem. (3h)
5. System solving methods. Gauss elimination method. (2h)
6. Analytic geometry in space. Vectors. Dot product, Vector product and mixed product of vectors. (2h)
7. Planes and lines in space. (2h)
8. The definition of a number sequence. Limit of sequences. . (2h)
- 9 .Limit of function. Limit theorems. Asymptotes. (2h)
10. Continuity of function. Theorems about continuous functions. (2h)
11. The derivative of the function. Function differential. Higher order derivatives. (2h)
12. Derivative theorems. The de L'Hospital rule. (2h)
13. Function study. Monotonicity and extrema of functions. Convexity and inflection points of functions. (2h)
14. Integration of functions. (2h)
15. Calculation of definite integrals and its applications in geometry and physics. (2h)

Class

1. Elements of mathematical logic and set theory. (1h)
2. Complex numbers. Operations on complex numbers. Fundamental theorem of algebra. (2h)
3. Matrices. Operations on matrices. Determinant of the matrix. Inverse matrix. (2h)
4. Systems of linear equations. Cramer's theorem. Rank of a matrix . Kronecker Capelli's theorem. (2h)
5. System solving methods. Gauss elimination method. (2h)
6. Analytic geometry in space. Vectors. Dot product. Vector product and mixed product of vectors. (2h)
7. Planes and lines in space. (2h)
8. Class test. (1h)
9. The definition of a number sequence. Limit of sequences. . (2h)
10. Limit of function. Limit theorems. Asymptotes. (2h)
11. Continuity of function. Theorems about continuous functions. (1h)
12. The derivative of the function. Function differential. Higher order derivatives. (2h)
13. Derivative theorems. The de L'Hospital rule. (2h)
14. Function study. Monotonicity and extrema of functions. Convexity and inflection points of functions. (2h)
15. Integration of functions. (2h)
16. Calculation of definite integrals and its applications in geometry and physics. (2h)
17. Class test. (1h)

## Metody kształcenia

Lecture: conventional, problematic, presentation.

Classes: work in groups, solving typical tasks illustrating the subject matter of the subject. Exercises on applying the theory, solving problematic tasks.

## Efekty uczenia się i metody weryfikacji osiągnięcia efektów uczenia się

| Opis efektu                                                                                                                                   | Symbole efektów                                         | Metody weryfikacji                                                                                                                               | Forma zajęć                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Student knows and understands the notion of algebra and mathematical analysis for tasks in the field of Management and Production Engineering | <ul style="list-style-type: none"> <li>K_W01</li> </ul> | <ul style="list-style-type: none"> <li>aktywność w trakcie zajęć</li> <li>egzamin - ustny, opisowy, testowy i inne</li> <li>kolokwium</li> </ul> | <ul style="list-style-type: none"> <li>Wykład</li> <li>Ćwiczenia</li> </ul> |

## Warunki zaliczenia

Classes: Average grades from tests and activity during classes.

Lecture: Exam/colloquium in written/oral form preceded by obtaining a pass from the exercises.

Final grade: The condition for passing the course is to pass all its forms. The final grade for completing the course is the arithmetic average of the grades for individual forms of classes.

## Literatura podstawowa

1. J. Douglas Faires, Barbara T. Faires, Calculus, Random House, New York.
2. Strang, Gilbert, Linear Algebra and Its Applications, Cengage Learning, 2005.
3. G. Birkhoff, S. Mac Lane, A Survey of Modern Algebra, A.K. Peters, 1997
4. R. Larson, Elementary linear algebra, 8 edition, Cengage Learning, 2007
5. E. W. Swokowski, *Calculus with analytic geometry*, Prindle, Weber & Schmidt Publishers, Boston 1983.

## Literatura uzupełniająca

1. R. Larson ., B.H. Edwards, Calculus, Brooks/Cole, 9 edition, 2010
2. S. Lipschutz, M. Lipson, Schaum's outlines. Linear algebra, 3 edition, 2001

## Uwagi

Zmodyfikowane przez dr Aleksandra Rzepka (ostatnia modyfikacja: 10-05-2023 21:52)

