COURSE DESCRIPTION CARD - SYLLABUS

Course name
Mathematics

Course

Field of study
Pharmaceutical Engineering
Area of study (specialization)
-
Level of study
First-cycle studies
Form of study
full-time
Year/Semester
1/2
Profile of study
general academic
Course offered in
polish
Requirements
compulsory

Number of hours

Lecture
30
Laboratory classes
0
Other (e.g. online)
0
Tutorials
30
Projects/seminars
0

Number of credit points

5

Lecturers

Responsible for the course/lecturer:
Dr Alicja Dota

Institute of Mathematics

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Responsible for the course/lecturer:

Prerequisites

1. The student has knowledge of mathematics in the field covered by teaching in the first semester with the basics of high school

2. The student has the ability to think logically, associate facts, analyze problems and apply the right conclusions

3. Students seriously treat the process of studying and understand that need to know mathematics that to study various subjects in the field of pharmaceutical engineering

Course objective

Getting comprehensive skills in the use of advanced mathematical apparatus and classical calculation methods in practical applications, with emphasis on the close relationship between mathematics and various branches of technical sciences, and showing its wide range of applications, also by chemical engineers and pharmaceutical technologists

Course-related learning outcomes

Knowledge

After completing the first degree studies, the graduate has expanded and in-depth knowledge of various branches of higher mathematics and detailed knowledge on the application of mathematical methods and tools in engineering and chemical sciences - K_W2

Skills

After completing the first degree studies, the graduate:

- can use knowledge of higher mathematics; can build and analyse simple mathematical models; can use mathematical tools and methods, including numerical ones, to solve engineering problems - K_U13

- is able to plan and implement self-education independently in order to raise and update their competences - K_U24

Social competences

After completing the first degree studies, the graduate:

- is aware of the deepening and expansion of knowledge to solve newly created technical problems - K_K1

- understands and appreciates the importance of intellectual honesty in own and other people's actions; is ready to demonstrate reliability, impartiality, professionalism and an ethical attitude - K_K1

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - written exam

Tutorials - two test and activity

Assessment criteria:

below 50% - 2,0 50%-59% - 3,0 60%-69% - 3,5

70%-79% - 4,0 80%-89% - 4,5 90%-100% - 5,0

Programme content

1. Linear Algebra

1.1. Matrix calculus: operations on matrices, determinants, elementary transformations, inverse matrix, matrix equations

1.2. Systems of linear equations (marked, unmarked and contradictory): Cramer's formulas, Gaussian elimination method

1.3. Vector calculus in space: operations on vectors, applications in geometry

2. Mathematical analysis

2.1. Differential calculus of functions of many variables: partial derivatives, total differential, extrema of functions of two variables

2.2. Integral calculus of functions of two variables: double integral over a rectangle, double integral over a normal area, field of flat domain, volume of a solid, field of surface , mechanical application of integrals

3. Ordinary differential equations

3.1. First-order differential equations

3.2. Second-order linear differential equations

Teaching methods

Lecture:

- classic form on the blackboard

- often discussions

Tutorials:

- verification of students' knowledge of the lecture,

- solving tasks on the blackboard,

- discussions on solutions.

Bibliography

Basic

1. Erich Steiner, Matematyka dla chemików, PWN, Warszawa 2001

2. T. Jurlewicz, Z. Skoczylas, Algebra i geometria analityczna 1, (Definicje, twierdzenia, wzory), GiS, Wrocław 2007

3. T. Jurlewicz, Z. Skoczylas, Algebra i geometria analityczna 1, (Przykłady i zadania), GiS, Wrocław 2007

4. M. Gewert, Z. Skoczylas, Analiza matematyczna 2 (Definicje, twierdzenia, wzory), GiS, Wrocław 2019

5. M. Gewert, Z. Skoczylas, Analiza matematyczna 2 (Przykłady i zadania), GiS, Wrocław 2019

6. M. Gewert, Z. Skoczylas, Równania różniczkowe zwyczajne (Teoria, przykłady, zadania), GiS, Wrocław 2011

Additional

1. W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach, T.2, PWN, Warszawa 2011.

2. M. Grzesiak, Liczby zespolone i algebra liniowa, Wydawnictwo PP, Poznań 1999.

3. J. Mikołajski, Z Sołtysiak, Zbiór zadań z matematyki dla studentów wyższych szkół technicznych, Część I, II i III, PWSZ, Kalisz 2009

Breakdown of average student's workload

	Hours	ECTS
Total workload	130	5,0
Classes requiring direct contact with the teacher	70	2,7
Student's own work (literature studies, preparation for tutorials, preparation for tests and the final exam) [1]	60	2,3

[1] delete or add other activities as appropriate