UNIVERSITY OF NOVI SAD
FACULTY OF MEDICINE

**Study program:** Integrated Academic Studies in Pharmacy

**Course title: Mathematics**

**Teacher:** Dušanka M. Perišić, Ivana Vojnović, Goran Radojev

**Course status:** compulsory

**ECTS Credits: 4**

**Condition:** -

**Course aim:**

The aim of the course is to enable students to use mathematical tools in analyzing various problems in the life sciences, to understand and use mathematical models, which use differential and integral calculus, and especially mathematical models in pharmacokinetics.

**Expected outcome of the course:**

Students acquire basic mathematical culture necessary to understand mathematical models of phenomena in various areas of life sciences.

Students completing this course can:

1. Use both the definition of derivative as a limit and the rules of differentiation to differentiate functions.
2. Sketch the graph of a function using asymptotes, critical points, and the derivative test for increasing/decreasing and concavity properties.
3. Set up max/min problems and use differentiation to solve them.
4. Set up related rates problems and use differentiation to solve them.
5. Evaluate integrals by using the Fundamental Theorem of Calculus.
6. Apply integration to analyze models in life sciences
7. Evaluate integrals using techniques of integration, such as substitution, inverse substitution, partial fractions and integration by parts.
8. Understand the inverse relationship between integration and differentiation
9. Set up and solve first order differential equations of the first order, which are inportant in models in pharmacokinetics.

**Course description**

*Theoretical education:*

1. Concepts of functions, Limits and Continuity (Graph of a function, Inverse function, Parity, Symmetry and Periodicity, Limitation, Monotony, Extreme values, Limits and Continuity, Essential functions)
2. Differential calculus (Derivative of a function, Geometrical and physical interpretation of derivatives, Application to Graphing, Rates and Extremum Problems)
3. Approximations (Elements of the theory of errors, Linear and Polynomial Approximations, Polynomial interpolation)
4. Integral calculus (Definite and Indefinite Integration, The Fundamental Theorem of Calculus, Approximation of Definite Integration, Applications to Geometry and to Science )
5. Differential equations. Mathematical models. Mathematical models in pharmacokinetics.

*Practical education:*

Exercises are aligned to the lectures.

**Literature**

*Compulsory*:

1. StewartJ, Day T. Biocalculus, Calculus for Life Sciences. Cengage Learning, 2015.

*Additional*

1. Simmons GF. Calculus with Analytic Geometry, 2nd ed. McGraw-Hill New York, 1996.

| **Number of active classes** | **Theory:** 30 | **Practice:** 30 |
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**Teaching methods:**

Lectures, exercises and e-learning on a moodle platform.

**Student activity assessment** (maximally 100 points)

| **Pre-exam activities** | **points** | **Final exam** | **points** |
|---|---|---|---|
| Test | 5 | Written | |
| Homework | 5 | Oral | 40 |

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| Colloquium I | 30 | | |
| Colloquium II | 20 | | |