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Calculus and linear algebra form the essential mathematical background necessary for understanding and developing modern science and technology. In this lecture, basics of calculus required for further pursuing of studies majored in science are explained.

The course Calculus with Exercises B, after providing some more topics on functions of one variable that were not mentioned in "Calculus with Exercises A", explains differentiation and integration of functions of several variables.

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The objective of this course is to learn and understand basic notions of differentiation and integration of functions of one and several variables and methods of mathematical analysis based on them, as well as to become able to apply this knowledge to solving problems.
In addition to mastering the basic calculus, students can learn through this course how to discuss and present mathematical topics in English.

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This subject is composed of two interrelated parts: Lecture and Exercises. The exercises sessions will take place basically once in two weeks, their purpose being to deepen the students' understanding of the contents of the lecture sessions through active participation in problem solving and through regular submission of reports.

In the course outline below, the order in which the given items will be presented is not fixed and depends on the background and understanding of the enrollees.

1. Series and sequences of functions (3-4 weeks)
Infinite series (convergence criteria, absolute and conditional convergence), power series (radius of convergence, termwise differentiation and integration), sequences and series of functions (uniform convergence, termwise differentiation and integration).
2. Sets of points in a plane and in space (2-3 weeks)
Distance, convergence of sequences of points, open sets, closed sets, properties of continuous functions.
3. Differentiation of functions of several variables (4-5 weeks)
Partial differential coefficients, total differentiability, tangential plane, gradient vector, differentiation of composite functions (chain rule), Jacobian matrix and determinant, implicit functions, inverse mapping, Taylor's formula, extreme value problems, extreme value problems with constraints.
4. Integration of functions of several variables (4-5 weeks)
Multiple integrals, iterated integrals, calculation of area and volume, change of variables for multiple integrals, improper integrals.

Total   14 classes, 1 Feedback session

Calculus with Exercises B(2)

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Students must attend the course "Calculus with Exercises A" before taking "Calculus with Exercises B". Moreover, students are expected to have mastered the contents of the course "Linear Algebra with Exercises A".

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Students will be evaluated based on their performance in both the lecture and the exercises sessions.
* Lecture will be graded based mainly on the final examination.
* Exercises will be evaluated based mainly on submitted reports and participation in class.
The details of the evaluation system will be given by the lecturer at the first lecture.

Students who fail to pass the examination but reach a certain standard are eligible for reexamination.

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A. M. Bruckner, J. B. Bruckner, B. S. Thomson   Elementary Real Analysis   Prentice-Hall   The book can be downloaded for free at https://classicalrealanalysis.info/Free-Downloads.php .

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A. M. Bruckner, J. B. Bruckner, B. S. Thomson   Elementary Real Analysis
M. Lovric   Vector Calculus   John Wiley & Sons   ISBN:978-0-4717-25695
I. Kriz, A. Pultr   Introduction to Mathematical Analysis   Birkhauser   ISBN:978-3-0348-0635-0

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It is difficult to follow the lecture without regular study. Therefore, students are expected to devote an amount of time equivalent to the time of the lecture to solve report problems and to review the contents of previous lectures.

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It is desirable to take the course "Linear Algebra with Exercises B" in parallel.

There are no fixed office hours. If you wish to have a consultation, please feel free to contact the lecturer.