Offer courses in English for exchange students in the acadenic year 2025/2026

WINTER TERM:

KMT/YIDMA The Introductuction to Didactics of Mathematics A			
Number of ECTS credits:	5	**Course completion:**	Exam
Completion requirements:	50 % attendance, tutorial work	**Lecturer:**	Jan Wossala
Semester in which the course is taught:		winter	
Description:			
The purpose of this seminar is to introduce students to basic points from didactics of mathematics in prospective mathematics teachers training. The course will be structured to present main didactical principles of mathematical teaching and to practice various activities which are supposed to increase pupils´ motivation in mathematics.			

KMT/ YCME Creativity in Mathematics Education			
Number of ECTS credits:	5	**Course completion:**	Exam
Completion requirements:	50 % attendance, tutorial work	**Lecturer:**	Martina Uhlířová
Semester in which the course is taught:		winter, summer	
Description:			
The course is designed for students of primary and preprimary school teacher training. The aim of the course is: to familiarize the students with mathematical activities that develop creativity of pupils. Emphasis is placed on interdisciplinary relationships and active work of students (didactic games, didactic brix-box, paper handing, solids creation).			

KMT/ YCAL1 Calculus 1			
Number of ECTS credits:	6	**Course completion:**	Exam
Completion requirements:	50 % attendance, tutorial work	**Lecturer:**	Jitka Laitochova
Semester in which the course is taught:		winter	
Description:			
Differential calculus of real functions of a real variable and its applications. It is focused at basic terms of the theory like real functions of a real variable, limits, continuity, derivatives, maxima and minima and graph sketching. Content: Basic terms and concepts; limits; derivatives; transcendental functions; application of derivatives; curve sketching with derivatives; approximations of functions (differentials, Taylor's theorem); derivatives of implicit functions; sequences.			

KMT/ YCAL3 Calculus 3

Number of ECTS credits:	6	**Course completion:**	Exam
Completion requirements:	50 % attendance, tutorial work	**Lecturer:**	Jitka Laitochova
Semester in which the course is taught:		winter	

Description:

Differential calculus of functions of two or more variables. Applications of partial derivatives are demonstrated.
Main topics:
n-dimensional space, metric space, Euclidean space. Neighbourhood of n-dimensional space.
Function of several variables. Domain and range. Geometric meaning of the function z = f (x, y).
Limit of a function of several variables. Improper limit.
Continuity of functions of several variables. Composite functions of several variables. Theorem on the continuity of composite functions.
Partial derivatives of functions of several variables. Geometrical meaning of partial derivative of a function f (x, y). Higher partial derivatives. Schwarz theorem.
Differentiable function. Complete differential. Geometrical meaning of the complete differential df(x, y). Complete differentials of higher orders.
Partial derivatives of composite functions. Higher derivatives of a composite function.
Taylor and Maclaurin's formula.
Maxima, Minima, and Saddle Points. Fermat's theorem
Sufficient conditions for local extrema.
Implicit functions and their derivatives. Theorems on the existence of a derivative of an implicit function expressed by the equation F (x, y) = 0 and the equation F (x, y, z) = 0

KMT/YAG1B Algebra course 1

Number of ECTS credits:	6	**Course completion:**	Exam
Completion requirements:	50 % attendance, tutorial work	**Lecturer:**	Tomáš Zdráhal
Semester in which the course is taught:		winter	

Description:

The course main objective is an active understanding of basic algebraic concepts necessary for further study of algebra and other mathematical disciplines.
Introduction to propositional and predicate logic. Algebraic structures with one or two operations. Vector spaces - linear dependency, basis, dimensions, orthogonality. Linear algebra.

KMT/YAG3B Algebra course 3

Number of ECTS credits:	6	**Course completion:**	Exam
Completion requirements:	50 % attendance, tutorial work	**Lecturer:**	Tomáš Zdráhal
Semester in which the course is taught:		winter	

Description:
The aim is understanding of algebraic solvability of algebraic equations. Polynomials Decomposition of polynomials of one indeterminate over the field of complex and field of real numbers. Symmetric polynomials The main theorem on symmetric polynomials, using symmetric polynomials. Algebraic solutions of algebraic equations Binomial equations, algebraic solvability of algebraic equations of the second, third and fourth degrees.

KMT/YIAMB ICT application in Mathematics

Number of ECTS credits:	5	**Course completion:**	Exam
Completion requirements:	50 % attendance, tutorial work	**Lecturer:**	David Nocar
Semester in which the course is taught:		winter	

Description:
The subject is focuseed on introducing students to the possibilities of commonly used mathematical software in mathematics education, both within MS Office (mathematical expressions/notation using Microsoft Equation, MathType) and specific mathematical applications used in teaching mathematics at elementary schools, particularly the GeoGebra software. The course participant uses interactive dynamic software (GeoGebra) for various display methods (e.g., fixed point sets, isometries, homotheties, conic sections, circular inversion) and uses these tools and transformations to solve geometric problems. Another part of the course is dedicated to algorithmization and programming using various robotic tools (programmable digital didactic aids). The final part of the course focuses on 3D printing and its potential applications in mathematics education. The subject meets the requirements for training prospective mathematics teachers in line with the development of digital literacy and computational thinking.

SUMMER TERM

KMT/ YCME Creativity in Mathematics Education

Number of ECTS credits:	5	**Course completion:**	Exam
Completion requirements:	50 % attendance, tutorial work	**Lecturer:**	Martina Uhlířová
Semester in which the course is taught:		winter, summer	

Description:
The course is designed for students of primary and preprimary school teacher training. The aim of the course is: to familiarize the students with mathematical activities that develop creativity of pupils. Emphasis is placed on interdisciplinary relationships and active work of students (didactic games, didactic brix-box, paper handing, solids creation).

KMT/YETM English Terminology in Mathematics

Number of ECTS credits:	4	**Course completion:**	Exam
Completion requirements:	50 % attendance, tutorial work	**Lecturer:**	Jitka Laitochova
Semester in which the course is taught:		summer	

Description:

The aim of the course is to acquire basic English mathematical terminology.
We work with English mathematical texts and recordings of mathematical lectures. We are interested in the basic concepts, propositions and problems of selected mathematical disciplines such as algebra, geometry and calculus.
We focus on school mathematics, we work with English mathematics textbooks for elementary schools. The subject is taught in English.

KMT/YITME ICT in Mathematics Education

Number of ECTS credits:	4	**Course completion:**	Exam
Completion requirements:	50 % attendance, tutorial work	**Lecturer:**	Jan Wossala
Semester in which the course is taught:		summer	

Description:

The aim of the course is to introduce students to the current possibilities of using DT in teaching mathematics at the first level of primary schools. Much attention will be paid to the possibilities of using digital technologies (e.g. MS Excel, GeoGebra) to support teachers, the educational process and individual work of students. Furthermore, some robotic devices for use in primary schools will be presented.
Students should acquire the skills needed to effectively incorporate computing into teacher training, to integrate computing into mathematics instruction, and to use computers for individual work and homework purposes for elementary school students.

KMT/ YCAL2 Calculus 2

Number of ECTS credits:	6	**Course completion:**	Exam
Completion requirements:	50 % attendance, tutorial work	**Lecturer:**	Jitka Laitochova
Semester in which the course is taught:		summer	

Description:

Integral calculus of real functions of a real variable. Main topics are indefinite integral, definite integral and applications of definite integral.

KMT/ YCAL4 Calculus 4

Number of ECTS credits:	6	**Course completion:**	Exam
Completion requirements:	50 % attendance, tutorial work	**Lecturer:**	Jitka Laitochova
Semester in which the course is taught:		summer	

Description:

Infinite sequences and infinite series of constants and functions. Basic theory of infinite series. Applications of power series.
Main topics:
Infinite sequences of numbers.
Infinite series of numbers - basic terms and concepts.
Series with non-negative members.
Absolute convergence.
Sequences and series of functions.
Power series and their applications.

KMT/YAG2B Algebra course 2

Number of ECTS credits:	6	**Course completion:**	Exam
Completion requirements:	50 % attendance, tutorial work	**Lecturer:**	Tomáš Zdráhal
Semester in which the course is taught:		summer	

Description:

The course focuses on exploring the algebraic properties of the structure of polynomials over a general range, respectively. field integrity. The main differences algebraic and functional approach to polynomials. Students will also address the divisibility of polynomials over a general body and some methods of finding the roots of polynomials.

KMT/YAG4B Algebra course 4

Number of ECTS credits:	6	**Course completion:**	Exam
Completion requirements:	50 % attendance, tutorial work	**Lecturer:**	Tomáš Zdráhal
Semester in which the course is taught:		summer	

Description:

The course aims to fully understand to the theory of algebraic structures with several operations.

Properties of groups. Lagrange's theorem in the group theory. Factor groups. Group homomorphism. Lattices and lattices homorphism. Boolean algebra. Application of lattices and Boolean algebras.