

Course description

Course abbreviation: KFY/UVMA3
Course name: Introduction to Higher Mathematics 3
Academic Year: 2016/2017

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Department/Unit /	KFY / UVMA3	Academic Year	2016/2017
Title	Introduction to Higher Mathematics 3	Type of completion	Pre-Exam Credit
Accredited/Credits	Yes, 2 Cred.	Type of completion	Written
Number of hours	Přednáška 1 [Hours/Week] Seminář 1 [Hours/Week]	Course credit prior to	NO
Occ/max	Status A Status B Status C	Counted into average	NO
Summer semester	0 / 0 10 / - 0 / -	Min. (B+C) students	not determined
Winter semester	0 / - 1 / - 0 / -	Repeated registration	NO
Timetable	Yes	Semester taught	Summer semester
Language of instruction	Czech	Internship duration	0
Substituted course	None		
Preclusive courses	N/A		
Prerequisite	N/A		
Informally recommended courses	N/A		
Courses depending on this Course	N/A		

Course objectives:

Basics of vector analysis (differential operators). Selected ordinary differential equations of first order and higher orders. Linear differential equations with constant coefficients and their systems.

Requirements on student

The student is expected to know definitions and be able to use differential vector operators. The student must be able to solve basic types of ordinary differential equations.

Approximately in the half of semester student will take a test on theory of differential operators (max. 40 points). During the exam period student will take a test on ordinary differential equations (max. 60 points).

If student do not achieve a grade at least 51 points in total from both tests, he can perform one correction test on both theory of differential operators and ordinary differential equations during the exam period (max. 100 points). To successfully pass the student has to achieve at least 51 points.

Content

Differential operators

- 1) Scalar and vector fields.
- 2) Kronecker delta, Levi-Civit tensor.
- 3) Differential operators.
- 4) properties of differential operators.
- 5) Expression of differential operators in curvilinear coordinates.

Ordinary differential equations (ODE)

- 6) Basic definitions.
- 7) ODE of first order.
- 8) Linear ODE of first order.
- 9) Linear ODE of higher orders.
- 10) The variation of constants method.
- 11) Homogeneous linear ODE with constant coefficients.
- 12) Non-homogeneous linear ODE with constant coefficients.
- 13) Systems of ODE.

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Prerequisites - other information about course preconditions

Competences acquired

The student is expected to know definitions and be able to use differential vector operators. The student must be able to solve basic types of ordinary differential equations.

Fields of study

Guarantors and lecturers

- **Guarantors:** Mgr. Aleš Vítek, Ph.D.
- **Lecturer:** Mgr. Aleš Vítek, Ph.D.
- **Seminar lecturer:** Mgr. Aleš Vítek, Ph.D.

Literature

- **Basic:** KALUS, R., HRIVŇÁK, D. *Breviář vyšší matematiky. 1. vyd. Ostrava: Ostravská univerzita, 2001. 132 s.*
- **Extending:** REKTORYS, K., aj. *Přehled užití matematiky I. 6. přepr. vyd. Praha: Prometheus, 1995..*
- **Extending:** REKTORYS, K., aj. *Přehled užití matematiky II. 6. přepr. vyd. Praha: Prometheus, 1995..*
- **Recommended:** GILLMAN, L., McDOWEL, LH. *Matematická analýza. Přel. J. Adámek. 2. vyd. Praha: SNTL, 1983..*
- **Recommended:** BARTSCH, HJ. *Matematické vzorce. Přel. Zd. Tichý. 3. rev. vyd. Praha: Mladá fronta, 2000..*

Time requirements

Activities	Time requirements for activity [h]
Being present in classes	26
Self-tutoring	10
Preparation for test	10
Continuous tasks completion (incl. correspondence tasks)	9
Consultation of work with the teacher/tutor (incl. electronic)	5
Total:	60

assessment methods

professional knowledge

- Continuous analysis of student's achievements
- Point system
- Written examination

teaching methods

professional knowledge

- Briefing
- Dialogic (discussion, dialogue, brainstorming)
- Monologic (explanation, lecture, briefing)

learning outcomes

professional knowledge - knowledge resulting from the course:

The student is expected to know definitions and be able to use differential vector operators. The student must be able to solve basic types of ordinary differential equations.

Course is included in study programmes:

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Applied Physics	Bachelor	Full-time	Biophysics	1	2012	2016	Povinně volitelné předměty	B	1	LS
Applied Physics	Bachelor	Full-time	Biophysics	1	2014	2016	Povinně volitelné předměty	B	1	LS
Chemistry	Bachelor	Full-time	Chemistry	1	2012	2016	Povinně volitelné předměty	B	1	LS
Physics	Bachelor	Full-time	Physics with Other Degree Specialization	1	2	2016	Povinně volitelné předměty	B	1	LS
Physics	Bachelor	Full-time	Physics with Other Degree Specialization	1	2013	2016	Povinně volitelné předměty	B	1	LS