

Course description

Course abbreviation:	KMA/ZA	Page:	1 / 4
Course name:	Fundamentals of Algebra		
Academic Year:	2023/2024	Printed:	01.06.2024 09:17

Department/Unit /	KMA / ZA			Academic Year	2023/2024
Title	Fundamentals of Algebra			Type of completion	Exam
Accredited/Credits	Yes, 4 Cred.			Type of completion	Combined
Number of hours	Lecture 2 [Hours/Week] Tutorial 1 [Hours/Week]				
Occ/max	Status A	Status B	Status C	Course credit prior to	YES
Summer semester	5 / -	3 / -	0 / -	Counted into average	YES
Winter semester	0 / -	0 / -	0 / -	Min. (B+C) students	1
Timetable	Yes			Repeated registration	NO
Language of instruction	Czech			Semester taught	Summer semester
Optional course	Yes			Internship duration	0
Evaluation scale	1 2 3 4			Ev. sc. – cred.	S N
No. of hours of on-premise					
Auto acc. of credit	No				
Periodicity	K				
Substituted course	None				
Preclusive courses	N/A				
Prerequisite courses	N/A				
Informally recommended courses	N/A				
Courses depending on this Course	N/A				

Course objectives:

The subject is dedicated to the study of basics of algebra - ordered set, lattices, groups, fields.

Requirements on student

Knowledge, understanding and applications of algebraic structures.

Credit - individual assignment.

Exam - orals: 3 topics (semigroups, groups, rings and fields).

Content

Week 1-4: Groupoids, monoids, semigroups.

Week 5-7: Groups, Abelian Groups, subgroups, Lagrange's Theorem, normal subgroups, quotient groups.

Week 8-9: Homomorphisms of groups, theorem about isomorphism of groups, cyclic groups and their structure.

Week 10-11: Rings and fields, subrings, ideals, quotient rings, zero divisors, basic properties of fields.

Week 12-13: Associative, commutative rings with an identity.

Fields of study

Guarantors and lecturers

- **Guarantors:** RNDr. Mgr. Jakub Teska, Ph.D. (100%)
- **Lecturer:** RNDr. Mgr. Jakub Teska, Ph.D. (100%)
- **Tutorial lecturer:** RNDr. Mgr. Jakub Teska, Ph.D. (100%)

Literature

- **Recommended:** Procházka a kol. *Algebra*. Academia Praha.

- **Recommended:** Cohn, Paul M. *Basic algebra : groups, rings and fields*. London : Springer, 2003. ISBN 1-85233-587-4.
- **Recommended:** Wallace, David Alexander Ross. *Groups, rings and fields*. [1st ed.]. London : Springer, 1998. ISBN 3-540-76177-2.
- **Recommended:** Beran, Ladislav. *Grupy a svazy*. Vyd. 1. Praha : SNTL, 1974.

Time requirements

All forms of study

Activities	Time requirements for activity [h]
Undergraduate study programme term essay (20-40)	30
Preparation for an examination (30-60)	45
Contact hours	39
Total:	114

assessment methods

Knowledge - knowledge achieved by taking this course are verified by the following means:

Combined exam
Seminar work

Skills - skills achieved by taking this course are verified by the following means:

Seminar work

Competences - competence achieved by taking this course are verified by the following means:

Seminar work

prerequisite

Knowledge - students are expected to possess the following knowledge before the course commences to finish it successfully:

využívat znalosti v rozsahu středoškolského učiva
orientovat se v základech matematické logiky

Skills - students are expected to possess the following skills before the course commences to finish it successfully:

aplikovat principy matematických důkazů

Competences - students are expected to possess the following competences before the course commences to finish it successfully:

N/A
N/A
N/A
N/A

teaching methods

Knowledge - the following training methods are used to achieve the required knowledge:

Lecture supplemented with a discussion

Skills - the following training methods are used to achieve the required skills:

Lecture supplemented with a discussion

Competences - the following training methods are used to achieve the required competences:

Lecture supplemented with a discussion

learning outcomes

Knowledge - knowledge resulting from the course:

ovládat pojmy ekvivalence, rozkladu množiny na třídy ekvivalence

ovládat pojmy z teorie pologrup

ovládat pojmy z teorie grup

Skills - skills resulting from the course:

aplikovat základní vlastnosti grup na konkrétní modely

umět rozpoznat strukturu okruhu a tělesa

řešit jednoduché úlohy v aritmetikách modulo k

Competences - competences resulting from the course:

N/A

Course is included in study programmes:

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Mathematics and its Applications	Bachelor	Full-time	Matematika a její aplikace	1	2018 akr	2023	Povinné předměty - matematika	A	2	LS
Mathematics and its Applications	Bachelor	Full-time	Matematika a její aplikace	1	2023	2023	Povinné předměty - matematika	A	2	LS
Mathematics	Postgraduate Master	Full-time	Training Teachers of Mathematics at Higher Secondary Scholls	1	2018	2023	Matematika - profilující předměty	B	1	LS
Učitelství matematiky pro střední školy	Postgraduate Master	Full-time	Secondary School Education Mathematics - Maior	1	2020	2023	Matematika - odborné doplňující předměty	B	1	LS
Učitelství matematiky pro střední školy	Postgraduate Master	Full-time	Secondary School Education Mathematics - Minor	1	2020	2023	Matematika - odborné doplňující předměty	B	1	LS
Upper Secondary School Teacher Training in Biology	Postgraduate Master	Full-time	Upper Secondary School Teacher Training in Biology	1	2022	2023	Matematika - odborné doplňující předměty	B	1	LS
Upper Secondary School Teacher Training in Biology	Postgraduate Master	Full-time	Upper Secondary School Teacher Training in Biology	1	2023	2023	Matematika - odborné doplňující předměty	B	1	LS
Upper Secondary School Teacher Training in Biology	Postgraduate Master	Full-time	Upper Secondary School Teacher Training in Biology	1	2021	2023	Matematika - odborné doplňující předměty	B	1	LS
Upper Secondary School Teacher Training in Biology	Postgraduate Master	Full-time	Upper Secondary School Teacher Training in Biology	1	2020	2023	Matematika - odborné doplňující předměty	B	1	LS
Upper Secondary School Teacher Training in Geography	Postgraduate Master	Full-time	Upper Secondary School Teacher Training in Geography	1	2020	2023	Matematika - odborné doplňující předměty	B	1	LS
Upper Secondary School Teacher Training in Geography	Postgraduate Master	Full-time	Upper Secondary School Teacher Training in Geography	1	2022	2023	Matematika - odborné doplňující předměty	B	1	LS
Upper Secondary School Teacher Training in Geography	Postgraduate Master	Full-time	Upper Secondary School Teacher Training in Geography	1	2023	2023	Matematika - odborné doplňující předměty	B	1	LS

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Upper Secondary School Teacher Training in Geography	Postgraduate Master	Full-time	Upper Secondary School Teacher Training in Geography	1	2021	2023	Matematika - odborné doplňující předměty	B	1	LS
Upper Secondary School Teacher Training in Chemistry	Postgraduate Master	Full-time	Upper Secondary School Teacher Training in Chemistry	1	2021	2023	Matematika - odborné doplňující předměty	B	1	LS
Upper Secondary School Teacher Training in Chemistry	Postgraduate Master	Full-time	Upper Secondary School Teacher Training in Chemistry	1	2020	2023	Matematika - odborné doplňující předměty	B	1	LS
Upper Secondary School Teacher Training in Chemistry	Postgraduate Master	Full-time	Upper Secondary School Teacher Training in Chemistry	1	2023	2023	Matematika - odborné doplňující předměty	B	1	LS
Upper Secondary School Teacher Training in Chemistry	Postgraduate Master	Full-time	Upper Secondary School Teacher Training in Chemistry	1	2022	2023	Matematika - odborné doplňující předměty	B	1	LS