Course description

Department/Unit /	KGM / MK1		Academic Year	2023/2024
Title	Mathematical Cartography 1		Type of completion	Exam
Accredited/Credits	Yes, 3 Cred.		Type of completion	Combined
Number of hours	Lecture 1 [Hours/Week] Seminar 1 [Hours/Week]			

Occ/max	Status A	Status B	Status C		
				Course credit prior to	YES
Summer semester	0 / -	0 / -	0 / -	Counted into average	YES
Winter semester	0 / -	2 / -	0 / -	Min. (B+C) students	1

Timetable	Yes		Repeated registration	NO
Language of instruction	Czech		Semester taught	Winter 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	Yes in the case of a previous evaluation 4 nebo nic.			
Periodicity	K			
Substituted course	KMA/MK1			
Preclusive courses	N/A			
Prerequisite courses	N/A			
Informally recommended courses	N/A			
Courses depending on this Course	N/A			

Course objectives:

The aim of this course is a basic introduction to following themes:
Form of the Earth, reference surfaces, coordinate systems, curves on the reference surfaces. Principles of deformations, basic map projections. Polyedric projections. Spherical trigonometry and some calculations on the sphere.

Requirements on student

Requirement for students of full-time and combine study programme:
Credit requirements:
- successful processed credit test during the semestr (spherical trigonometry, necessary to obtain 65%)
- successful processed semestral project(submission 7.week)
Exam:
obligatory credit,
written and oral part (discussion about contents of lectures and semestral project).

Content

Content

History of cartography, form and size of the Earth, measurements of the Earth's circumference.
Reference surfaces, coordinate systems, length elements of meridian and parallel, geodetic line, orthodrome, rumb line.
Map projections and their classification.
Tissot indicatrix, principal directions. Map projection deformations (linear, angular, areal).
Conic, azimuthal and cylindrical projections and their projection equations derivation.
Křovák projection. Gauss-Krüger projection. Cassini-Soldner projection. Polyedric projections and their used for topographic maps at Austria-Hungary.

Fields of study

Guarantors and lecturers

- **Guarantors:** doc.Ing.Mgr. Otakar Čerba, Ph.D.
- **Lecturer:** doc.Ing.Mgr. Otakar Čerba, Ph.D. (100%), Ing. Jan Ježek, Ph.D. (100%)
- **Tutorial lecturer:** Ing. Radek Fiala, Ph.D. (100%), Ing. Jan Ježek, Ph.D. (100%)

Literature

- **Basic:** Pyšek, Jiří. *Kartografie, kartometrie a matematická geografie v příkladech*. Vyd. 1. [Plzeň] : Západočeská univerzita, 1995. ISBN 80-7043-157-1.
- **Basic:** Pyšek, Jiří. *Matematická kartografie : Třída jednoduchých zobrazení*. 1. vyd. Plzeň : Pedagogická fakulta Západočeské univerzity, 1995. ISBN 80-7043-165-2.
- **Basic:** Multimediální výuka MK (Baranová Magdaléna) - http://www.gis.zcu.cz/studium/mk2/multimedialni_texty/index.html >
- **Recommended:** Hojovec, Vladimír. *Kartografie : Celost. vysokošk. učebnice pro stavební fak.*. 1. vyd. Praha : Geodetický a kartografický podnik, 1987.
- **Recommended:** Buchar P. *Matematická kartografie 10*. ČVUT Praha, 2002.

Time requirements

All forms of study

Activities	Time requirements for activity [h]
Contact hours	26
Undergraduate study programme term essay (20-40)	8
Preparation for an examination (30-60)	40
Preparation for comprehensive test (10-40)	5
Total:	**79**

assessment methods

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

Combined exam

Test

Continuous assessment

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

Combined exam

Skills demonstration during practicum

Seminar work

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

Combined exam

Seminar work

prerequisite

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

explain the properties and relationships of trigonometric and cyclometric functions

explain the properties and methods of solving differential equations

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

use the Cartesian, polar and geographical coordinate systems

process and present the results of their work using the functions of application software

apply an algorithmic approach to problem solving

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

N/A

N/A

N/A

teaching methods

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

Interactive lecture

Lecture supplemented with a discussion

Self-study of literature

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

Individual study

Practicum

Task-based study method

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

Practicum

Individual study

Task-based study method

learning outcomes

Knowledge - knowledge resulting from the course:

describe the problems of cartographic distortion

describe the specifics of spherical trigonometry

explain the basic theory of cartographic representations

Skills - skills resulting from the course:

provádět výpočty na kouli

use application software for cartographic calculations

determine the position using commonly used coordinate systems

Competences - competences resulting from the course:

N/A

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.
Geomatics	Bachelor	Full-time	Geomatika	1	2022 akr	2023	Povinné předměty	A	2	ZS
Geomatics	Bachelor	Full-time	Geomatika	1	2023	2023	Povinné předměty	A	2	ZS
Geomatics	Bachelor	Full-time	Geomatics	1	2018	2023	Oborové předměty povinné	A	2	ZS
Mathematics and its Applications	Bachelor	Full-time	Matematika a její aplikace	1	2023	2023	Povinně volitelné - fakultní	B	3	ZS

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	Povinně volitelné - fakultní	B	3	ZS

Mathematics and its Applications	Bachelor	Full-time	Matematika a její aplikace	1	2018	2023	Povinně volitelné - fakultní	B	3	ZS