

Module Handbook (<https://modhb.uni-kl.de/>)

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## Course MAT-02-13a-K-1

Mathematics für Socioinformatics: Analysis (2V+2U, 5.0 LP)

### Course Type

SWS	Type	Course Form	CP (Effort)	Presence-Time / Self-Study
-	K	Lecture with exercise classes (V/U)	5.0 CP	94 h
2	V	Lecture		28 h
2	U	Exercise class (in small groups)		28 h
(2V+2U)			5.0 CP	56 h 94 h

### Basedata

SWS	2V+2U
CP, Effort	5.0 CP = 150 h
Position of the semester	1 Sem. in SuSe
Level	[1] Bachelor (General)
Language	[DE] German
Lecturers	Böhm, Janko, Dr. (WMA   DEPT: MAT) (/staff/4/) Kämmerer, Florentine, Dr. (WMA   DEPT: MAT) (/staff/17/) Kunte, Michael, Dr. (WMA   DEPT: MAT) (/staff/22/) + further Lecturers of the department Mathematics
Area of study	[MAT-Service] Mathematics for other Departments
Lifecycle-State	[NORM] Active

#### Notice

The lecture is identical with the lecture in **[MAT-02-13-K-1]** (/mhb/courses/MAT-02-13-K-1/). Additionally, a dedicated exercise programme (small group exercises) is offered for students of socioinformatics.

### Possible Study achievement

- Verification of study performance: **proof of successful participation in the exercise classes (incl. written**

### examination, ungraded)

- Examination number (Study achievement): 80217 ("Mathematics für Sozioinformatics: Analysis")
- Details of the examination (type, duration, criteria) will be announced at the beginning of the course.

### Contents

- integer and rational numbers, countability,
- sequences, convergence, Cauchy sequences, convergence criteria, application: existence and calculation of square roots, real numbers,
- series, geometric series, convergence and divergence criteria, Cauchy product of series, functions, continuity,
- intermediate value theorem, power series, exponential function and functional equation, sine and cosine,
- differentiability, rules of derivation, derivation of power series, Taylor series, extreme values, mean value theorem, rule of l'Hospital,
- Riemann integral, antiderivative and fundamental theorem of calculus, integration rules,

inverse function, logarithm, general powers, derivative of the inverse function,

- outlook on ideas and concepts of multivariate analysis: limit values and continuity in several variables, partial derivatives, gradient and Hesse matrix, Taylor formula and local extrema.

### Literature

- O. Forster: Analysis 1, Analysis 2,
- H. Heuser: Lehrbuch der Analysis, Teil 1 und Teil 2,
- M. Barner, F. Flohr: Analysis I, Analysis II,
- K. Königsberger: Analysis 1, Analysis 2,
- B. Kreuzler, G. Pfister: Mathematik für Informatiker: Algebra, Analysis, Diskrete Strukturen.

### Materials

Further literature will be announced in the lecture(s); exercise material is provided.

### Registration

Registration for the exercise classes via the online administration system URM (<https://urm.mathematik.uni-kl.de>) (<https://urm.mathematik.uni-kl.de>).

### Requirements for attendance (informal)

Prior or parallel participation in the course [MAT-02-11a-K-1] (/mhb/courses/MAT-02-11a-K-1/) is expected.

### Requirements for attendance (formal)

None

### References to Course [MAT-02-13a-K-1]

Module	Name	Context
[MAT-02-90-M-1 (/mhb/modules/MAT-02-90-M-1/)]	Mathematics for Socioinformatics: Linear Algebra and Analysis	P: 2V+2U, 5.0 Obligatory LP