1 Export

1.1 Module: Functional Data Analysis [M-MATH-106485]

Responsible: Dr. rer. nat. Bruno Ebner
Organisation: KIT Department of Mathematics

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Mandatory

| T-MATH-113102 | Functional Data Analysis | 4 LP | Ebner |

Competence Certificate
Oral examination of ca. 25 minutes.

Competence Goal
The aim of the course is to give an introduction to weak convergence concepts in metric spaces and to highlight some statistical applications.

After successful participation students can

- model random elements in metric spaces,
- explain the concept of weak convergence in metric spaces and are familiar with structural problems in this context,
- apply limit laws for functionals of the empirical distribution function,
- model the normal distribution for random elements in Hilbert spaces,
- derive limit distributions of L2 type goodness-of-fit statistics,
- apply goodness-of-fit tests to functional data.

Module grade calculation
The grade of the module is the grade of the oral exam.

Prerequisites
None

Content

- Theorem of Glivenko-Cantelli,
- weak convergence in metric spaces,
- Theorem of Prokhorov,
- Gaussian Processes,
- Donsker's Theorem,
- functional central limit theorem,
- empirical processes,
- random elements in separable Hilbert spaces,
- Goodness-of-fit tests.

Recommendation
The contents of the modules "Probability Theory" and "Mathematical Statistics" are strongly recommended.

Workload
Total workload: 120 hours

Attendance: 45 h
- lectures and examination

Self studies: 75 h
- follow-up and deepening of the course content,
- literature study and internet research on the course content,
- preparation for the module examination
1.2 Course: Functional Data Analysis [T-MATH-113102]

**Responsible:** Dr. rer. nat. Bruno Ebner  
**Organisation:** KIT Department of Mathematics  
**Part of:** M-MATH-106485 - Funktionale Datenanalyse

**Type**  
Oral examination

**Credits**  
4

**Recurrence**  
Irregular

**Version**  
1

**Competence Certificate**  
Oral examination of ca. 25 minutes.

**Prerequisites**  
none

**Recommendation**  
The contents of the modules "Probability Theory" and "Mathematical Statistics" are strongly recommended.