

# Guideline for Choosing Courses

## 1. General Information

To sign up for all courses, tutorials and exams, you use [www.campus.tum.de](http://www.campus.tum.de), also known as TUMonline.

Technische Universität München  
Campus-Management-System TUMonline  
Technische Universität München

Hier an/abmelden!

Suche

Login

de | en

Technische Universität München

- Hochschulpräsidium
- Gremien
- Hochschulreferate
- Zentrale Serviceeinrichtungen
- Zentrale Verwaltung
- Fakultäten
  - Mathematik
  - Physik
  - Chemie
  - Wirtschaftswissenschaften
  - Bau Geo Umwelt
  - Architektur
  - Maschinenwesen
  - Elektrotechnik und Informations
  - Informatik
  - Wissenschaftszentrum Weihen
  - Medizin
  - Sport- und Gesundheitswissens
  - TUM School of Education
  - Politik- und Sozialwissenschafte

**TUMonline**

### Wie melde ich mich an?

**Studierende, Mitarbeiter/innen und Alumni:**  
Bitte melden Sie sich mit Ihrer TUM-Mail-Adresse und Ihrem persönlichen Kennwort über den Login-Link oben rechts an. (Anleitungen für verschiedene Nutzergruppen)

**Studienbewerber/innen:**  
Bitte legen Sie sich hier ein Bewerberkonto an.  
(Falls Sie sich schon einmal ein Bewerberkonto angelegt haben: Bitte legen Sie sich kein neues Konto an! Melden Sie sich mit E-Mail-Adresse und Kennwort über den Login-Link oben rechts an. Bei Problemen mit dem Login schreiben Sie uns bitte eine E-Mail über den "Feedback"-Link unten rechts. Bitte geben Sie dabei Name, Geburtsdatum und Benutzernamen für TUMonline an.)

At the top right corner, you can change the language to English if necessary. Within the list on the left side, you can select *Mathematics (Mathematik)* and then *Courses (Lehrveranstaltungen)*. Now you see a list of all courses offered in the current year at our Department:

**Courses offered**  
Academic year 2016/17

Navigation  
Academic year 2016/17  
Grouping Compulsory subject/ elective subject Semester none  
Display Update Timetables

Page 1 of 4

177 entries available

Course no.	Sem.	Term.	Title	Duration	Type	Part/Eval/Info	SPO C/E/Q	Lecturer (assistant)	resp. org.	Languages of instruction	Place (1st session)	Time (1st session)
220033862	W	🕒	Vector Analysis	2	L	🟢🟡🔴	0/7/15	Massopust P	TUMAZMA	German	2501, Rudolf-Moßbauer-Hörsaal (5101.EG.501)	20.10.16 14:15 - 15:45
0000003435	W	🕒	Variational Principles in Quantum Theory (Exercise Session)	1	P	🟢🟡🔴		Friesecke G	TUMAZMA	English		
0000003433	W	🕒	Variational Principles in Quantum Theory	2	L	🟢🟡🔴		Friesecke G	TUMAZMA	English	03.08.011, Seminarraum (M1/M7) (5608.03.011)	18.10.16 16:30 - 18:00

## 2. List of Courses

The following list is an overview of core and special modules. This list might be incomplete due to the changes in offers every year. Only the core modules are offered every year, either in the summer or in the winter term. All special modules might be offered every year as well, but it is also possible that some are offered irregularly, every two years or it was an on time offer only (see 3.). The regular workload per term is 30 ECTS (Credits).

The following classification is not mandatory, but just to be understood as an overview (orientated at the classification from the M.Sc. Mathematics). In general, the meaning of the alphanumerical ID for each course is as follows:

MA	Course offered by the Mathematics department
1xxx-2xxx	Basic and Fundamental Courses
3xxx-4xxx	Advanced Courses
5xxx	Specialized Courses (mainly offered irregularly)

Courses with ID 1xxx-2xxx are mostly Bachelor Modules and hence offered in German. The other modules are Master level where the language of instruction is mostly English.

### **Analysis**

#### **Core Modules**

MA3001	Functional Analysis
MA3005	Partial Differential Equations
MA3081	Dynamical Systems
MA4064	Fourier Analysis (every 2. year)

#### **Special Modules**

MA5051	Topics in Mathematical Data Analysis
--------	--------------------------------------

### **Algebra, Geometry and Discrete Mathematics**

#### **Core Modules**

MA3101	Computer Algebra (every 2. year)
MA3203	Projective Geometry 1
MA3205	Differential Geometry
MA3502	Discrete Optimization
MA4502	Combinatorial Optimization

#### **Special Modules**

MA2504	Fundamentals of Convex Optimization
MA3241	Topology
MA4211	Foundations of Geometry
MA4512	Case Studies Discrete Optimization
MA5101	Elementary Number Theory
MA5120	Algebra 2
MA5215	Discrete Geometry: Lattice Polytopes

## **Probability Theory, Statistics and Financial Mathematics**

### **Core Modules**

MA2409	Probability Theory
MA3402	Computational Statistics
MA3403	Generalized Linear Models
MA3411	Time Series Analysis
MA3701	Discrete Time Finance
MA3702	Continuous Time Finance
MA4405	Stochastic Analysis

### **Special Modules**

MA3442	Actuarial Risk Theory
MA3451	Life Insurance
MA3452	Actuarial Mathematics for Pensions
MA3453	Health Insurance
MA3454	Non-Life Insurance
MA3703	Fixed Income Markets
MA4401	Applied Regression
MA4408	Markov Processes
MA4406	Probability on Graphs
MA4472	Multivariate Statistics
MA4706	Portfolio Analysis
MA4801	Mathematical Foundations of Machine Learning
MA5415	Quantitative Risk Management
MA5417	Large Deviations
MA5717	Computational Finance

## **Numerics, Scientific Computing and Nonlinear Optimization**

### **Core Modules**

MA3303	Numerical Methods for Partial Differential Equations
MA3503	Nonlinear Optimization: Advanced
MA3601	Mathematical Models in Biology
MA3602	Advanced Mathematical Biology
MA4503	Modern Methods in Nonlinear Optimization

### **Special Modules**

MA4303	Advanced Finite Element Methods
MA4304	Computational Plasma Physics
MA4512	Case Studies Nonlinear Optimization
MA5324	Meshfree Methods
MA5329	Geometric Numerical Integration of Ordinary Differential Equations
MA5607	Topics in Computational Biology

### 3. How to get specific information about several courses

If you want to have specific information about a course, you click again *Mathematics* at the left side, and then on *Module Catalogue*. There you can search with the course ID or the name.

#### Module handbook

Modules of the organisation Modules in SPOs

**Filter**

Name or ID

Semester (description) <= 16W

Remove filter Filter

Page 1 of 11

Name	ID	Version	Org. ID
<a href="#">Generalized Model Solutions for Physical Systems, Modeled by PDE's and Their Linear Stability</a>	MA5342		TUMAFMA
<a href="#">Mathematical Theories in other Disciplines from other Universities</a>	MA8301		TUMAFMA
<a href="#">Abstract Harmonic Analysis</a>	MA5065		TUMAFMA
<a href="#">Actuarial Mathematics for Pensions</a>	MA3452		TUMAFMA
<a href="#">Actuarial Risk Theory</a>	MA3442		TUMAFMA

To get detailed information for a course, you simply click on its name.

**Module details**

Name **Actuarial Mathematics for Pensions**

Organisation TUM Department of Mathematics

Organisation identification TUMAFMA

Comment alle 2 Jahre

Credits 3

Weighting factor 1

Duration [Acc. to SPO version] 1

Module ID **MA3452**

Abbreviated name of version

External allocation

Valid from

Valid until

Here you see in the Comment that e.g. the course “Actuarial Mathematics for Pensions” is only offered every second year (“alle 2 Jahre”), not every year. If you scroll down a bit, you get the information about the workload and in which term this course is offered, what is the language of instruction, a short course description as well as the recommended prerequisites:

**General data (module handbook)**

Module Level Master

Abbreviation

Subtitle

Duration one semester

Occurrence summer semester

Language English

**Work load**

Total Hours 90

Contact Hours 30

Self-study Hours 60

#### Study and examination performance

Description of Achievement and Assessment Methods: Klausur, acknowledged by the German Society of Actuaries (DAV)

Type of Assessment (Please do not fill in!) written

Duration of Assessment (Please do not fill in!) 60

Homework N

Term Paper N

Oral Presentation N

Conversation N

Exam retake next semester N

Exam retake at the end of semester J

#### Description

Prerequisites (recommended) MA1401 Introduction to Probability, MA2402 Basic Statistics

Intended Learning Outcomes After successful completion of the module the students are able to understand and apply actuarial methods to value pension liabilities - both under German and international accepted accounting principles.

Content In this course students will learn the basics of occupational pension schemes and the actuarial methods required to value pension liabilities. In particular the following topics will be covered:

1) Typical examples for occupational pension schemes (defined benefit plans, defined contribution plans, cash balance plans).

2) Methods to derive mortality and disability probabilities.

3) How to calculate the present value of pension liabilities.

4) Actuarial methods under German accounting principles to value pension liabilities (book reserves in the balance sheet approach).

Please be aware that only because the title and the information might be in English, this does NOT imply that the course is offered in English. Binding is the language (of instruction) as written in the *General Data (module handbook)* section.