

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

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Course of Study "Business Mathematics" (M.Sc.)

Department	[MAT] Mathematik
Degree	[M.Sc.] Master (M.Sc.)
Course of Study	Business Mathematics
State	[NORM] Active
Short Name	M.Sc. Business Mathematics
Additional informations	Examination regulations (http://www.uni-kl.de/fileadmin/ha-4/42-Pruefung/Pruefungsordnungen/Master/Master-PO_Mathematik_TMathe_WMathe_MatheInt.pdf) Homepage of the Course of Study (https://www.mathematik.uni-kl.de/studium/studiengaenge/msc/wirtschaftsmathematik/)

Section *General Mathematics*

Core Modules (non specialised)

In this section, modules amounting to 18 - 21 credit points (CP) from the list below are to be successfully completed, among those at least 9 CP to modules from a field related to business mathematics. With approval of the examination board, other modules from the area of Mathematics may be selectable.

The choice of the modules is limited by the chosen mathematical specialisation:

- Modules that are directly attributable to the chosen specialisation may not be included in the section General Mathematics.

WP	MAT-50-11-M-4 (/mhb/modules/MAT-50-11-M-4/)	Integer Programming: Polyhedral Theory and Algorithms Not possible if the chosen specialisation is "Optimisation".	9.0 CP
WP	MAT-50-12-M-4 (/mhb/modules/MAT-50-12-M-4/)	Nonlinear Optimization Not possible if the chosen specialisation is "Optimisation".	9.0 CP
WP	MAT-60-11-M-4 (/mhb/modules/MAT-60-11-M-4/)	Probability Theory Not possible if the chosen specialisation is "Financial Mathematics" or "Statistics".	9.0 CP
WP	MAT-60-12-M-4 (/mhb/modules/MAT-60-12-M-4/)	Regression and Time Series Analysis Not possible if the chosen specialisation is "Financial Mathematics" or "Statistics".	9.0 CP
WP	MAT-60-14-M-6 (/mhb/modules/MAT-60-14-M-6/)	Monte Carlo Algorithms Not possible if the chosen specialisation is "Financial Mathematics" or "Statistics".	9.0 CP
WP	MAT-70-11-M-4 (/mhb/modules/MAT-70-11-M-4/)	Functional Analysis	9.0 CP
WP	MAT-80-11-M-4 (/mhb/modules/MAT-80-11-M-4/)	Differential Equations: Numerics of ODE & Introduction to PDE	9.0 CP
WP	MAT-80-11A-M-4 (/mhb/modules/MAT-80-11A-M-4/)	Numerics of ODE	4.5 CP
WP	MAT-80-11B-M-4 (/mhb/modules/MAT-80-11B-M-4/)	Introduction to PDE	4.5 CP
WP	MAT-80-12A-M-4 (/mhb/modules/MAT-80-12A-M-4/)	Introduction to Systems and Control Theory	4.5 CP
WP	MAT-80-17-M-6 (/mhb/modules/MAT-80-17-M-6/)	Dynamical Systems	4.5 CP
WP	MAT-80-18-M-4 (/mhb/modules/MAT-80-18-M-4/)	Introduction to Systems and Control Theory & Dynamical Systems	9.0 CP
WP	MAT-81-23-M-4 (/mhb/modules/MAT-81-23-M-4/)	Differential-Algebraic Equations	4.5 CP
WP	MAT-GM-MPOOL-5 (/mhb/modulepools/MAT-GM-MPOOL-5/)	General Mathematics (Introductory Modules M.Sc.)	[3.0 - 9.0] CP
WP	MAT-AM-MPOOL-7 (/mhb/modulepools/MAT-AM-MPOOL-7/)	Applied Mathematics (Advanced Modules M.Sc.)	[4.5 - 13.5] CP
WP	MAT-RM-MPOOL-7 (/mhb/modulepools/MAT-RM-MPOOL-7/)	Pure Mathematics (Advanced Modules M.Sc.)	[4.5 - 9.0] CP

Section *Computer Science and Computational Methods*

Core Modules (non specialised)

In this section, modules associated to lectures or lectures with exercise classes or project modules amounting to 18 - 21 credit points (CP) have to be completed, including at least 12 CP for advanced courses from one or two of the following teaching and research areas:

- Visualisation and Scientific Computing (Computer Science),
- Information Systems (Computer Science),
- Software Engineering (Computer Science),
- Distributed and Networked Systems (Computer Science),
- Embedded Systems and Robotics (Computer Science),

- Intelligent Systems (Computer Science),
- Business Information Systems and Operations Research (Business Studies and Economics).

Modules for courses with mainly mathematical content are not permitted here if they overlap with other modules of the Bachelor's or Master's examination or if the examination board states that they do not have a sufficiently advanced character.

In particular, the modules or module catalogues listed below are permissible.

Advanced Modules

WP	INF-VIS_Ba_V-MPOOL-4 (/mhb/modulepools/INF-VIS_Ba_V-MPOOL-4/)	Specialization Bachelor TA Visualization and Scientific Computing	[4.0 - 8.0] CP
WP	INF-14-54-M-6 (/mhb/modules/INF-14-54-M-6/)	High Performance Computing with GPUs	6.0 CP
WP	INF-14-57-M-6 (/mhb/modules/INF-14-57-M-6/)	Algorithmic Differentiation	5.0 CP
WP	INF-10-45-M-4 (/mhb/modules/INF-10-45-M-4/)	Visualization and Scientific Computing (Project)	8.0 CP
WP	INF-INSY_Ba_V-MPOOL-4 (/mhb/modulepools/INF-INSY_Ba_V-MPOOL-4/)	Specialization Bachelor TA Information Systems	[8.0] CP
WP	INF-20-45-M-4 (/mhb/modules/INF-20-45-M-4/)	Information Systems (Project)	8.0 CP
WP	INF-SE_Ba_V-MPOOL-4 (/mhb/modulepools/INF-SE_Ba_V-MPOOL-4/)	Specialization Bachelor TA Software Engineering	[4.0 - 8.0] CP
WP	INF-30-45-M-4 (/mhb/modules/INF-30-45-M-4/)	Software Engineering (Bachelor-Project)	8.0 CP
WP	INF-VVS_Ba_V-MPOOL-4 (/mhb/modulepools/INF-VVS_Ba_V-MPOOL-4/)	Specialization Bachelor TA Distributed and Networked Systems	[4.0] CP
WP	INF-40-45-M-4 (/mhb/modules/INF-40-45-M-4/)	Distributed and networked systems (Project)	8.0 CP
WP	INF-ES_Ba_V-MPOOL-4 (/mhb/modulepools/INF-ES_Ba_V-MPOOL-4/)	Specialization Bachelor TA Embedded Systems and Robotics	[4.0 - 8.0] CP
WP	INF-60-45-M-4 (/mhb/modules/INF-60-45-M-4/)	Embedded Systems (Project)	8.0 CP
WP	INF-KI_Ba_V-MPOOL-4 (/mhb/modulepools/INF-KI_Ba_V-MPOOL-4/)	Specialization Bachelor TA Intelligent Systems	[4.0 - 8.0] CP
WP	INF-70-45-M-4 (/mhb/modules/INF-70-45-M-4/)	Intelligent Systems (Project)	8.0 CP
WP	WIW-WIN-CIN-M-7 (/mhb/modules/WIW-WIN-CIN-M-7/)	Computational Intelligence	6.0 CP
WP	WIW-WIN-MAS-M-7 (/mhb/modules/WIW-WIN-MAS-M-7/)	Multiagent Systems	6.0 CP
WP	WIW-WIN-BPM-M-7 (/mhb/modules/WIW-WIN-BPM-M-7/)	Business Process Management	6.0 CP
WP	WIW-WIN-EM-M-7 (/mhb/modules/WIW-WIN-EM-M-7/)	Electronic Markets	6.0 CP

Supplementary modules

With the approval of the examination board, one of the supplementary modules can also be included in the master's examination with a reduced number of CP.

WP	INF-02-16-M-2 (/mhb/modules/INF-02-16-M-2/)	Project Management	6.0 CP
WP	INF-14-53_MAT-M-6 (/mhb/modules/INF-14-53-M-6/)	Introduction to HPC (for Mathematics Students)	6.0 CP
WP	INF-02-10-M-2 (/mhb/modules/INF-02-10-M-2/)	Computer Organization and System Software only selectable if the specialisation Embedded Systems and Robotics is chosen	8.0 CP
WP	INF-00-12-M-2 (/mhb/modules/INF-00-12-M-2/)	Information Systems only selectable if the specialisation Information Systems is chosen	8.0 CP
WP	INF-02-13-M-2 (/mhb/modules/INF-02-13-M-2/)	Communication Systems only selectable if the specialisation Distributed and Networked Systems is chosen	4.0 CP

Section *Specialisation*

Specialisation

In this section, modules amounting to 18 - 21 credit points (CP) from the module catalog for the chosen specialisation (see below) have to be completed .

In addition, reading courses amounting to 12 CP have to be completed. The latter usually take place with semester-changing topics that are often based on current mathematical research. Towards the end of the lecture period of each semester, the reading courses offered in the following semester for the respective specialisation areas will be presented as part of the information sessions of the individual research focuses.

Modules associated to lectures (with or without exercise classes)

WP	MAT-52-MPOOL-7 (/mhb/modulepools/MAT-52-MPOOL-7/)	Specialisation Mathematical Optimisation (M.Sc.)	[4.5 - 9.0] CP
WP	MAT-61-MPOOL-7 (/mhb/modulepools/MAT-61-MPOOL-7/)	Specialisation Financial Mathematics (M.Sc.)	[4.5 - 13.5] CP
WP	MAT-62-MPOOL-7 (/mhb/modulepools/MAT-62-MPOOL-7/)	Specialisation Statistics (M.Sc.)	[4.5 - 9.0] CP

Reading Courses

P	MAT-RC-M-7 (/mhb/modules/MAT-RC-M-7/)	Reading Course (Mathematics)	12.0 CP
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Section *Seminars*

Core Modules (non specialised)

In this section, two seminars must be selected, at least one of which must be on a topic from the chosen mathematical specialisation.

P **MAT-VSEM-M-7** (/mhb/modules/MAT-VSEM-M-7/) Seminar (Mathematical Specialisation) 3.0 CP

P **MAT-SEM-M-7** (/mhb/modules/MAT-SEM-M-7/) Seminar (Mathematics) 3.0 CP

Section *Master Thesis*

Thesis

P **MAT-MA-MAT-M-7** (/mhb/modules/MAT-MA-MAT-M-7/) Master Thesis (Mathematics, M.Sc.) 30.0 CP

Section *Economics and Business Sciences*

Subsidiary Topic

In this section, elective compulsory modules to a total of 18 - 21 CP must be chosen from one or two of the research and study areas

- Controlling,
- Economic Theory,
- Entrepreneurship,
- Financial Economics,
- Financial and Banking Management,
- Human Resource Management and Organizational Behavior,
- Industrial Economics,
- Logistics,
- Marketing,
- Production Management,
- Environment, Resources, Energy: Economics and Policy,
- Taxation and Auditing,
- Strategy, Innovation and Cooperation,
- Sustainability Management

of the Master's programme **[WIW-88.21-SG]** (/mhb/FB-WIW/cos-534/) *Business Studies* or at least equivalent achievements. In each of the selected areas, modules to a total of at least 6 LP must be completed.

Modules for courses with mainly mathematical content are not permitted here if they overlap with other modules of the Bachelor's or Master's examination or if the examination board states that they do not have a sufficiently advanced character.

In particular, the modules associated to lectures or lectures with exercise classes of the module catalogues listed below can be selected:

WP	WIW-CON-MPOOL-7 (/mhb/modulepools/WIW-CON-MPOOL-7/)	Field of Specialization: Management Accounting	[4.0 - 9.0] CP
WP	WIW-ET-MPOOL-7 (/mhb/modulepools/WIW-ET-MPOOL-7/)	Field of Specialization: Economic Theory	[4.0 - 4.5] CP
WP	WIW-EPS-MPOOL-7 (/mhb/modulepools/WIW-EPS-MPOOL-7/)	Field of Specialization: Entrepreneurship	[3.0 - 6.0] CP
WP	WIW-FE-MPOOL-7 (/mhb/modulepools/WIW-FE-MPOOL-7/)	Field of Specialization: Financial Economics	[4.0 - 6.0] CP
WP	WIW-FUB-MPOOL-7 (/mhb/modulepools/WIW-FUB-MPOOL-7/)	Field of Specialization: Finance and Banking Management	[4.0 - 4.5] CP
WP	WIW-HRMOB-MPOOL-7 (/mhb/modulepools/WIW-HRMOB-MPOOL-7/)	Field of Specialization: Human Resource Management and Organizational Behavior	[4.0 - 9.0] CP
WP	WIW-IOE-MPOOL-7 (/mhb/modulepools/WIW-IOE-MPOOL-7/)	Field of Specialization: Industrial Economics	[4.0 - 4.5] CP
WP	WIW-LOG-MPOOL-7 (/mhb/modulepools/WIW-LOG-MPOOL-7/)	Field of Specialization: Logistics	[4.0 - 4.5] CP
WP	WIW-MKT-MPOOL-7 (/mhb/modulepools/WIW-MKT-MPOOL-7/)	Field of Specialization: Marketing	[3.0 - 6.0] CP
WP	WIW-POM-MPOOL-7 (/mhb/modulepools/WIW-POM-MPOOL-7/)	Field of Specialization: Produktionsmanagement	[4.0 - 9.0] CP
WP	WIW-RE-MPOOL-7 (/mhb/modulepools/WIW-RE-MPOOL-7/)	Field of Specialization: Environment, Resources, Energy: Economics and Policy	[4.0 - 4.5] CP
WP	WIW-SWP-MPOOL-7 (/mhb/modulepools/WIW-SWP-MPOOL-7/)	Field of Specialization: Taxation and Auditing	[4.0 - 6.0] CP
WP	WIW-SIC-MPOOL-7 (/mhb/modulepools/WIW-SIC-MPOOL-7/)	Field of Specialization: Strategy, Innovation and Cooperation	[4.0 - 9.0] CP
WP	WIW-SMG-MPOOL-7 (/mhb/modulepools/WIW-SMG-MPOOL-7/)	Field of Specialization: Sustainability Management	[4.0 - 9.0] CP