

## Module Handbook

TUK MODHB Homepage

# Module WIW-BWL-MS2-M-1

Management Science II (M, 3.0 LP)

## Module Identification

Module Number	Module Name	CP (Effort)
WIW-BWL-MS2-M-1	<i>Management Science II</i>	3.0 CP (90 h)
WIW-BWL-OPR2-M-2	<i>Operations Research II</i>	3.0 CP (90 h)

## Basedata

CP, Effort	3.0 CP = 90 h
Position of the semester	1 Sem. in SuSe
Level	[1] Bachelor (General)
Language	[EN] English
Module Manager	Wendt, Oliver, Prof. Dr. (PROF   DEPT: WIW)
Lecturers	Wendt, Oliver, Prof. Dr. (PROF   DEPT: WIW) Moeini, Mahdi, Dr. habil. (WMA   DEPT: WIW)
Area of study	[WIW-WIN] Business Information Systems and Operations Research
Reference course of study	[WIW-82.21-SG#2009] B.Sc. Business Studies (2009) [2009]
Lifecycle-State	[NORM] Active

### Notice

The modules Management Science I (WIW-BWL-MS1-M-1) and Management Science II (WIW-BWL-MS2-M-1) are the successor modules for the modules Operations Research I (WIW-BWL-OPR1-M-1) and Operations Research II (WIW-BWL-OPR2-M-2), respectively.

## Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
----------	---------------	--------------------------	----	----	----	------

1V+1U	WIW-BWL-MS2-K-2	P	-	PL1	3.0	SuSe
-------	-----------------	---	---	-----	-----	------

- About [WIW-BWL-MS2-K-2]: Title: "Management Science II"; Presence-Time: 30 h; Self-Study: 60 h

## Examination achievement PL1

- Form of examination: **written exam (Klausur) (80 Min.)**
- Examination Frequency: each semester
- Examination number: 32334 ("Management Science II")

## Evaluation of grades

The grade of the module examination is also the module grade.

### Contents

#### From [WIW-BWL-MS2-K-2] Management Science II:

Lectures Management of Science 2:

- Stochastic Processes
  - Queueing theory, Simulation of stochastic processes
- Heuristics
  - Problem search methods (A\*-Algorithm), local search methods, Simulated Annealing, Genetic Algorithms
- Nonlinear Optimization
  - Unconstrained and constrained nonlinear problems and models, Convex optimization, Karush-Kuhn-Tucker-conditions, lagrangian method
  - Quadratic optimization (Wolfe's Algorithm), approximation methods (Golden Section, Gradient Method),
  - Barrier methods, Penalty methods

Exercises of Management Science 2:

- Applying the taught algorithms
- Presenting assignments
- Tutorials

### Competencies / intended learning achievements

Successful completion of this module enables students to:

- Understand the possible difficulties of a problem.
- Discuss about the advantages and disadvantages of different algorithms.
- Understand the algorithms and use them to solve problems.
- Categorize optimization problems and their corresponding solution methods.
- Modify the existing methods in order to adjust them for special structures.
- Provide mathematical models for well-structured operational decision problems.
- Create graphical representation of the problems.
- Suggest new solutions and discuss about the quality of alternative solutions.

### Literature

#### From [WIW-BWL-MS2-K-2] Management Science II:

- Hamdy A. Taha: Operations Research - An Introduction, 10 Aufl. (Global Edition), Pearson 2017.
- Müller-Merbach: Operations Research - Methoden und Modelle der Optimalplanung, 3. Aufl., München: Vahlen 1973.

Slides with in-depth references for further reading will be made available.

Exercise materials will be provided.

### Requirements for attendance of the module (informal)

None

### Requirements for attendance of the module (formal)

None

### References to Module / Module Number [WIW-BWL-MS2-M-1]

Course of Study	Section	Choice/Obligation
[WIW-82.21-SG#2009] B.Sc. Business Studies (2009) [2009]	[Fundamentals] Basics in Management and Business Administration	[WP] Compulsory Elective
[WIW-82.175-SG#2009] B.Sc. Business Administration and Engineering specialising in Environmental and Process Engineering (2009) [2009]	[Fundamentals] Business and Management - Elective II	[WP] Compulsory Elective
[WIW-82.176-SG#2009] B.Sc. Business Administration and Engineering specialising in Computer Science (2009) [2009]	[Free Elective Area] Business and Management - Elective II	[WP] Compulsory Elective
[WIW-82.177-SG#2009] B.Sc. Business Administration and Engineering specialising in Chemistry (2009) [2009]	[Free Elective Area] Business and Management - Elective II	[WP] Compulsory Elective
[WIW-82.178-SG#2009] B.Sc. Business Administration and Engineering specialising in Electrical Engineering (2009) [2009]	[Free Elective Area] Business and Management - Elective II	[WP] Compulsory Elective
[WIW-82.179-SG#2009] B.Sc. Business Administration and Engineering specialising in Mechanical Engineering (2009) [2009]	[Fundamentals] Business and Management - Elective II	[WP] Compulsory Elective
[WIW-82.789-SG#2009] B.Sc. Business Studies with Technical Qualifications (2009) [2009]	[Fundamentals] Basics in Management and Business Administration	[WP] Compulsory Elective
[WIW-82.-SG#2021] B.Sc. Business Studies (2021) [2021]	[Core Modules (non specialised)] Profile Area of Economic Sciences	[WP] Compulsory Elective
[WIW-82.-SG#2021] B.Sc. Business Studies with Technical Qualifications (2021) [2021]	[Core Modules (non specialised)] Profile Area of Economic Sciences	[WP] Compulsory Elective
[WIW-82.-SG#2021] B.Sc. Business Administration and Engineering specialising in Chemistry (2021) [2021]	[Core Modules (non specialised)] Profile Area of Economic Sciences	[WP] Compulsory Elective
[WIW-82.-SG#2021] B.Sc. Business Administration and Engineering specialising in Electrical Engineering (2021) [2021]	[Core Modules (non specialised)] Profile Area of Economic Sciences	[WP] Compulsory Elective
[WIW-82.-SG#2021] B.Sc. Business Administration and Engineering specialising in Computer Science (2021) [2021]	[Core Modules (non specialised)] Profile Area of Economic Sciences	[WP] Compulsory Elective

[WIW-82.?-SG#2021] B.Sc. Business Administration and Engineering specialising in Energy and Process Engineering (2021) [2021]

[Core Modules (non specialised)] Profile area of Economic Sciences

[WP] Compulsory Elective

[WIW-82.?-SG#2021] B.Sc. Business Administration and Engineering specialising in Mechanical Engineering (2021) [2021]

[Core Modules (non specialised)] Profile Area of Economic Sciences

[WP] Compulsory Elective

**Module-Pool**

**Name**

[MV-MB-BWL-2022-MPOOL-4]

Wahlpflichtmodule Bachelor Maschinenbau mit BWL

[MV-MB-BWL-2022-MPOOL-6]

Wahlpflichtmodule Master Maschinenbau mit BWL

[MV-MBBWL-MPOOL-6]

Wahlpflichtmodule Maschinenbau mit Betriebswirtschaftslehre

**References to Module / Module Number [WIW-BWL-OPR2-M-2]**

**Course of Study**

**Section**

**Choice/Obligation**

[CHE-82.B41-SG#2020] B.Sc. Chemistry with Focus Economics [2020]

[Compulsory Elective Modules] Module der Wirtschaftswissenschaften (Wahlpflichtmodule)

[WP] Compulsory Elective

[CHE-88.707-SG#2020] M.Sc. Business Chemistry [2020]

[Compulsory Elective Modules] Grundmodule der Wirtschaftswissenschaften

[WP] Compulsory Elective