Introduction to the Master Courses of the Chair of Production Management

Analytics and Production Management Focus

Prof. Dr. Raik Stolletz

AACSB ACCREDITED EQUIS ACCREDITED ASSOCIATION OF MBAS ACCREDITED

University of Mannheim, Fall Term 2026

Chair of Production Management: Chair Holder

Prof. Dr. Raik Stolletz

- Studies of Mathematics, Business Administration, and Computer Science (TU Berlin, 1999)
- Dr. rer. pol. in Business Administration (TU Clausthal, 2002)
- Habilitation in Business Administration (University of Hannover, 2009)
- Associate Professor for Operations Management (Technical University of Denmark, 2009/2010)
- Chair Holder of Production Management (since December 2010)

TECHNISCHE UNIVERSITÄT BERLIN

TU Clausthal

Leibniz Universität Hannover

DTU Technical University of Denmark

UNIVERSITY OF MANNHEIM

Team

Prof. Dr. Raik Stolletz

Daniela Fichtenmayer-Hüßler (Office)

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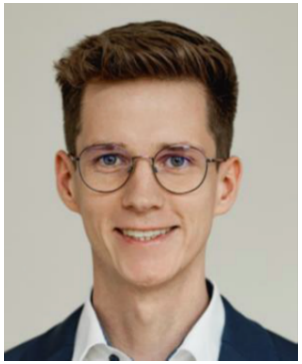

Leonard Schneider

Bijan Bibak, PhD

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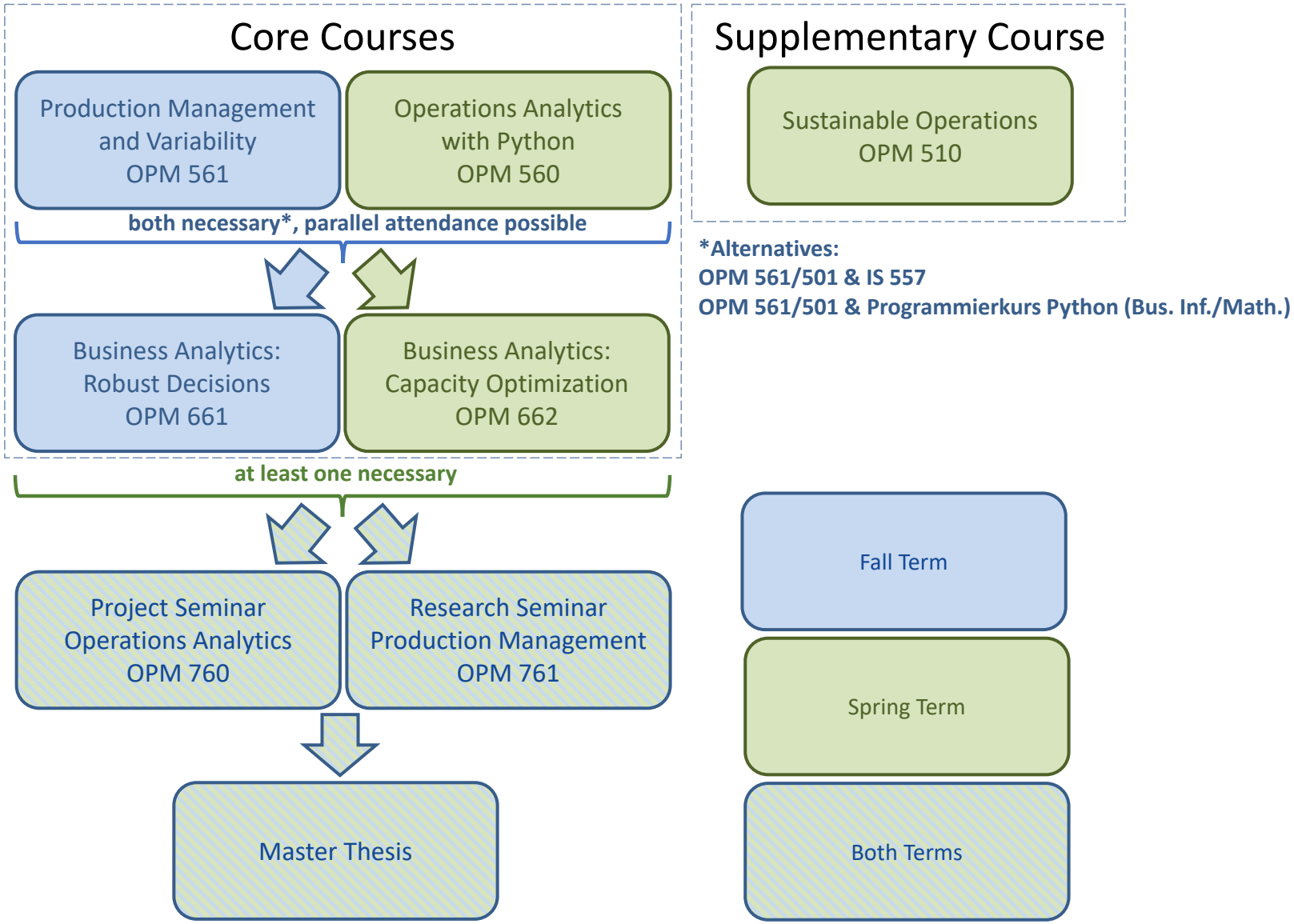
Tim Weber

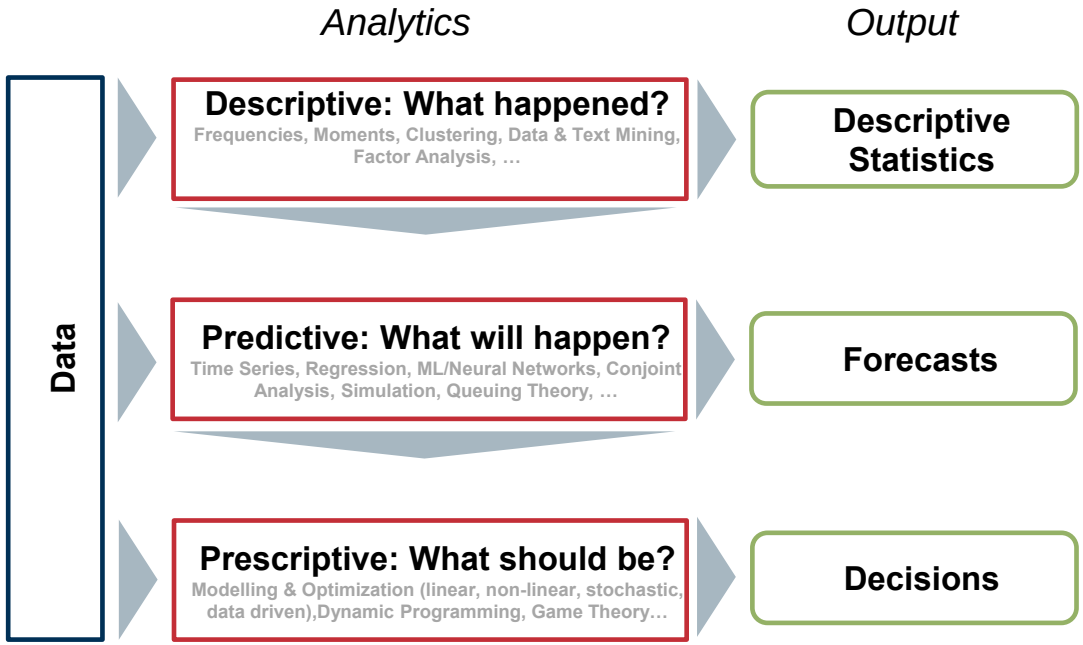
https://www.bwl.uni-mannheim.de/en/stolletz/

Course Program - Master (M.Sc.)



Analytics-oriented Approach

- Address complexities of **managerial decision making** by means of analytics
- Wide range of **advanced analytical methods**
- Combination of **methodological expertise** and **intimate domain knowledge** in relevant areas of operations management
- Focus on how to **generate value** from data by enabling **better decisions**



What is our teaching about

Production and analytics topics

- Descriptive, predictive, prescriptive analytics
- Capacity & operations planning
  - Optimization with constrained resources
- Impact of variability
  - Hedging against different variability types
- Sustainable production management

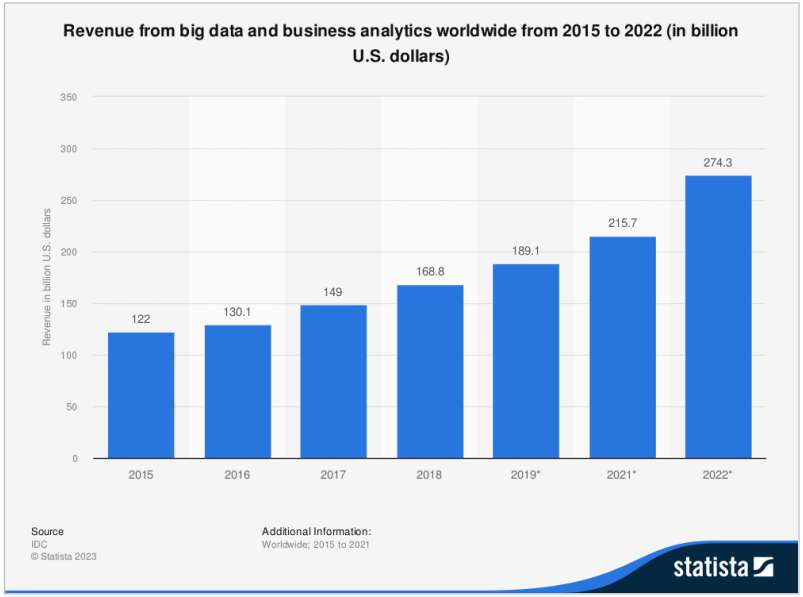
Teaching style

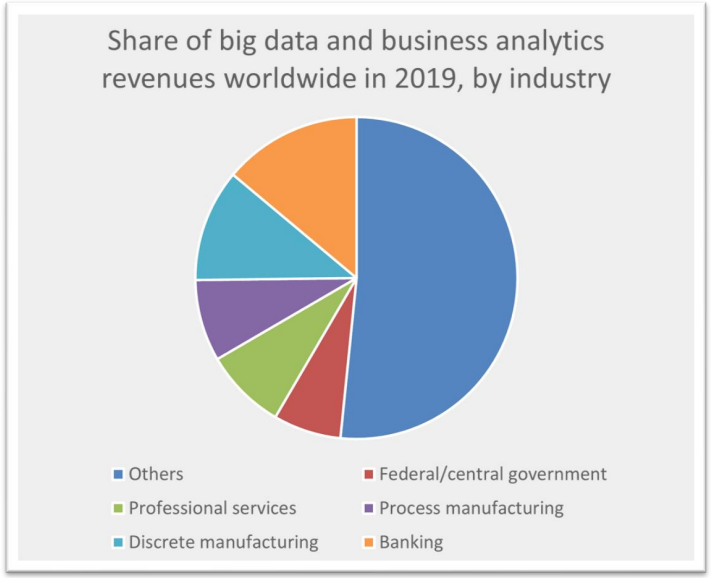
- Classical & integrated lecture
- Learning by doing
  - Interactive discussions and presentations
  - Implementation
- Test-yourself tasks
- Guest lectures

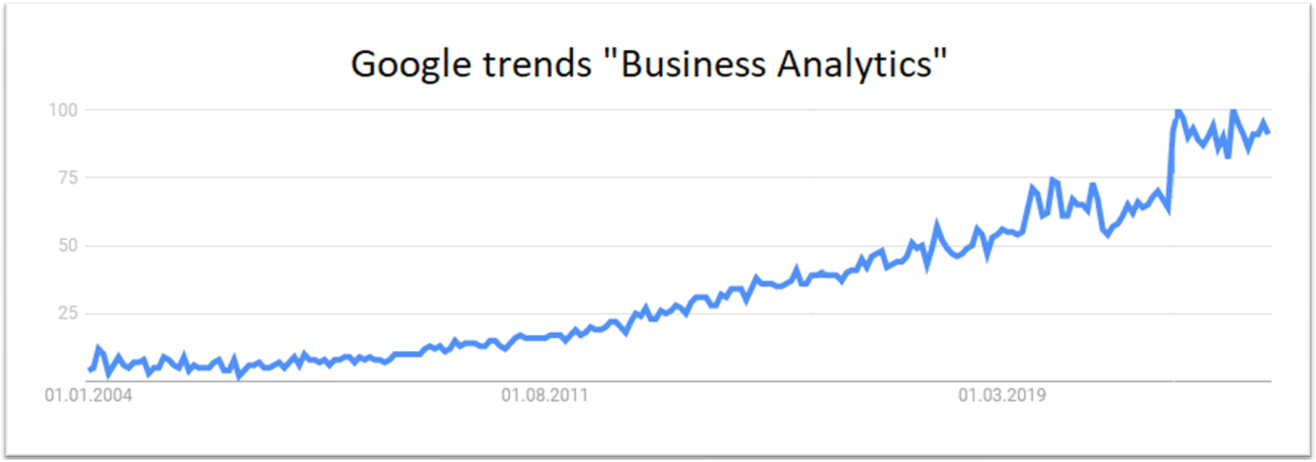
Assignments as graded part of the course

- Application & implementation of business analytics methods & models
- Generating managerial insights
- Analysis and solution development for current problems in industry

The Analytics Job Market







Sources: Google.com, Statista.com

Career Opportunities

- Consulting (Management, Operations, Analytics, ...)
- Data science & engineering
- Developer / expert in business analytics
- Academic career in business analytics
- AI startups
- ...

OPM 561(0) - Production Management and Variability

Key topics:

Capacity planning in Operations Management

- Introduction to stochastic variability
- Design of production lines

Operations Planning and Optimization

- Scheduling & Lot sizing

Variability in Industry

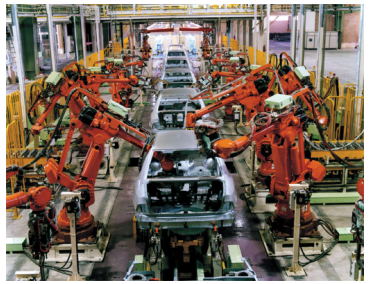
- Lean Philosophy
- Industry 4.0: Technologies and planning approaches

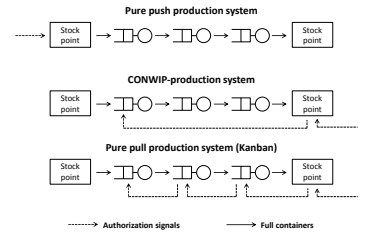
Grading: (6 ECTS)

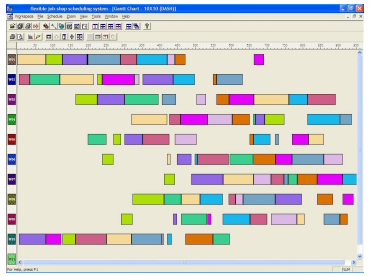
- Written exam (60 min., 70% Grade); **Midterm** End of October
- Case Study Report (30% Grade); Begin of December

Dates/course structure:

- Lecture: Wed B2 (O 145), 09.09.-09.12.2026
- Exercise: Mon B5 (SO 142), 10.09.-10.12.2026







OPM 561(0) - Course Structure

I Introduction

- Variability in Operations Management

II Variability & Design of Production Lines

- Introduction to stochastic variability in production systems
- Lean flow lines
- Optimization of flow oriented production systems

III Scheduling Applications

- Lot sizing
- Job Shop scheduling

IV Variability in Industry

- Industry 4.0
- Lean Management
- Guest Lecture

V Case Study: Managing Variability in Industry

OPM 560(0) - Operations Analytics with Python

Key topics:

- Introduction: Basics of Python
- Numerical analysis of capacity planning and operations scheduling problems
- Hands-on implementation: Business analytics models from OPM 561(0)
- Managerial insights: Sensitivity analysis for capacity and operations decisions

Recommended: OPM 561(0)

Grading: (6 ECTS)

- 70 % Assignments (individual and in groups)
- 30 % Programming exam

Dates/course structure:

- Lecture with integrated exercises
- Non-mandatory exercise sessions (Q&A)
- Planned next offering: Spring 2027

OPM 560(0): Course Structure

I Get started with Python

- Simple types and operators
- Branching programs and conditional statements
- While loops, for loops and ranges
- Python data structure (list, dict, etc.)
- Functions

II Descriptive Analytics

- Read and write datasets
- Univariate and bivariate analyses
- Quantify & visualize variability in datasets

III Predictive Analytics

- Analyzing functions and sensitivities
- Digital twins and random numbers

IV Prescriptive Analysis

- Implementation of optimization models
- Design of numerical studies

OPM 661(0) - Business Analytics: Robust Decisions

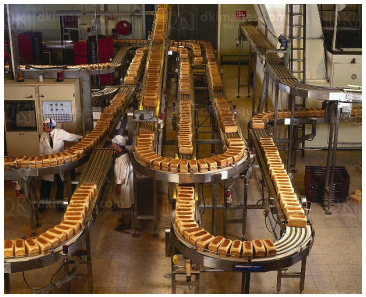
Key topics:

Methodological foundations of stochastic systems

- Stochastic processes and Markov chains
- Simulation and key performance measures

Implementation of predictive and prescriptive analytics approaches

- Performance analysis under stochastic variability
- Optimization concepts under uncertainty



Prerequisites: OPM 561(0) or OPM 501(0) **and**

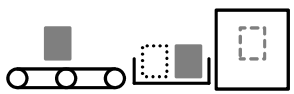
OPM 560(0) or IS 557(0) or Schlüsselqualifikation 1: Programmierkurs Python

Grading: (8 ECTS)

- 70 % Assignments and presentations (individual and in groups) and 30 % written (45 min)/oral exam

Dates/course structure:

- Lecture with integrated exercises
- Non-mandatory exercise sessions (Q&A)
- Planned next offering: TBA



OPM 661(0) - Course Structure

I Introduction to performance evaluation

- Queueing systems, decisions, and applications
- Performance measures in queues

II Performance analysis of Markovian queueing systems

- Stochastic processes and Markov chains
- Birth & death processes and economies of scale

III Impact of variability in queueing

- Time-dependent analysis of queueing systems
- Analysis of complex systems and digital twins

IV Optimization and queueing

- Robust planning with scenarios

V Practical insights

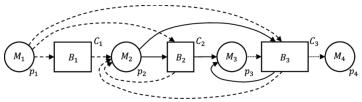
- Predictive and prescriptive analytics with Python
- Guest lecture

OPM 662(0) - Business Analytics: Capacity Optimization

Key topics:

Mathematical optimization models

- Operations planning and workforce optimization
- Production system design



Implementation of prescriptive analytics approaches

- Optimization and algorithmic solution methods
- Robustness and fairness in optimization approaches
- Managerial insights and numerical studies

Prerequisites: OPM 561(0) or OPM 501(0) **and**

OPM 560(0) or IS 557(0) or Schlüsselqualifikation 1: Programmierkurs Python

Minimize:

$$\sum_{m=\underline{M}+1}^{\overline{M}} z_m$$

Subject to:

$$\sum_{i=1}^{I} t_i(x_{im} + y_{im}) \leq C \cdot z_m \qquad m = \underline{M}+1, \ldots, M$$

$$\sum_{m=1}^{M} (x_{im} + y_{im}) = 1 \qquad i = 1, \ldots, I$$

$$\sum_{m=1}^{M} (M - m + 1)(x_{rm} - x_{sm}) \geq 0 \qquad \forall\, (r,s) \in P$$

$$\sum_{m=1}^{M} (M - m + 1)(y_{sm} - y_{rm}) \geq 0 \qquad \forall\, (r,s) \in P$$

Grading: (6 ECTS)

- 70 % Assignments and presentations (individual and in groups) and 30 % written (45 min)/oral exam

Dates/course structure:

- Lecture with integrated exercise & non-mandatory exercise session (support assignments)
- Planned next offering: Spring 2027

OPM 662(0): Course Structure

I Model building implementation and numerical tests

- Formulate and implement algebraic models
- Conduct sensitivity analysis
- Interpret solutions and generate insights

II Workforce planning

- Assignment problems
- Shift and tour scheduling problems

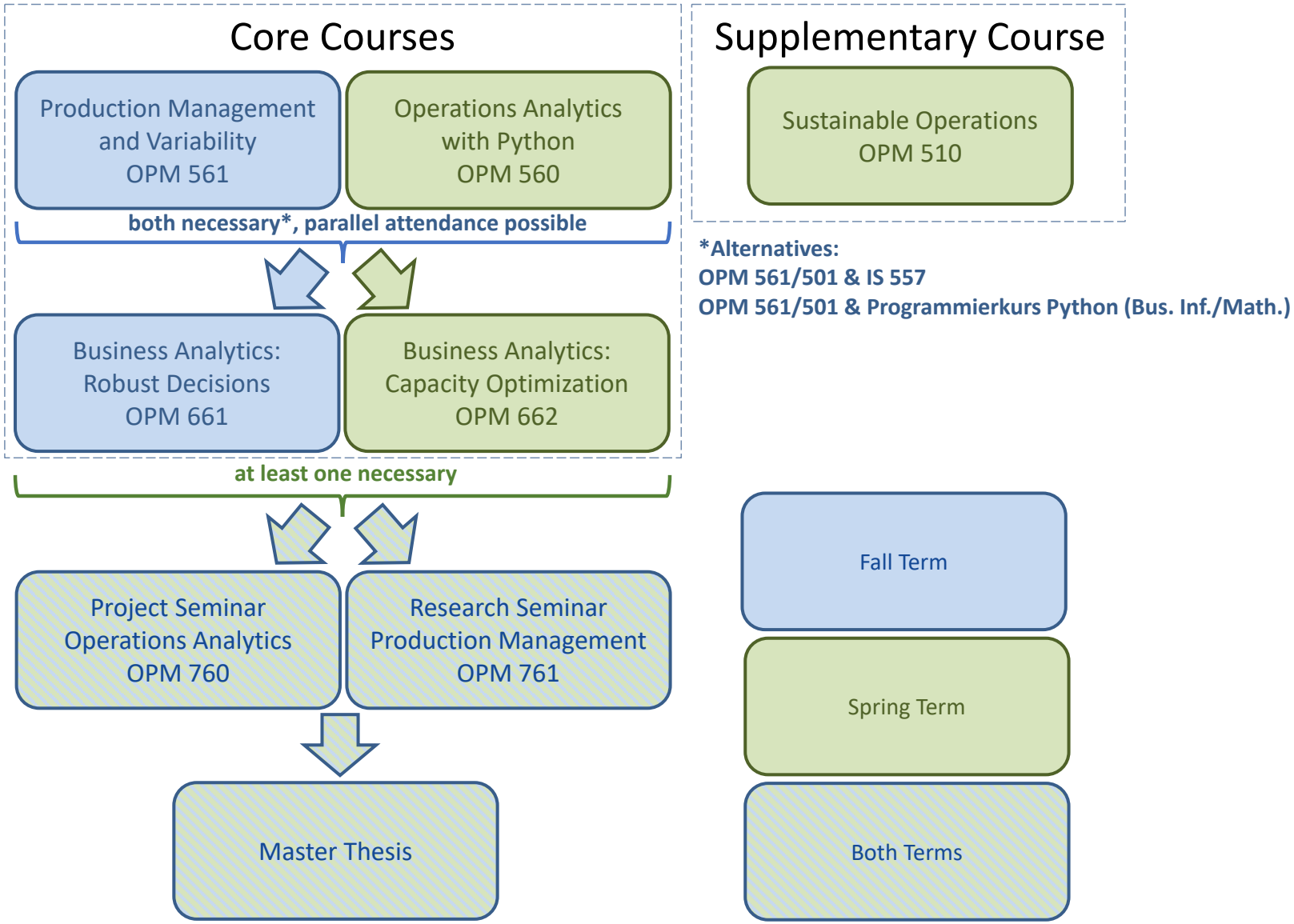
III Planning with stochastic variability

- Optimizing under uncertainty
- Stochastic facility location problem

IV Solving real world problems

- Aggregation, decomposition
- Multi-objective optimization
- Evaluation of algorithms
- Guest lecture by business analytics professionals

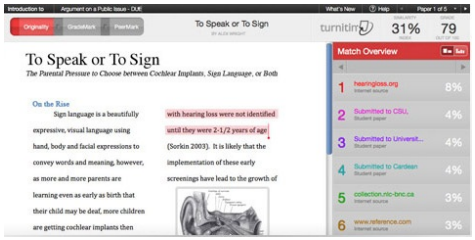
Course Program - Master (M.Sc.)



OPM 761(0) - Research Seminar Production Management

Key topics:

- Literature review of analytics models or approaches
- Paper discussion

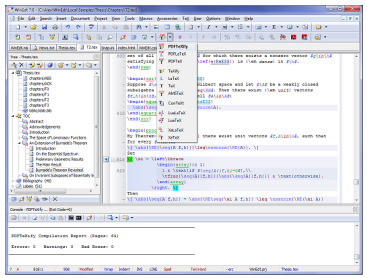


Prerequisites:

- At least one of the OPM 6xx(0) courses (parallel attendance possible)

Grading: (6 ECTS)

- Seminar thesis (18-22 pages) (50%),
- Presentation (50%)



Master's thesis in the same semester is possible

For further information, see our website

OPM 760(0) - Project Seminar: Operations Analytics

Key facts:

- Implementation and comparison of predictive/ prescriptive analytics approaches
- Development of numerical studies to generate managerial insights
- Work individually or in small **teams**

Prerequisites:

- At least one of the OPM 661(0) or OPM 662(0) courses

Grading: (6 ECTS)

- Seminar thesis (18-22 pages) (50%),
- Presentation (50%)

Master's thesis in the same semester is possible

For further information, see our website

Master's Thesis

Types of topics:

- Implementation and extensions of predictive or prescriptive analytics approaches
- Literature reviews analytics models or approaches
- Collaboration with companies

Prerequisites: OPM 761(0) or OPM 760(0)

Duration:

- 20 weeks
- Start possible any time

Application:

- Motivation letter, CV, bachelor certificate, transcript of records,

For further information and sample topics, see our website

MMOSCM Example study plan: Analytics & Capacity Management (with exchange)

1st Semester - Fall

- OPM 5010 Logistics Management 6 ECTS
- OPM 5610 Production Management & Variability 6 ECTS
- OPM 5810 Service Operations Management: From Strategy to Execution 6 ECTS
- OPM 5910 Supply Management 6 ECTS
- CC 5010 Decision Analysis: Business Analytics II 6 ECTS

30 ECTS

2nd Semester - Spring

- OPM 5100 Sustainable Operations Management 4 ECTS
- OPM 5600 Operations Analytics with Python 6 ECTS
- OPM 6820 Revenue Management and Dynamic Pricing 6 ECTS
- OPM 6620 Business Analytics: Capacity Optimization 6 ECTS
- Electives or Core Electives 0 – 8 ECTS

and / or

- Electives 0 – 8 ECTS

30 ECTS

3rd Semester with exchange – Fall

- Classes at exchange University 0 – 30 ECTS

and / or

- Business Interfaces (exchange) 0 - 30 ECTS

30 ECTS

4th Semester - Spring

- OPM 7600 Project Seminar Operations Analytics or OPM 7610 Research Seminar Production Management 6 ECTS
- Master Thesis in Capacity Management (Prof. Stolletz) 24 ECTS

30 ECTS

- Foundations of Operations &Supply Chain Management 28 ECTS
- Business Analytics 12-18 ECTS
- Specialized Topics in Operations & Supply Chain Management 12-50 ECTS
- Business Interfaces 0-30 ECTS
- Theses 30 ECTS

Total: 120 ECTS

MMOSCM Example study plan: Analytics & Capacity Management (w/o exchange)

1st Semester - Fall

- OPM 5010 Logistics Management 6 ECTS
- OPM 5610 Production Management & Variability 6 ECTS
- OPM 5810 Service Operations Management: From Strategy to Execution 6 ECTS
- OPM 5910 Supply Management 6 ECTS
- CC 5010 Decision Analysis: Business Analytics II 6 ECTS

30 ECTS

2nd Semester - Spring

- OPM 5100 Sustainable Operations Management 4 ECTS
- OPM 5600 Operations Analytics with Python 6 ECTS
- OPM 6010 Supply Chain Strategy 6 ECTS
- OPM 6620 Business Analytics: Capacity Optimization 6 ECTS
- Electives or Core Electives 0 – 8 ECTS

and / or

- Electives 0 – 8 ECTS

30 ECTS

3rd Semester – Fall

- OPM 5020 Inventory Management 6 ECTS
- OPM 5930 Negotiation 4 ECTS
- OPM 6610 Business Analytics: Robust Decisions 8 ECTS
- OPM 6990 Projects in Supply Chain Management 6 ECTS
- OPM 7600 Project Seminar Operations Analytics or OPM 7610 Research Seminar Production Management 6 ECTS

30 ECTS

4th Semester - Spring

- OPM 5820 Case Studies in Operations Management 6 ECTS
- Master Thesis 24 ECTS

30 ECTS

- Foundations of Operations &Supply Chain Management 28 ECTS
- Business Analytics 12-18 ECTS
- Specialized Topics in Operations & Supply Chain Management 12-50 ECTS
- Business Interfaces 0-30 ECTS
- Theses 30 ECTS

Total: 120 ECTS

Example study plan: Analytics & Capacity Management (with exchange)

1st Semester - Fall

Course Title	ECTS
OPM 5610 - Production Management & Variability	**6**
OPM 5810 Service Operations Management: From Strategy to Execution	6
1 OPM core course or elective	6
CC 5010 - Decision Analysis: Business Analytics II	6
BE 5100 - Business Economics I	6

= 30 ECTS

3rd Semester - Fall

Course Title	ECTS
Exchange University	32

= 32 ECTS

Core Area Operations

Course Title	ECTS
Fall:	
• OPM 5010 Logistics Management	6
• **OPM 5610 Production Management & Variability**	**6**
• OPM 5810 Service Operations Management: From Strategy to Execution	6
• OPM 5910 Supply Management	6
Spring:	
• OPM 5100 Sustainable Operations Management	4
• OPM 6010 Supply Chain Strategy	6
• **OPM 6620 Business Analytics: Capacity Optimization**	**6**
• OPM 6820 Revenue Management and Dynamic Pricing	6
• OPM 6920 Sourcing	6

Electives Area Operations

Course Title	ECTS
Fall:	
• OPM 5020 Inventory Management	6
• OPM 5050 The Supply Chain Strategy Process – A Practical Approach	4
• OPM 5060 Data and Decision Management in Supply Chains	4
• OPM 5840 Case Studies in Airline Operations Management	6
• OPM 5930 Negotiation	4
• **OPM 6610 Business Analytics: Robust Decisions**	**8**
Spring:	
• OPM 5820 Case Studies in Operations Management	6
• OPM 5850 Airline Operations Management	4

2nd Semester - Spring

Course Title	ECTS
OPM 5600 - Operations Analytics with Python	**6**
OPM 6620 - Business Analytics: Capacity Optimization	**6**
CC 5030 - Empirical Methods: Business Analytics I	6
CC 5040 Corporate Social Responsibility	4
BE 5110 - Business Economics II	6

= 28 ECTS

4th Semester - Spring

Course Title	ECTS
OPM 7600 - Project Seminar Operations Analytics or OPM 7610 - Research Seminar Production Management	**6**
Thesis in Capacity Optimization (Prof. Stolletz)	**24**

= 30 ECTS

Σ = 120 ECTS

Example study plan: Analytics & Capacity Management (w/o exchange)

1st Semester - Fall

Course Title	ECTS
OPM 5610 - Production Management & Variability	**6**
OPM 5010: Logistics Management	6
2 OPM core courses or electives	12
CC 5010 - Decision Analysis: Business Analytics II	6

= 30 ECTS

3rd Semester - Fall

Course Title	ECTS
OPM 7600 - Project Seminar Operations Analytics or OPM 7610 - Research Seminar Production Management	**6**
OPM 6610 - Business Analytics: Robust Systems	**8**
Core courses or electives Area OPM	12
BE 5100 - Business Economics I	6

= 32 ECTS

Core Area Operations

Course Title	ECTS
Fall:	
• OPM 5010 Logistics Management	6
• **OPM 5610 Production Management & Variability**	**6**
• OPM 5810 Service Operations Management: From Strategy to Execution	6
• OPM 5910 Supply Management	6
Spring:	
• OPM 5100 Sustainable Operations Management	4
• OPM 6010 Supply Chain Strategy	6
• **OPM 6620 Business Analytics: Capacity Optimization**	**6**
• OPM 6820 Revenue Management and Dynamic Pricing	6
• OPM 6920 Sourcing	6

Electives Area Operations

Course Title	ECTS
Fall:	
• OPM 5020 Inventory Management	6
• OPM 5050 The Supply Chain Strategy Process – A Practical Approach	4
• OPM 5060 Data and Decision Management in Supply Chains	4
• OPM 5840 Case Studies in Airline Operations Management	6
• OPM 5930 Negotiation	4
• **OPM 6610 Business Analytics: Robust Decisions**	**8**
Spring:	
• OPM 5820 Case Studies in Operations Management	6
• OPM 5850 Airline Operations Management	4

2nd Semester - Spring

Course Title	ECTS
OPM 5600 - Operations Analytics with Python	**6**
OPM 6620 - Business Analytics: Capacity Optimization	**6**
At least 1 OPM course out of 3: • OPM 6010: Supply Chain Strategy • OPM 6820: Revenue Management and Dynamic Pricing • OPM 6920: Sourcing	6
CC 5030 - Empirical Methods: Business Analytics I	6
CC 5040 Corporate Social Responsibility	4

= 28 ECTS

4th Semester - Spring

Course Title	ECTS
BE 5110 - Business Economics II	6
Thesis in Capacity Management (Prof. Stolletz)	**24**

= 30 ECTS

Σ = 120 ECTS

General Introduction to the Chair

Thank you for your attention!

In case of questions: prod@uni-mannheim.de