

UNIVERSITEIT TWENTE.

Welcome to
Applied Mathematics Tracks
Operations Research
Data Science

Discrete Mathematics & Mathematical Programming (DMMP)

Stochastic Operations Research (SOR)

Statistics (STAT)

chairs: Marc Uetz
Richard Boucherie
Johannes Schmidt-Hieber



Short Introduction Round: Staff / Students





It's MATHEMATICS + PRACTICE of Operations Research

Year 1: Theory Courses

Optimization

- Discrete Optimization
- Continuous Optimization
- Game Theory
- Mixed Integer Optimization

Stochastics

- Stochastic Processes
- Queueing Theory
- Markov Decision Theory
- Measure & Probability
- Applied Queueing Models

Other core MSc courses in OR:

- Limits to Computing
- Highlights OR (Capita S)
- Scheduling Theory
- Complex Networks
- Applied Statistics
- Reinforcement Learning
- ...**Data Science, Mastermath, LNMB**

Rules: (compulsory course)
(3 out of 8)
(elective courses)

Year 2: Traineeship (~3m) and Final Project (~9m)

Overview

<https://www.utwente.nl/en/am/programme/am-programme/>

AM courses	Master Courses Applied Mathematics			
	Quarter 1A	Quarter 1B	Quarter 2A	Quarter 2B
	Continuous Optimization (Mastermath 6)		Scientific Computing (6)	
			Pioneers of Applied Mathematics (5 EC)	
OR Courses	Discrete Optimization (Mastermath 6)		Queueing Theory (6)	Applied Queueing models (5)
	Game Theory (5)	Markov Decision Theory (5)	Mixed-Integer Optimization (5)	
	Measure & Probability (5)	Stochastic Processes (5)		
	Complex Networks (5) ***		Scheduling (Mastermath 6)	
	Limits to Computing (5)		Information Theory and Statistics (5)	Spatial Statistics (5)
			Applied Statistics (Mastermath 6)	
			Capita Selecta OR (5)	
SACS Courses	Applied Functional Analysis (6)		Finite Element Methods: theory and applications (6)	
		Optimal Control (5)		
	Systems & Control (6)		Introduction to Partial Differential Equations (5)	Time Series Analysis (5)
	Nonlinear Dynamics (5)	Numerical Techniques for PDE (5)	Robust Control (5)	
	Measure & Probability (5)		Partial Differential Equations (6)	
			Inverse problems in imaging (Mastermath 6)	
MDS Courses	Complex Networks (5) ***	Deep Learning (5)*	Information Theory and statistics (5)	Spatial Statistics (5)
	Machine Learning I (5)*			
	Statistical Learning (5) *			
	Data Science (5)	Data Science (5)	Data Science (5)	
	Discrete Optimization (6)		Capita Selecta Statistics (5)	
	Applied Statistical Learning (5)	Markov Decision theory (5)		
AI4Health Courses	Machine Learning I (5)	Deep Learning (5)	Mixed-Integer Optimization (5) **	Deep learning medical image analysis (5) **
	Statistical Learning (5)	Markov Decision theory (5)	Uncertainty quantification and data-driven modeling (5) **	Graphical Models and causality (5) **
	Complex Networks (5) ***	Optimal Control (5)	Information Theory and statistics (5)	Reinforcement learning (5) **
	Applied Statistical Learning (5)		Optimization of Healthcare processes (5)	
	Imaging Techniques (5)		Capita Selecta Statistics (5)	
			Inverse problems in imaging (Mastermath 6)	
	Case studies in Data Science and AI (6-10 EC in total)			

Note that the course load for semester courses might not be split 50/50 over both quartiles. Check the timetable or mastermath site for more specific scheduling information.


Mandatory for all AM students	OR Three out of Six	Mandatory for SACS	MDS three out of six, including one out of the three marked *	Mandatory for AI4Health added by two out of five marked **
recommended electives	OR electives	SACS electives	MDS electives	AI4Health electives



Personal Study Program

<https://www.utwente.nl/en/am/programme/approved-programme/>

Within next few weeks, get approved *study programme*

Degree programme MSc Applied Mathematics			
Specialisation			
OR			
Chair			
<small>delete chairs and chairholders that are not applicable</small>			
o Chair	Discrete Mathematics and Mathematical Programming (DMMP)		
Contactperson	Prof.dr. M.J. Uetz		
o Chair	Stochastic Operations Research (SOR)		
Contactperson	Prof.dr. R.J. Boucherie		
Studentnumber		88 25	
Name		88 25	
Common mandatory subjects			
EC		<small>remove subjects that are not part of your programme</small>	
191551200	Scientific computing	6	Mastermath
191581200	Continuous optimization	6	
201500510	Pioneers of Applied Mathematics	5	
OR subjects (3 out of 6)			
<small>remove subjects that are not part of your programme</small>			
191531750	Stochastic processes	6	Mastermath
191581100	Discrete optimization	6	
191531870	Queueing theory	6	
191531920	Markov decision theory & Algorith. Meth.	5	Mastermath
191581420	Optimization Modeling	5	
191521800	Game theory	5	
201800171	Applied Queueing Models	5	
201800321	Measure and Probability	5	
191508209	Traineeship	20	
191508409	Final project	40	
Electives			
<small>pick up the subjects in Chairs</small>			
TOTAL NUMBER OF  75 (at least 120)			
Date and Signature Contactperson		Date and Signature Master coordinator	

([link to the document](#))





<https://www.utwente.nl/en/am/programme/approved-programme/>

([link to the document](#))

Degree programme MSc Applied Mathematics			
Specialisation OR			
Chair <i>select chairs and chairholders that are not applicable</i>			
O Chair	Discrete Mathematics and Mathematical Programming (DAMP)		
Contactperson	Prof.dr. M.J. Uetz		
O Chair	Stochastic Operations Research (SOR)		
Contactperson	Prof.dr. R.J. Boucherie		
		Studentnumber <i>66 in</i>	
		Name <i>66 in</i>	
Common mandatory subjects		EC	<i>remove subjects that are not part of your programme</i>
191551200	Scientific computing	6	
191581200	Continuous optimization	6	Mastermath
201500510	Pioneers of Applied Mathematics	5	
OR subjects (3 out of 8)			<i>remove subjects that are not part of your programme</i>
191531730	Stochastic processes	6	
191581100	Discrete optimization	6	Mastermath
191531870	Queueing theory	6	
191531920	Markov decision theory & Algorith. Meth.	5	
191581420	Optimization Modeling	5	
191521800	Game theory	5	
201800171	Applied Queueing Models	5	
201800321	Measure and Probability	5	
191508209	Tutorship	20	
191508409	Final project	40	
Electives			<i>look up the subjects in Choice</i>
TOTAL NUMBER OF		75	(at least 120)
Date and Signature Contactperson		Date and Signature Master coordinator	



MSc Seminar / Mentors

All OR/MDS MSc students present in our monthly MSc seminar

- *Traineeship (~when finished)*
- *MSc project (~3 months before finishing)*

Attendance expected (free lunch)

We offer each OR MSc student a „mentor“

- *Point of contact for questions / organizational / etc*
- *Not necessarily supervisor of MSc project(s)*





Urgent Decision(s)

What are the courses for **first quarter**?

Compulsory:

- Continuous Optimization

Other (core) courses first quarter:

- Discrete Optimization
- Game Theory
- Measure & Probability
- Complex Networks
- Limits to Computing



Example Program “Optimization (DMMP)”

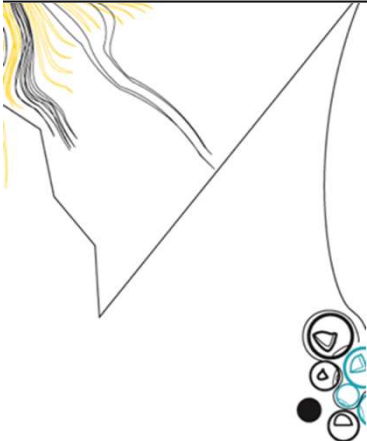
	Master Courses Applied Mathematics			
	Quarter 1A	Quarter 1B	Quarter 2A	Quarter 2B
	AM courses		OR Courses	
	Continuous Optimization (Mastermath 6)		Scientific Computing (6)	
				Pioneers of Applied Mathematics (5 EC)
	Discrete Optimization (Mastermath 6)		Queueing Theory (6)	Applied Queueing models (5)
	Game Theory (5)		Mixed-Integer Optimization (5)	
		Stochastic Processes (5)		
			Scheduling (Mastermath 6)	
	Limits to Computing (5)			
			Capita Selecta OR (5)	





Example Program “Stochastic OR (SOR)”

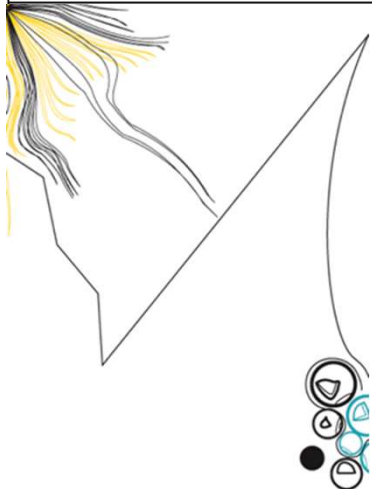
	Master Courses Applied Mathematics			
	Quarter 1A	Quarter 1B	Quarter 2A	Quarter 2B
	Continuous Optimization (Mastermath 6)		Scientific Computing (6)	
AM courses				Pioneers of Applied Mathematics (5 EC)
			Queueing Theory (6)	Applied Queueing models (5)
OR Courses	Game Theory (5)	Markov Decision Theory (5)	Mixed-Integer Optimization (5)	
	Measure & Probability (5)	Stochastic Processes (5)		
			Information Theory and Statistics (5)	Spatial Statistics (5)





Example Program “Undecided”

AM courses	Master Courses Applied Mathematics			
	Quarter 1A	Quarter 1B	Quarter 2A	Quarter 2B
	Continuous Optimization (Mastermath 6)		Scientific Computing (6)	
				Pioneers of Applied Mathematics (5 EC)
OR Courses	Discrete Optimization (Mastermath 6)		Queueing Theory (6)	Applied Queueing models (5)
	Game Theory (5)	Markov Decision Theory (5)	Mixed-Integer Optimization (5)	
		Stochastic Processes (5)		
	Complex Networks (5) ***			
			Capita Selecta OR (5)	





And you !!



UNIVERSITEIT TWENTE.

Applied Mathematics: Track OR

5/9/2023

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