Appendices
to
Teaching and Examination regulations:
Master's degree programme
in
Applied Mathematics
2015-2016

Appendix I Teaching outcomes of the degree programme (art. 1.3)

The learning outcomes consist of general learning outcomes with respect to both knowledge and skills (which are applicable for the Master's degree programme in Mathematics as well) which are supplemented with programme-specific learning outcomes. For each learning outcome a reference to the Dublin descriptors is given between brackets.

The master graduate in Applied Mathematics:
- A1. has an understanding of the most important concepts of the field, [applying knowledge and understanding]
- A2. is able to contribute to the scientific advancement of a subfield of mathematics, [applying knowledge and understanding]
- A3. is able to use abstract thinking and mathematical modelling to get to the root of a problem and thus recognize whether existing methods are applicable, or to ascertain that new methods must be developed, [applying knowledge and understanding]
- A4. is able to function in multidisciplinary teams, [applying knowledge and understanding]
- A5. is familiar with the social and ethical aspects of applying mathematics in practice, [judgement]
- A6. understands the scientific relevance of problem definitions and results, and the validity of the scientific method, [judgement]
- A7. is able to describe solutions in both general and formal mathematical terms, [communication]
- A8. is able to express him- or herself well both orally and in writing, [communication]
- A9. is able to evaluate the scientific literature so as to keep their knowledge up to date. [learning]
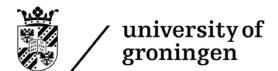
In addition, the master graduate in Applied Mathematics:
- T1. has general knowledge of the theories, methods and techniques in the field of applied mathematics, [knowledge and understanding]
- T2. has specialized knowledge in at least one of the following subfields of applied mathematics: [knowledge and understanding]
    - a. Computational Science and Numerical Mathematics
    - b. Systems, Control and Optimization,
- T3. has wide experience with the mathematical modelling of problems from actual practice, [applying knowledge and understanding]
- T4. has extensive experience with using the relevant mathematical tools. [applying knowledge and understanding]

Appendix II Specializations of the degree programme (art. 2.2)

The degree programme has the following specializations:
- Computational Science and Numerical Mathematics
- Systems and Control

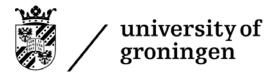# Appendix III Content of the degree programme (art. 2.3)

The degree programme has the following specializations:
- Computational Science and Numerical Mathematics
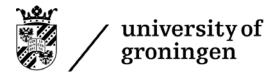- Systems and Control

The master programme comprises 120 ECTS.

The requirements on the programme are the following.

Parts	Constraints	ECTS
Student colloquium		5
At least five modules from the list of modules given at the University of Groningen, the modules in the specialization area are compulsory	*Specialization Computational Science and Numerical Mathematics :* - Computational Fluid Dynamics (annual) - Computational Engineering (every two years , 2016-2017) - Boundary Layers (every two years, 2015-2016) *Specialization Systems and Control:* - Robust Control (annual) - Modeling and Identification (every two years, 2016-2017) - Modeling and Control of Complex Nonlinear Engineering Systems (annual) *Specialization Algebra and Geometry (Mathematics):* - Caput Algebra and Geometry (annual) - Geometry and Topology (every two years, 2015-2016) - Geometry and Differential Equations (every two years, 2016-2017) - Caput Differential Geometry (annual) *Specialization Dynamical Systems and Analysis (Mathematics):* - Dynamical Systems and Chaos (annual) - Caput Dynamical Systems (every two years, 2016-2017) - Caput Mathematical Physics (every two years, 2015-2016) - Hamiltonian Mechanics (annual)	≥ 25

	Specialization Statistics and Probability (Mathematics): - Contemporary Statistics with Applications (every two years, 2016-2017) - Statistical Genomics (every two years, 2015-2016)	
At least three modules from the Mastermath programme	From these modules at least two have to be in the specialization area and at least one has to be outside the specialization area. For information on the modules of the Mastermath programme see: www.mastermath.nl	≥ 18
Advanced modules of programmes taught at the University of Groningen other than the master programmes mathematics and applied mathematics	These modules have to be of at least third year bachelor level, and have to be relevant for the master Mathematics (at the discretion of the exam committee).	≥ 10
Free choice		≤ 5
Final Research Project	Research project in the specialization area	35
Internship	Internship in Applied Mathematics	15

The Mathematics and Applied Mathematics modules given at the University of Groningen are

module	offered	ECTS	practical
Caput Algebra and Geometry	annual	5	
Geometry and Topology	every two years	5	
Geometry and Differential Equations	every two years	5	
Caput Differential Geometry	annual	5	
Boundary Layers	every two years	5	x
Caput Dynamical Systems	every two years	5	
Caput Mathematical Physics	every two years	5	
Computational Engineering	every two years	5	x
Computational Fluid Dynamics	annual	5	x
Contemporary Statistics with Applications	every two years	5	
Dynamical Systems and Chaos	annual	5	
Hamiltonian Mechanics	annual	5	
Final Research Project in Applied Mathematics	annual	35	
Internship in Applied Mathematics	annual	15	
Modelling and Identification	every two years	5	
Modeling and Control of Complex Nonlinear Engineering Systems	annual	5	
Robust Control	annual	5	
Statistical Genomics	every two years	5	
Student Colloquium	annual	5	

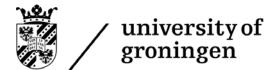For information on the modules of the Mastermath programme see http://www.mastermath.nl.

For information on the modules of programmes of the University of Groningen other than the master programmes mathematics and applied mathematics see the teaching and examination regulations of the corresponding programme.

Appendix IV Electives
(art. 2.4)

See Appendix III.

Appendix V Entry requirements and compulsory order of examinations
(art. 3.2)

The entry requirement for the Final Research Project (35 ects) and Internship (15 ects) is a successful completion of 45 ects of modules of the master's degree programme in Applied Mathematics.

Appendix VI Admission to the degree programme and different specializations
(art. 4.1.1 + art. 4.2)

Holders of the following Bachelor's degree from the University of Groningen are considered to have sufficient knowledge and skills and will be admitted to the Master's degree programme in Applied Mathematics:
- BSc Mathematics
- BSc Applied Mathematics

faculty of mathematics and natural sciences

Appendix VII

Application deadlines for admission
(art. 4.6.1)

Deadline of Application	Non-EU students	EU students
Nanoscience	February 1st 2016	February 1st 2016
Behavioural and Cognitive Neurosciences	May 1st 2016	May 1st 2016
Biomolecular Sciences (topprogramme)	May 1st 2016	May 1st 2016
Evolutionary Biology (topprogramme/EM)	January 15th 2016	January 15th 2016
Remaining FMNS Masters (amongst which Applied Mathematics)	Mayl 1st 2016	May 1st 2016

Decision deadlines
(art. 4.6.3)

Deadline of Decision	Non-EU students	EU students
Nanoscience	June 1st 2016	June 1st 2016
Behavioural and Cognitive Neurosciences	June 1st 2016	June 1st 2016
Biomolecular Sciences (topprogramme)	June 1st 2016	June 1st 2016
Evolutionary Biology (topprogramme/EM)	June 1st 2016	June 1st 2016
Remaining FMNS Masters (amongst which Applied Mathematics)	June 1st 2016	June 1st 2016