

Study Programme

Academic year 2024-2025

Faculty of Sciences

Master of Science in Mathematics

Language of instruction: Dutch Programme version 9

| 1 | Minors | | | | | 30 c | credits |
|--------------------------|--|---|------|-----|-----|--------------------|---------|
| Sut 1.1 | ubscribe to 1 minor from the following list. Subject to approval by the faculty. .1 Minor Research 30 credits | | | | | | |
| Sub • 6 • 6 Sub | oscribe to 12 credit units to credit units to oscribe to no | credit units from the following list, with from the courses with reference a, from the courses with reference b. less than 1 and no more than 2 modules from the following list. | | | | | |
| Nr | Course | | CRDT | Ref | MT1 | Session | Study |
| 1 | C003683 | Seminar Hendrik Van Maldeghem Department of Mathematics: Algebra and Geometry | 6 | а | | A:J | 165 |
| 2 | C003684 | Internship Marnix Van Daele Department of Mathematics, Computer Science and Statistics | 6 | а | | A:J | 180 |
| 3 | C003685 | Literature Study Hans Vernaeve Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | b | | A:J | 165 |
| 1.1 | .1 Advan | ced Research Courses | | | | | |
| Sub | oscribe to no | less than 6 and no more than 18 credit units from the following list. | | | | | |
| Nr | Course | , i i i i i i i i i i i i i i i i i i i | CRDT | Ref | MT1 | Session | Study |
| 1 | C004119 | Capita Selecta in Analysis | 6 | | | | 180 |
| 2 | C003017 | Capita Selecta in Algebra [en] | 6 | | | (A:2) ^d | 165 |
| 3 | C004399 | Capita Selecta in Incidence Geometry [en, nl] Koen Thas Department of Mathematics: Algebra and Geometry | 6 | | | (A:1) ^d | 180 |
| 4 | C004400 | Capita Selecta in Galois Geometry [en] Leo Storme Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | | | A:2ª | 180 |
| 5 | C003687 | Capita Selecta in Logic | 6 | | | | 165 |
| 6 | C003688 | Capita Selecta in Statistics | 6 | | | | 165 |
| 7 | C003689 | Capita Selecta in Numerical Mathematics | 6 | | | | 165 |
| 8 | C000145 | Algorithmic Graph Theory Gunnar Brinkmann Department of Mathematics, Computer Science and Statistics | 6 | | | A:2 | 165 |
| 9 | C002329 | Astrophysical Simulations Maarten Baes Department of Physics and Astronomy | 6 | | | A:1 | 180 |
| 10 | C003690 | Quantum Black Holes and Holography [en, nl] Michal Heller Department of Physics and Astronomy | 6 | | | (A:2) ^d | 180 |
| 1.1 | .2 Electiv | re Courses | | | | | |

Subscribe to no more than 12 credit units from the following list.

| Nr | Course | | CRDT | Ref | MT1 | Session | Study |
|----|---------|---|------|-----|-----|---------|-------|
| 1 | C002180 | Polar Spaces Hendrik Van Maldeghem Department of Mathematics, Computer Science and Statistics | 6 | | | A:2 | 165 |
| 2 | C003009 | Galois Geometry Leo Storme Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | | | A:1 | 165 |
| 3 | C002677 | Proof Theory Andreas Weiermann Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | | | A:1ª | 165 |
| 4 | C002999 | Clifford Analysis | 6 | | | | 165 |
| 5 | C001998 | Infinitesimal Analysis | 6 | | | | 165 |

| 6 | C000217 | Coding Theory Leo Storme Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | A:2 | 165 |
|----|---------|--|---|--------------------|-----|
| 7 | C001026 | Computer Algebra Andreas Weiermann Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | A:2 | 165 |
| 8 | C004109 | Functional Analysis [en] Jasson Vindas Diaz Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | A:1 ^a | 180 |
| 9 | C002337 | Finite Geometry [en] Bart De Bruyn Department of Mathematics, Computer Science and Statistics | 6 | (A:2) ^d | 165 |
| 10 | C002676 | Continuum Mechanics Geert Verdoolaege Department of Applied Physics | 6 | | 180 |
| 11 | C004451 | General Relativity [en] Archisman Ghosh Department of Physics and Astronomy | 6 | A:1 | 180 |
| 12 | C002512 | Cosmology and Galaxy Formation Sven De Rijcke Department of Physics and Astronomy | 6 | A:1 | 180 |
| 13 | C001427 | Introduction to the Dynamics of Atmospheres Piet Termonia Department of Physics and Astronomy | 6 | A:1 | 180 |
| 14 | C001747 | Quantum Field Theory [en, nl] Thomas Mertens Department of Physics and Astronomy | 6 | A:1 | 180 |
| 15 | C000819 | Quantum Electrodynamics Dimitri Van Neck Department of Physics and Astronomy | 6 | (B:2) ^d | 180 |
| 16 | C004220 | Statistical Physics Jan Ryckebusch Department of Physics and Astronomy | 6 | A:1 | 180 |
| 17 | C000627 | Computability and Complexity [en] Giovanni Solda Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | A:1 | 165 |
| 18 | C004370 | Mathematical Modelling of Fuzziness Chris Cornelis Department of Mathematics, Computer Science and Statistics | 6 | A:1 | 165 |
| 19 | C001719 | Capita Selecta in Soft Computing Chris Cornelis Department of Mathematics, Computer Science and Statistics | 6 | A:2 ^a | 165 |
| 20 | C004011 | Advanced Numerical Methods Marnix Van Daele Department of Mathematics, Computer Science and Statistics | 6 | A:2 | 180 |
| 21 | C001497 | Approximation Methods for Boundary Value Problems | 6 | | 165 |
| 22 | C001307 | Applied Functional Analysis | 6 | | 165 |
| 23 | C001700 | Representation Theory and Applications | 6 | | 165 |
| 24 | C000242 | Financial Mathematics: Discrete Stochastic Models David Vyncke Department of Mathematics, Computer Science and Statistics | 6 | A:1 | 165 |
| 25 | C001814 | Financial Mathematics: Continuous Stochastic Models Michèle Vanmaele Department of Mathematics, Computer Science and Statistics | 6 | | 165 |
| 26 | C002678 | Statistical Inference [en] Oliver Dukes Department of Mathematics, Computer Science and Statistics | 6 | A:2 | 165 |
| 27 | C002679 | Survival Analysis [en] Els Goetghebeur Department of Mathematics, Computer Science and Statistics | 6 | A:2 | 165 |
| 28 | C004413 | Causal Machine Learning Stijn Vansteelandt Department of Mathematics, Computer Science and Statistics | 6 | | 180 |
| 29 | C004084 | History and Philosophy of Sciences: Mathematics Maarten Van Dyck Department of Philosophy and Moral Sciences | 6 | A:1 ^a | 165 |
| 30 | C004214 | Galaxies Ilse De Looze Department of Physics and Astronomy | 6 | A:2 | 180 |
| 31 | C000802 | Partial Differential Equations [en] Michael Ruzhansky Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | A:1 | 165 |
| 32 | C003824 | Analytic Number Theory [en, nl] Jasson Vindas Diaz Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | A:2 | 165 |
| 33 | C003011 | Mathematical Logic II [en, nl] Andreas Weiermann Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | A:2 | 165 |
| 34 | C003012 | Banach Spaces and Banach Algebras Hans Vernaeve Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | A:1 | 165 |
| 35 | C003013 | Linear Algebraic Groups [en] Tom De Medts Department of Mathematics, Computer Science and Statistics | 6 | A:2 | 165 |

| 36 C004221 | Structure of the Universe Arjen van der Wel Department of Physics and Astronomy | 6 | A:1 | 180 |
|-------------|--|---|------------------|--------|
| 37 E011320 | Queueing Theory [en] Joris Walraevens Department of Telecommunications and Information Processing | 6 | A:1 | 180 |
| 38 C003668 | Quantum Computing [en] Frank Verstraete Department of Physics and Astronomy | 6 | A:2 | 180 |
| 39 C003789 | Computational Biology Peter Dawyndt Department of Mathematics, Computer Science and Statistics | 6 | A:2 | 180 |
| 40 C004071 | Strongly Correlated Quantum Systems [en] Jutho Haegeman Department of Physics and Astronomy | 6 | A:2 | 180 |
| 41 C003349 | Discrete Algorithms Veerle Fack Department of Mathematics, Computer Science and Statistics | 6 | A:2 | 165 |
| 42 C003758 | Machine Learning [en] Yvan Saeys Department of Mathematics, Computer Science and Statistics | 6 | A:1 | 180 |
| 43 C003785 | Automata, Computability and Complexity Leo Storme Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | A:2 | 180 |
| 44 C004421 | Relativistic Hydrodynamics - from Quantum Field Theory to Black Holes [en] Michal Heller Department of Physics and Astronomy | 6 | A:1 ^a | 180 |
| 45 C004222 | Atomic and Molecular Physics Jonas Joos Department of Solid State Sciences | 6 | B:2 | 180 |
| 46 C004221 | Structure of the Universe Arjen van der Wel Department of Physics and Astronomy | 6 | A:1 | 180 |
| 1.2 Minor I | Economics and Insurance | | 30 c | redits |

1.2 Minor Economics and Insurance

Subscribe to no less than 28 and no more than 32 credit units from the following list.

| INF | Course | | | Ret | INT 1 | Session | Study | |
|-----|---------|---|---|-----|-------|---------|-------|--|
| 1 | F000446 | Markets and Prices | 6 | | | | 180 | |
| 2 | F000758 | Economics Bruno Merlevede Department of Economics | 5 | | | A:1 | 150 | |
| 3 | F000653 | Insurances Thomas Verheyen Department of Interdisciplinary Study of Law, Private Law and Business Law | 6 | | | A:1 | 180 | |
| 4 | C000291 | Commercial Law Diederik Bruloot Department of Interdisciplinary Study of Law, Private Law and Business Law | 3 | | | A:1 | 90 | |
| 5 | F000852 | Taxation Annelies Roggeman Department of Accounting, Corporate Finance and Taxation | 5 | | | A:2 | 150 | |
| 6 | F000683 | Investment Analysis [en] Michael Frömmel Department of Economics | 6 | | | A:1 | 180 | |
| 7 | F000093 | Financial Markets and Institutions | 5 | | | | 150 | |
| 8 | F000083 | Macroeconomics Freddy Heylen Department of Economics | 6 | | | A:1 | 180 | |
| 9 | F000717 | Financial Risk Management [en] Frank De Jonghe Department of Economics | 6 | | | A:1 | 180 | |
| 10 | E076431 | Introduction to Entrepreneurship [en] Petra Andries Department of Marketing, Innovation and Organisation | 3 | | | A:1 | 90 | |
| 11 | E076460 | Dare to Venture [en] Johan Verrue Department of Marketing, Innovation and Organisation | 4 | | | A:2 | 120 | |
| 12 | F000551 | Business Skills [en] Mieke Audenaert Department of Marketing, Innovation and Organisation | 4 | | | C:2 | 120 | |
| 13 | F000804 | Financial Mathematics Arnaud Devos Department of Telecommunications and Information Processing | 6 | | | A:2 | 180 | |

| 2 Majors | 30 c | 30 credits | | | |
|---|--------------|------------|-----|---------|---------|
| Subscribe to 30 credit units from 1 major from the following list. Subject to approval by | the faculty. | | | | |
| 2.1 Major Pure Mathematics | | | | 30 | credits |
| Subscribe to 30 credit units from the following list. | | | | | |
| Nr Course | CRDT | Ref | MT1 | Session | Study |
| 1 C002180 Polar Spaces | 6 | | 1 | A:2 | 165 |
| | | | | | |

Hendrik Van Maldeghem -- Department of Mathematics, Computer Science and Statistics

| 2 | C003009 | Galois Geometry Leo Storme Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | 1 | A:1 | 165 |
|-----|-----------|--|---|---|------------------|---------|
| 3 | C004109 | Functional Analysis [en] Jasson Vindas Diaz Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | 1 | A:1 ^a | 180 |
| 4 | C003011 | Mathematical Logic II [en, nl] Andreas Weiermann Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | 1 | A:2 | 165 |
| 5 | C002999 | Clifford Analysis | 6 | 1 | | 165 |
| 6 | C000802 | Partial Differential Equations [en] Michael Ruzhansky Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | 1 | A:1 | 165 |
| 7 | C003012 | Banach Spaces and Banach Algebras Hans Vernaeve Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | 1 | A:1 | 165 |
| 8 | C003013 | Linear Algebraic Groups [en] Tom De Medts Department of Mathematics, Computer Science and Statistics | 6 | 1 | A:2 | 165 |
| 9 | C001700 | Representation Theory and Applications | 6 | 1 | | 165 |
| 2.2 | 2 Major N | Mathematical Physics | | | 30 | credits |

Subscribe to 30 credit units from the following list.

| Nr | Course | | CRDI | Ref MI1 | Session | Study |
|----|---------|--|------|---------|------------------|-------|
| 1 | C000802 | Partial Differential Equations [en] Michael Ruzhansky Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | 1 | A:1 | 165 |
| 2 | C004109 | Functional Analysis [en] Jasson Vindas Diaz Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | 1 | A:1 ^a | 180 |
| 3 | C001700 | Representation Theory and Applications | 6 | 1 | | 165 |
| 4 | C004451 | General Relativity [en] Archisman Ghosh Department of Physics and Astronomy | 6 | 1 | A:1 | 180 |
| 5 | C002999 | Clifford Analysis | 6 | 1 | | 165 |
| 6 | C001747 | Quantum Field Theory [en, nl] Thomas Mertens Department of Physics and Astronomy | 6 | 1 | A:1 | 180 |
| 7 | C003668 | Quantum Computing [en] Frank Verstraete Department of Physics and Astronomy | 6 | 1 | A:2 | 180 |
| 8 | C004220 | Statistical Physics Jan Ryckebusch Department of Physics and Astronomy | 6 | 1 | A:1 | 180 |
| 9 | C004222 | Atomic and Molecular Physics Jonas Joos Department of Solid State Sciences | 6 | 1 | B:2 | 180 |
| 10 | C004221 | Structure of the Universe Arjen van der Wel Department of Physics and Astronomy | 6 | 1 | A:1 | 180 |
| | | | | | | |

2.3 Major Applied Mathematics and Computer Science

30 credits

| Su | bscribe to 30 | credit units from the following list. | | | | |
|----|---------------|--|--------|---|---------|-------|
| Nr | | | CRDT F | | Session | Study |
| 1 | C000802 | Partial Differential Equations [en] Michael Ruzhansky Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | 1 | A:1 | 165 |
| 2 | C001026 | Computer Algebra Andreas Weiermann Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | 1 | A:2 | 165 |
| 3 | C004370 | Mathematical Modelling of Fuzziness Chris Cornelis Department of Mathematics, Computer Science and Statistics | 6 | 1 | A:1 | 165 |
| 4 | C004011 | Advanced Numerical Methods Marnix Van Daele Department of Mathematics, Computer Science and Statistics | 6 | 1 | A:2 | 180 |
| 5 | C000242 | Financial Mathematics: Discrete Stochastic Models David Vyncke Department of Mathematics, Computer Science and Statistics | 6 | 1 | A:1 | 165 |
| 6 | C002678 | Statistical Inference [en] Oliver Dukes Department of Mathematics, Computer Science and Statistics | 6 | 1 | A:2 | 165 |
| 7 | E011320 | Queueing Theory [en] Joris Walraevens Department of Telecommunications and Information Processing | 6 | 1 | A:1 | 180 |
| 8 | C003349 | Discrete Algorithms Veerle Fack Department of Mathematics, Computer Science and Statistics | 6 | 1 | A:2 | 165 |
| 9 | C003758 | Machine Learning [en] Yvan Saeys Department of Mathematics, Computer Science and Statistics | 6 | 1 | A:1 | 180 |

| 10 C003785 | Automata, Computability and Complexity Leo Storme Department of Mathematics: Analysis, Logic and Discrete Mathematics | 6 | | 1 | A:2 | 180 |
|---|--|------------------------------|----------------------|---|---------------------|---------|
| 3 Elective | Courses | | | | 30 c | credits |
| Subscribe to no elective course ENLIGHT (onlin Subscribe to: n | e less than 28 and no more than 32 credit units from the study programmes <u>s</u> or, from other universities of the Flemish and French Community or, <u>Eras</u> <u>te) elective courses.</u> Subject to approval by the faculty. o less than 18 credit units 'mathematical courses'. | of UGent inc mus+ partner | luding th univers | ne <u>Ghent Ur</u> s <u>ities</u> includir | niversity ng the | |
| 4 Master's | s Dissertation | | | | 30 c | credits |
| Nr Course | | CRDT | Ref | MT1 | Session | Study |
| 1 C002308 | Master's Dissertation N. N. | 30 | | 2 | A:J | 825 |

Teaching

When a course is not taught (solely) in the programme's language of instruction, the effectively used languages are indicated in square brackets following the cours name, using the following ISO codes:

| bg: Bulgarian | de: German | es: Spanish | ja: Japanese | pl: Polish | sh: Kroatian/Serbian | zh: Chinese |
|---------------|-------------|-------------|---------------|----------------|----------------------|-------------|
| cs: Czech | el: Greek | fr: French | nl: Dutch | pt: Portuguese | sl: Slovene | |
| da: Danish | en: English | it: Italian | no: Norwegian | ru: Russian | sv: Swedish | |

Semester

Semesters are indicated by their number (1 or 2); semester 3 represents the summer period and J indicates a course spanning semesters 1 and 2. When a capital letter precedes a semester number, the course has multiple offerings. The letter indicates the offering concerned. When a semester is shown in brackets, the course in not offered this year in the specific offering. The offering frequency and first year of offering are indicated by the following codes:

| a: bi-annually | c: annually, from 2025-2026 |
|-----------------|---------------------------------|
| b: tri-annually | d: bi-annually, from 2025-2026 |
| | e: tri-annually, from 2025-2026 |

f: annually, from 2026-2027 g: bi-annually, from 2026-2027 h: tri-annually, from 2026-2027 i: annually, from 2027-2028 j: bi-annually, from 2027-2028 k: tri-annually, from 2027-2028