

Programme jointly offered by Ghent University, TU Bergakademie Freiberg, Uppsala University

International Master of Science in Sustainable and Innovative Natural Resource Management

Language of instruction: English

Programme version 7

1 General Courses 65 credits

1.1 Ghent University 22 credits

| Nr | Course | CRDT | Ref | MT1 | Session | Study |
|----|--|------|-----|-----|---------|-------|
| 1 | I002766 Introduction to the Circular Economy, Economics and Management of Natural Resources <i>Stijn Speelman -- Department of Agricultural Economics</i> | 4 | | 1 | A:1 | 120 |
| 2 | I002700 Clean Technology <i>Sophie Huysveld -- Department of Green Chemistry and Technology</i> | 5 | | 1 | A:1 | 150 |
| 3 | I002919 Sustainable Development and Multicriteria Decision-making <i>Gijs Du Laing -- Department of Green Chemistry and Technology</i> | 3 | | 1 | A:1 | 75 |
| 4 | E065460 Rational Use of Materials <i>Tom Depover -- Department of Materials, Textiles and Chemical Engineering</i> | 5 | | 1 | A:1 | 150 |
| 5 | I002767 Resource Recovery and Recycling Technologies <i>Tom Hennebel -- Department of Biotechnology</i> | 5 | | 1 | A:J | 150 |

1.2 TU Bergakademie Freiberg 18 credits

| Nr | Course | CRDT | Ref | MT1 | Session | Study |
|----|---|------|-----|-----|---------|-------|
| 1 | I002768 Problems and Innovations in the Process Chain of Mineral Resources <i>Martin Bertau -- TU Bergakademie Freiberg</i> | 4 | | 1 | A:1 | 120 |
| 2 | I002174 Resources Chemistry <i>Gero Frisch -- TU Bergakademie Freiberg</i> | 9 | | 1 | A:J | 270 |
| 3 | I002920 Financial and Sustainability Reporting, Financial Planning and Business Valuation <i>Karina Sopp -- TU Bergakademie Freiberg</i> | 5 | | 2 | A:J | 150 |

1.3 Uppsala University 25 credits

| Nr | Course | CRDT | Ref | MT1 | Session | Study |
|----|--|------|-----|-----|---------|-------|
| 1 | I002921 Mineral Exploration <i>Pauline Jeanneret -- Uppsala University</i> | 10 | | 1 | A:2 | 300 |
| 2 | I002770 Innovation Management and Entrepreneurship <i>Jens Eklinder Frick -- Uppsala University</i> | 10 | | 1 | A:2 | 300 |

1.3.1 Elective courses 5 credits

Subscribe to 5 credit units from the following list. Subject to approval by the faculty.

| Nr | Course | CRDT | Ref | MT1 | Session | Study |
|----|---|------|-----|-----|---------|-------|
| 1 | I002194 Environmental Assessment <i>Benjamin Fischer -- Uppsala University</i> | 5 | | 1 | A:2 | 150 |
| 2 | I002195 Physical–Chemical Properties of Rocks, Minerals and Materials <i>Alireza Malehmir -- Uppsala University</i> | 5 | | 1 | A:2 | 150 |
| 3 | I002408 African Mineral Resources: the Science and Politics of Sustainable Extraction of Mineral Resources <i>Musa Manzi -- Uppsala University</i> | 5 | | 1 | A:2 | 150 |

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|---|---------|---|---|---|-----|-----|
| 4 | I002922 | Geological Field Project <i>Jaroslav Majka -- Uppsala University</i> | 5 | 1 | A:2 | 150 |
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2 Majors

15 credits

Subscribe to 1 major from the following list. Subject to approval by the faculty.

2.1 Georesource Exploration – Uppsala University

15 credits

Subscribe to 15 credit units from the following list.

| Nr | Course | CRDT | Ref | MT1 | Session | Study |
|----|---|------|-----|-----|---------|-------|
| 1 | I002197 Critical Metals and Minerals <i>Erik Jonsson -- Uppsala University</i> | 5 | | 2 | A:1 | 150 |
| 2 | I002198 Exploration and Environmental Geophysics <i>Alireza Malehmir -- Uppsala University</i> | 15 | | 2 | A:1 | 450 |
| 3 | I002409 Challenges of Deep and High Stress Mining <i>Raymond Durrheim -- Uppsala University</i> | 5 | | 2 | A:1 | 150 |
| 4 | I002883 Applied 3D Geological Modeling and Mapping <i>Steffi Burchardt -- Uppsala University</i> | 5 | | 2 | A:1 | 150 |
| 5 | I002923 Exploration Geochemistry <i>Hannes Mattsson -- Uppsala University</i> | 5 | | 2 | A:1 | 150 |

2.2 Resource Recovery and Sustainable Materials - Ghent University

15 credits

Subscribe to 15 credit units from the following list, with

- 4 credit units from the courses with reference a,
- no less than 6 credit units from the courses with reference b.

| Nr | Course | CRDT | Ref | MT1 | Session | Study |
|----|--|------|-----|-----|---------|-------|
| 1 | I002882 Sustainable Management of Resources in the Circular Economy <i>Gijs Du Laing -- Department of Green Chemistry and Technology</i> | 4 | a | 2 | A:J | 120 |
| 2 | E900069 Composites <i>Wim Van Paepegem -- Department of Materials, Textiles and Chemical Engineering</i> | 6 | b | 2 | A:1 | 180 |
| 3 | I002607 Resource Recovery Technology <i>Ramon Ganigüé -- Department of Biotechnology</i> | 6 | b | 2 | A:2 | 180 |
| 4 | E065480 Life Cycle Assessment of Materials and Structures <i>Nele De Belie -- Department of Structural Engineering and Building Materials</i> | 3 | b | 2 | A:2 | 90 |
| 5 | I001571 Environmental Legislation <i>Hendrik Schoukens -- Department of European, Public and International Law</i> | 3 | | 2 | A:1 | 75 |
| 6 | I002677 Thermochemical Conversion of Biomass [nl] <i>Frederik Ronsse -- Department of Green Chemistry and Technology</i> | 4 | | 2 | A:2 | 120 |
| 7 | I002679 Green Chemistry of Renewable Resources <i>Sven Mangelinckx -- Department of Green Chemistry and Technology</i> | 4 | | 2 | A:1 | 120 |
| 8 | E066662 Environmentally Assisted Degradation of Materials <i>Kim Verbeken -- Department of Materials, Textiles and Chemical Engineering</i> | 6 | b | 2 | A:2 | 180 |
| 9 | E065472 Metal Extraction and Recycling <i>Inge Bellemans -- Department of Materials, Textiles and Chemical Engineering</i> | 6 | b | 2 | A:2 | 180 |
| 10 | I002749 Metals and Metalloids in Environment and Technology <i>Filip Tack -- Department of Green Chemistry and Technology</i> | 6 | | 2 | A:1 | 180 |
| 11 | I002406 Basics of Process Engineering <i>Frederik Ronsse -- Department of Green Chemistry and Technology</i> | 3 | | 2 | A:2 | 75 |
| 12 | E071131 Sustainable Chemical Production Processes <i>Kevin Van Geem -- Department of Materials, Textiles and Chemical Engineering</i> | 6 | | 2 | A:1 | 180 |
| 13 | E035421 Sustainable Energy <i>Jan Mertens -- Department of Electromechanical, Systems and Metal Engineering</i> | 3 | | 2 | A:1 | 90 |
| 14 | C003693 Imaging Techniques of Consolidated and Unconsolidated Sediments <i>Veerle Cnudde -- Department of Geology</i> | 6 | | 2 | A:1 | 176 |
| 15 | I002591 Environmental Technology: Waste <i>Frederik Ronsse -- Department of Green Chemistry and Technology</i> | 3 | b | 2 | A:2 | 90 |
| 16 | I002771 Resource Recovery from Wastewater <i>Gijs Du Laing -- Department of Green Chemistry and Technology</i> | 3 | b | 2 | A:J | 90 |
| 17 | I002776 Processes in Practice <i>Eveline Volcke -- Department of Green Chemistry and Technology</i> | 3 | | 2 | A:1 | 90 |

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|----|---------|---|---|---|-----|----|
| 18 | I002752 | Advanced Wastewater Treatment Process Design <i>Eveline Volcke -- Department of Green Chemistry and Technology</i> | 3 | 2 | A:1 | 90 |
|----|---------|---|---|---|-----|----|

2.3 Sustainable Processes – TU Bergakademie Freiberg

15 credits

[Subscribe to 15 credit units from the following list.](#)

| Nr | Course | CRDT | Ref | MT1 | Session | Study |
|----|---|------|-----|-----|---------|-------|
| 1 | I002183 Sensors and Actuators <i>Yvonne Joseph -- TU Bergakademie Freiberg</i> | 4 | | 2 | A:J | 120 |
| 2 | I002849 Selective Separation of Strategic Elements <i>Roland Haseneder -- TU Bergakademie Freiberg</i> | 5 | | 2 | A:J | 150 |
| 3 | I002848 Resources Chemical Technology <i>Martin Bertau -- TU Bergakademie Freiberg</i> | 5 | | 2 | A:J | 150 |
| 4 | I002847 Microbiology for Resource Scientists: Lab Course <i>Michael Schlömann -- TU Bergakademie Freiberg</i> | 4 | | 2 | A:J | 120 |
| 5 | I002850 Simulation of Sustainable Metallurgical Process <i>Markus Reuter -- TU Bergakademie Freiberg</i> | 6 | | 2 | A:J | 180 |
| 6 | I002884 Analysis of High Temperature Processes in Extractive Metallurgy <i>Alexandros Charitos -- TU Bergakademie Freiberg</i> | 5 | | 2 | A:J | 150 |
| 7 | I002924 Biotechnology in Metal Extraction and Recycling <i>Sabrina Hedrich -- TU Bergakademie Freiberg</i> | 4 | | 2 | A:J | 120 |
| 8 | I002925 Classifying Machines, Crushers, Mills <i>Holger Lieberwirth -- TU Bergakademie Freiberg</i> | 5 | | 2 | A:J | 150 |

2.4 Circular Societies - Ghent University

15 credits

[Subscribe to 15 credit units from the following list, with 7 credit units with reference a.](#)

| Nr | Course | CRDT | Ref | MT1 | Session | Study |
|----|--|------|-----|-----|---------|-------|
| 1 | I002882 Sustainable Management of Resources in the Circular Economy <i>Gijs Du Laing -- Department of Green Chemistry and Technology</i> | 4 | a | 2 | A:J | 120 |
| 2 | I002772 Circular Cities <i>Gijs Du Laing -- Department of Green Chemistry and Technology</i> | 3 | a | 2 | A:1 | 90 |
| 3 | I002591 Environmental Technology: Waste <i>Frederik Ronsse -- Department of Green Chemistry and Technology</i> | 3 | | 2 | A:2 | 90 |
| 4 | I002771 Resource Recovery from Wastewater <i>Gijs Du Laing -- Department of Green Chemistry and Technology</i> | 3 | | 2 | A:J | 90 |
| 5 | I001571 Environmental Legislation <i>Hendrik Schoukens -- Department of European, Public and International Law</i> | 3 | | 2 | A:1 | 75 |
| 6 | E065480 Life Cycle Assessment of Materials and Structures <i>Nele De Belie -- Department of Structural Engineering and Building Materials</i> | 3 | | 2 | A:2 | 90 |
| 7 | E035421 Sustainable Energy <i>Jan Mertens -- Department of Electromechanical, Systems and Metal Engineering</i> | 3 | | 2 | A:1 | 90 |
| 8 | K001298 Sustainable Development <i>Bernard Mazijn -- Department of Conflict and Development Studies</i> | 5 | | 2 | A:2 | 150 |
| 9 | B001439 Urban Mobility and Logistics <i>Frank Witlox -- Department of Geography</i> | 3 | | 2 | A:1 | 90 |
| 10 | I002607 Resource Recovery Technology <i>Ramon Ganigué -- Department of Biotechnology</i> | 6 | | 2 | A:2 | 180 |
| 11 | B001514 Transport Economics and Policy <i>Frank Witlox -- Department of Geography</i> | 3 | | 2 | A:1 | 90 |

2.5 Sustainable Entrepreneurship - Uppsala University

15 credits

[Subscribe to 15 credit units from the following list.](#)

| Nr | Course | CRDT | Ref | MT1 | Session | Study |
|----|--|------|-----|-----|---------|-------|
| 1 | I002885 Introduction to Sustainable Entrepreneurship in the Raw Materials Industry <i>Göran Lindström -- Uppsala University</i> | 5 | | 2 | A:1 | 150 |
| 2 | I002886 Managing Sustainable Business Development in the Raw Materials Industry <i>Göran Lindström -- Uppsala University</i> | 10 | | 2 | A:1 | 300 |

3 Work Placement

10 credits

[Institution where the internship is to be taken depends on the chosen major:](#)

- major at Uppsala University = internship coordinated by TU Bergakademie Freiberg
- major at Ghent University = internship coordinated by TU Bergakademie Freiberg
- major at TU Bergakademie Freiberg = internship coordinated by Ghent University

| Nr | Course | CRDT | Ref | MT1 | Session | Study |
|----|------------------------------|------|-----|-----|---------|-------|
| 1 | I002410 Training in Industry | 10 | | 2 | A:J | 300 |

4 Master's Dissertation 30 credits

Subscribe to course units from the following list.

The Master's Dissertation can be taken at either Uppsala University (Sweden) ; TU Bergakademie Freiberg (Germany); Ghent University (Belgium) : to be taken at the institution that offers the chosen major.

| Nr | Course | CRDT | Ref | MT1 | Session | Study |
|----|---|------|-----|-----|---------|-------|
| 1 | I002199 Master's Dissertation <i>Gijs Du Laing -- Department of Green Chemistry and Technology</i> | 30 | | 2 | A:J | 900 |

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 course name, using the following ISO codes:

| | | | | | | |
|---------------|-------------|-------------|---------------|----------------|----------------------|-------------|
| bg: Bulgarian | de: German | es: Spanish | ja: Japanese | pl: Polish | sh: Croatian/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 is 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 2024-2025 | f: annually, from 2025-2026 | i: annually, from 2026-2027 |
| b: tri-annually | d: bi-annually, from 2024-2025 | g: bi-annually, from 2025-2026 | j: bi-annually, from 2026-2027 |
| | e: tri-annually, from 2024-2025 | h: tri-annually, from 2025-2026 | k: tri-annually, from 2026-2027 |