

# Teaching and Examination Regulations (TER)

## Masterprogramme in Earth Sciences Faculty of Science

Academic year 2018-2019

**B1: Programme specific section - general provisions**

**B2: Programme specific section – content of programme**

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## Section B1: Programme specific – general provisions

### 6. General programme information and characteristics

#### Article 6.1 Study programme information

1a. The programme Msc Earth Sciences CROHO number 66986 is offered on a full-time basis.	Advice OLC; approval FGV (7.13 i)																																													
1b. The language of instruction is English	Advice OLC; approval FGV (9.38)																																													
2. A unit of study comprises 6 EC or a multiple thereof. The units listed below have a different size:																																														
<table border="1"> <thead> <tr> <th>Code</th> <th>Naam</th> <th>EC</th> </tr> </thead> <tbody> <tr> <td>AM_1012</td> <td>Hydrological Systems and Water Management.</td> <td>3</td> </tr> <tr> <td>AM_1149</td> <td>Research Project Earth and Climate</td> <td>27</td> </tr> <tr> <td>AM_1186</td> <td>Master Thesis Geology and Geochemistry</td> <td>27</td> </tr> <tr> <td>AM_1187</td> <td>Research Project Geology and Geochemistry</td> <td>27</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>AM_450058</td> <td>Sediment Petrography of Heavy Minerals</td> <td>3</td> </tr> <tr> <td>AM_450061</td> <td>Volcanism</td> <td>3</td> </tr> <tr> <td>AM_450164</td> <td>Precambrian Geology</td> <td>3</td> </tr> <tr> <td>AM_450169</td> <td>Diagenesis of Sedimentary Rocks</td> <td>3</td> </tr> <tr> <td>AM_450171</td> <td>Advanced Geochronology</td> <td>3</td> </tr> <tr> <td>AM_450172</td> <td>Advanced Inorganic Geochemistry</td> <td>3</td> </tr> <tr> <td>AM_450179</td> <td>Petroleum Systems and Regional Geology</td> <td>3</td> </tr> <tr> <td>AM_450229</td> <td>Introduction Field Excursion</td> <td>3</td> </tr> <tr> <td>AM_450354</td> <td>Scotland Excursion</td> <td>3</td> </tr> </tbody> </table>	Code	Naam	EC	AM_1012	Hydrological Systems and Water Management.	3	AM_1149	Research Project Earth and Climate	27	AM_1186	Master Thesis Geology and Geochemistry	27	AM_1187	Research Project Geology and Geochemistry	27				AM_450058	Sediment Petrography of Heavy Minerals	3	AM_450061	Volcanism	3	AM_450164	Precambrian Geology	3	AM_450169	Diagenesis of Sedimentary Rocks	3	AM_450171	Advanced Geochronology	3	AM_450172	Advanced Inorganic Geochemistry	3	AM_450179	Petroleum Systems and Regional Geology	3	AM_450229	Introduction Field Excursion	3	AM_450354	Scotland Excursion	3	
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<p><i>In rare cases units of study comprise deviating numbers of EC due to courses being offered at other Dutch universities with their own rules for the size of units of study.</i></p>																																														

#### Article 6.2 Teaching formats used and modes of assessment

1. The programme uses the teaching formats as specified in the Study Guide.	Advice OLC; approval FGV (7.13 x)
2. The modes of assessment used per educational component are specified in the Study Guide.	Advice OLC; approval FGV (7.13 l)

#### Article 6.3 Academic student counselling

The programme offers the following counselling in addition to the student counselling mentioned in Section A: the respective coordinator for the different specializations is available for additional advice.	Advice OLC; approval FGV (7.13 u)
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## 7. Further admission requirements

### Article 7.1 Intake date(s)

1. The programme starts on September 1.	Advice OLC; approval FGV (9.38 b)
2. Limited programme capacity: Not applicable.	Advice OLC; approval FGV (9.38 b)

### Article 7.2 Admission requirements

1. Admission to the Master's programme is possible for an applicant who has obtained a Bachelor's degree obtained at an institution of academic higher education, which demonstrates the following knowledge, understanding and skills: <ol style="list-style-type: none"> <li>knowledge: natural sciences (mathematics, physics, and chemistry) and earth sciences (BSc level geology/geochemistry/geophysics)</li> <li>understanding: common processes in earth sciences</li> <li>skills: general academic skills including analytical and critical thinking; English language skills; scientific writing skills as demonstrated by a BSc thesis or equivalent.</li> </ol>	Partly legal provision & ordinance CvB, see appendix 3. Admission requirements excepted from participation in WHW
2. The Admissions Board will investigate whether the applicant meets the admission requirements.	Legal provision
3. In addition to the requirements referred to in the first paragraph, the Admissions Board can also assess requests for admission in terms of (at least two of) the following criteria: <ol style="list-style-type: none"> <li>talent and motivation;</li> <li>level of relevant knowledge and understanding;</li> <li>proficiency in methods and techniques;</li> <li>academic attitude and critical thinking;</li> <li>proficiency in the language(s) of instruction</li> </ol>	Partly legal provision & ordinance CvB, see appendix 3. Admission requirements excepted from participation in WHW
4. Any individual who has obtained a Bachelor's degree Aardwetenschappen at the VU meets the requirements referred to in paragraph 1. 5. The following additional admission requirements for students with a Bachelor of Science degree in Earth Sciences (Aardwetenschappen) from Vrije Universiteit Amsterdam apply to specific specializations within the Master Earth Sciences: <ol style="list-style-type: none"> <li>Students who have successfully completed the Bachelor's degree examinations in Earth Sciences (<b>specialization/afstudeerrichting Solid Earth/Vaste Aarde</b>) will be admitted to the specializations Earth and Climate, G&amp;G, Science Communication (C variant). Students who have in addition completed the component 'Sociale geografie I' (AB_450099), will be admitted to the specialization Education (E-variant))</li> <li>Students who have successfully completed the Bachelor's degree examinations in Earth Sciences (<b>specialization/afstudeerrichting Earth Surface/Aardoppervlak</b>) will be admitted to the specializations Earth and Climate, Science communication (C variant). Students who have in addition completed the component 'Sociale geografie I' (AB_450099), will be admitted to the specialization Education (E-variant))</li> <li>Students who have successfully completed the Bachelor's degree examinations in <b>Earth Sciences and Economics ('Aarde en Economie')</b>, including the minor Earth Surface (Aardoppervlak) will be admitted to the specialization Earth and Climate. Students who have in addition completed the component 'Sociale geografie I' (AB_450099), will be admitted to the specialization Education (E-variant))</li> <li>Students who do not receive direct admission to a given specialization within the Master Earth Sciences based on their Bachelor's degree variant</li> </ol>	

	<p>can still be admitted to the Master's programme in question on the grounds of a decision to that effect taken by the Admission Board of the Master. In taking this decision, the Admission Board will specify the specialization within the Master Earth Sciences to which the student in question is admitted. The Admission Board may make additional demands of the student before granting admission to the Master.</p>
6.	<p>Students who hold a Bachelor's degree in Earth Sciences from a Dutch university other than the Vrije Universiteit Amsterdam may be admitted to the Master Earth Sciences at Vrije Universiteit Amsterdam on the basis of a decision to that effect taken by the Admission Board of the Master. In taking this decision, the Admission Board will specify the specialization within the Master Earth Sciences to which the student in question is admitted. The Admission Board may make additional demands of the student before granting admission to the Master.</p>
7.	<p>Students who hold a Bachelor's degree in a science or technical subject from a Dutch university may be admitted to the Master Earth Sciences at Vrije Universiteit Amsterdam on the basis of a decision to that effect taken by the Admission Board of the Master. The Admission Board will determine whether the Bachelor's programme completed by the candidate is sufficiently relevant to warrant admission to the Master Earth Sciences and will specify the specialization within the Master in Earth Sciences to which the candidate is admitted. The Admission Board may make additional demands of the student before granting admission to the Master's programme.</p>
8.	<p>Students who hold an equivalent qualification from an institution outside of the Netherlands may be admitted to the Master Earth Sciences at Vrije Universiteit Amsterdam on the basis of a decision to that effect taken by the Admission Board of the Master. In taking this decision, the Admission Board will specify the specialization within the Master Earth Sciences to which the student in question is admitted. The Admission Board may make additional demands of the student before granting admission to the Master's programme.</p>
9.	<p>When the programme commences, the candidate must have fully completed the Bachelor's programme or pre-Master's programme allowing admission to this Master's programme.</p>

### Article 7.3 English language requirement for English-language Master's programmes

<ol style="list-style-type: none"> <li>1. The proficiency requirement in English as the language of instruction can be met, if no longer than two years before the start of the programme the applicant has successfully completed one of the following examinations with the minimum scores indicated: <ul style="list-style-type: none"> <li>- IELTS: 6.5</li> <li>- TOEFL paper based test: 580 schijnt te laag in niveau te zijn</li> <li>- TOEFL internet based test: 92</li> <li>- Cambridge Advanced English: A, B or C passed.</li> </ul> <p>This does not hold for students who have a bachelor degree from a Dutch University or from a country where English is the native language.</p> </li> <li>2. Exemption is granted from the examination in English referred to in the first paragraph of this article to: <ol style="list-style-type: none"> <li>a. students who completed an English-taught secondary or higher education degree in Canada, the United States, the United Kingdom, Ireland, New Zealand or Australia;</li> <li>b. those who have earned a bachelor's or master's degree in an English-taught programme accredited by NVAO in the Netherlands;</li> <li>c. those who have earned a Bachelor's or Master's degree in an accredited English-taught programme in another member state of the European Union;</li> <li>d. and otherwise, if the admission is granted by the Admission Board of the programme concerned.</li> </ol> </li> </ol>	<p>Landelijke gedragscode Internationale studenten</p>
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**Article 7.4 Pre-Master's programme**

The MSc Earth Sciences has no predefined pre-master programme	advies OLC; instemming FGV (9.38 b)
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**8. Interim examinations and results****Article 8.1 Sequence of interim examinations**

Non applicable.	Advice OLC; approval FGV (7.13 h, s & t)
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**Article 8.2 Validity period for results**

1. As laid down in article 3.7. Ma of TER	Advice OLC; approval FGV (7.13 )
2. A student may request the Examination Board to extend the validity of an exam. If the exam shows that a student's knowledge is insufficient or outdated, or if the student's skills and insights evaluated in the exam are demonstrably outdated, the Examination Board may impose a supplementary examination, impose a replacement examination or refuse to extend the period of validity.	Legal provision
3. In situations where a limited period of validity applies, the period of validity of examinations may be extended in the event of extenuating circumstances as stipulated in WHW Article 7.51, paragraph 2, with at least the period of allocated financial assistance specified in WHW Article 7.15, paragraph 1.	Legal provision

**Art. 8.3. Degree**

Students who have successfully completed their Master's final Examination are awarded a Master of Science degree. The degree awarded is stated on the diploma. Track name will be stated on the diploma, if one has successfully completed all requirements of the specialization; otherwise no track name will be stated on the diploma.	Legal provision
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## Section B2: P

### Programme specific – content of programme

#### 9. Programme objectives, specializations and exit qualifications

##### Article 9.1 Workload

1. The programme has a workload of 120 EC	Advice OLC; (7.13 a)
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##### Article 9.2 Specializations

<p>The programme has the following specializations:</p> <ul style="list-style-type: none"> <li>• Geology and Geochemistry, Earth and Climate</li> <li>• Global Environmental Change and Policy</li> </ul>	Advice OLC; (7.13 a)
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##### Article 9.3 Programme objective

<p>The programme aims to educate a graduate so that the student:</p> <ol style="list-style-type: none"> <li>1. Has specific and fundamental theoretical and practical knowledge of Earth science, notably within his/her field of specialization. Insight into Earth processes requires further deepening of basic knowledge, understanding of a broad spectrum of spatial and temporal scales and an approach focusing on the interaction by and between the various Earth science and relevant socio-economic domains.</li> <li>2. Has experience in carrying out research independently. This experience is gradually developed within the programme through exposure to research and interaction with active researchers and, ultimately, through active participation in research. This occurs in such a way that it allows the student to consciously decide whether he/she prefers to continue his/her studies in order to obtain a PhD degree or to take up a position outside the academic world.</li> <li>3. Functions in his/her discipline at an academic level, both mentally and in daily practice; the programme stimulates the social and personal development of the student by motivating societal awareness, independence, communicative behavior and co-operation.</li> <li>4. Recognizes the need to continue his/her education by following relevant developments within the field of Earth sciences to maintain a state-of-the-art knowledge basis.</li> <li>5. Is able to start and successfully complete a PhD thesis or to successfully compete in the (inter-) national labor market for positions at an academic level with government or government-related institutions, private companies, or elsewhere.</li> <li>6. Has insight into the broad historical, philosophical and socio-economic context of the discipline and aspects concerning the intellectual integrity and moral and ethical dimensions of scientific research and its applications.</li> </ol>	Advice OLC; (7.13 a)
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## Article 9.4 Exit qualifications

<p>1. The objectives listed in the Programme Objectives (Article 9.3) have been translated into final exit qualifications of the three specializations of the MSc Earth Sciences programme in relation to Dublin descriptors. The exit qualification levels are listed below:</p> <p><b>1. Exit qualifications for the 'Geology and Geochemistry' specialization in the MSc Earth Sciences</b></p> <p><b>A. Knowledge and insight</b></p> <p><b>B. Application of knowledge and insight</b></p> <p><b>C. Critical judgement</b></p> <p><b>D. Communication</b></p> <p><b>E. Learning skills</b></p>		Approval OLC (7.13 b)
<b>A. Knowledge and insight</b>	<i>The graduate has profound knowledge of and insight in:</i>	
A1: The graduate has specialised theoretical and practical knowledge of the science of Geology and Geochemistry	<ul style="list-style-type: none"> <li>- regional geological systems across the globe and their settings</li> <li>- relationships between geological and geochemical processes in Earth's interior (subduction, metamorphism, magmatism, tectonics) and related surface expressions and sedimentary deposits;</li> <li>- processes of heat and material transport within the earth's interior, and of large-scale mountain building and deformation;</li> <li>- interpretation techniques of subsurface geophysical and geological data;</li> <li>- techniques used in high-temperature geochemistry</li> <li>- fieldwork skills, i.e. linking theoretical knowledge and factual information to field observations;</li> </ul>	
<b>B. Application of knowledge and insight in practice</b>	<i>The graduate is able to:</i>	
B1: The graduate is experienced in carrying out research	<ul style="list-style-type: none"> <li>- formulate a problem based on raw data and/or data from literature and design a scientific approach for researching and solving the problem;</li> <li>- set up and execute a scientific investigation by selecting and applying fieldwork, analogue and/or numerical modelling and/or laboratory techniques associated with the subject of specialization.</li> <li>- develop conceptual and physical models suited for testing hypotheses;</li> </ul>	
B2: The graduate is able to apply scientific knowledge to problems raised in society	<ul style="list-style-type: none"> <li>- discern the various geological and geochemical processes that are relevant to society;</li> <li>- use his/her knowledge and insight to debate the role that geology and geochemistry can play in several key aspects of society.</li> </ul>	
<b>C. Critical judgement</b>	<i>The graduate can:</i>	
C1: The graduate is able to independently and critically judge (own) information	<ul style="list-style-type: none"> <li>- understand professional literature and critically assess its quality and usefulness for own research;</li> <li>- understand the limitations of data, models, instruments and measurement techniques and how to take these into account for critically evaluating measurements;</li> </ul>	
C2: The graduate is able to think within a multidisciplinary framework	<ul style="list-style-type: none"> <li>- think in a multidisciplinary way and recognise the importance of (sub)disciplines</li> <li>- connect different types of factual information</li> <li>- understand the limits of geology and geochemistry research , i.e. realise that some issues additional expertise should be brought in;</li> </ul>	
C3: The graduate has an understanding of his/her personal stronger and weaker points	<ul style="list-style-type: none"> <li>- understand his/her personal stronger and weaker points, affinities, development potential and preferences in relation to the discipline chosen as a professional potential.</li> </ul>	
<b>D. Communication</b>	<i>The graduate is able to:</i>	
D1: The graduate is able to transfer knowledge and skills related to his/her subject area to other persons and is able to adequately reply to questions and problems posed within society	<ul style="list-style-type: none"> <li>- clearly present information (on data, method, analysis, findings) both written and orally to a public of specialists; actively and constructively participate in discussions in the field of geology and geochemistry; convey scientific findings to a public of non-specialists (i.e. colleagues from different disciplines, stakeholders, general public);</li> </ul>	
<b>E. Learning Skills</b>	<i>The graduate is able to:</i>	
E1: The graduate has developed learning skills that enable him/her to educate and develop him/herself further in a specific subject area	<ul style="list-style-type: none"> <li>- get acquainted with specific subject areas related to geology and geochemistry and link this to his/her knowledge;</li> <li>- recognize the local reality of complex issues;</li> <li>- independently collect, analyse and summarize information on geological and geochemical problems to extend his/her current knowledge;</li> </ul>	
E2: The graduate functions in his/her discipline at an academic level, both mentally and in daily practice	<ul style="list-style-type: none"> <li>- compete in the international job market for positions related to geological and geochemical processes in academia, government, non-government organisations, private organisations, or elsewhere.</li> </ul>	



<b>2. Exit qualifications for the 'Earth and Climate' specialization in the MSc Earth Sciences</b>	
<b>A. Knowledge and insight</b> <b>B. Application of knowledge and insight</b> <b>C. Critical judgement</b> <b>D. Communication</b> <b>E. Learning skills</b>	
<b>A. Knowledge and insight</b>	<i>The graduate has profound knowledge of and insight in:</i>
A1: The graduate has specialised theoretical and practical knowledge of the science of Earth and Climate	<ul style="list-style-type: none"> <li>- climate systems Earth surface processes that operated both in the past and at present, and the interactions of the different components of the climate system</li> <li>- global changes that occur at the earth surface at present and the interaction with climate and environmental variation at different spatial and temporal scales;</li> <li>- the processes that regulate the transfer of energy, water and trace gases between the land surface and the atmosphere;</li> <li>- mathematics, physics, chemistry and statistics in relation to geo-environmental sciences.</li> <li>- the proxies employed in palaeoclimate and geo-ecosystem research.</li> </ul>
<b>B. Application of knowledge and insight</b>	<i>The graduate is able to:</i>
B1: The graduate is experienced in carrying out research	<ul style="list-style-type: none"> <li>- formulate a problem based on raw data and/or data from literature and design a scientific approach for researching and solving the problem;</li> <li>- set up and execute a scientific investigation by selecting and applying the appropriate techniques to collect, process and analyse data);</li> <li>- develop conceptual and physical models suited for testing hypotheses;</li> <li>- programme, validate and calibrate Earth System models.</li> </ul>
B2: The graduate is able to apply scientific knowledge to problems raised in society	<ul style="list-style-type: none"> <li>- discern the various physical and biogeochemical processes that contribute to (future) climate change and their impact on sustainability;</li> <li>- use his/hers knowledge and insights in the political debate on the role that future climate developments play in society.</li> </ul>
<b>C. Critical judgement</b>	<i>The graduate can:</i>
C1: The graduate is able to independently and critically judge (own) information	<ul style="list-style-type: none"> <li>- understand professional literature and judge its quality and usefulness for own research;</li> <li>- understand the limitations of data, models, instruments and measurement techniques and how to take these into account for critically evaluating measurements;</li> </ul>
C2: The graduate is able to think within a multidisciplinary framework	<ul style="list-style-type: none"> <li>- think in a multidisciplinary way and recognise the importance of (sub) disciplines and connect different types of factual information</li> <li>- understand the limits of climate science , i.e. realise that for some issues other expertise should be brought in and there is a need for interdisciplinary co-operation;</li> </ul>
C3: The graduate has an understanding of his/her personal stronger and weaker points	<ul style="list-style-type: none"> <li>- understand his/her personal stronger and weaker points, affinities, development potential and preferences in relation to the discipline chosen and the related professional potential.</li> </ul>
<b>D. Communication</b>	<i>The graduate is able to:</i>
D1: The graduate is able to transfer knowledge and skills related to his/her subject area to other persons and is able to adequately reply to questions and problems posed within society	<ul style="list-style-type: none"> <li>- clearly present information (on data, method, analysis, findings) both written and orally to a public of specialists;</li> <li>- actively and constructively participate in discussions on climate issues; convey scientific findings to a public of non-specialists (i.e. colleagues from different disciplines, stakeholders, general public);</li> </ul>
<b>E. Learning Skills</b>	<i>The graduate is able to:</i>
E1: The graduate has developed learning skills that enable him/her to educate and develop him/herself further in a specific subject area	<ul style="list-style-type: none"> <li>- get acquainted with subject areas related to earth and climate and link this to his/her knowledge;</li> <li>- recognize the local reality of complex issues ,</li> <li>- independently collect, analyse and summarize information on climate and earth surface subjects to extend his/her current knowledge;</li> </ul>
E2: The graduate functions in his/her discipline at an academic level, both mentally and in daily practice	<ul style="list-style-type: none"> <li>- compete in the international market for positions related to climate science and earth surface processes in academia, government, non-government organisations, private organisations, or elsewhere.</li> </ul>
<b>3. Exit qualifications for the 'Global Environmental Change and Policy' specialization in the MSc Earth Sciences</b>	

<b>A. Knowledge and Insight</b> <b>B. Application of knowledge and insight</b> <b>C. Critical judgement</b> <b>D. Communication</b> <b>E. Learning skills</b>	
<b>A. Knowledge and insight</b>	<i>The graduate has:</i>
A1: The graduate has specialised theoretical and practical knowledge of global environmental change and related policies and solutions.	<ul style="list-style-type: none"> <li>- A profound knowledge of climate systems and ecosystems, environmental governance and environmental economics processes of, and solutions for, global environmental change.</li> <li>- Good knowledge of the interdisciplinary research process and related methodologies for analysis of environmental change.</li> <li>- Basic knowledge of global environmental change and associated policy/governance challenges. Depending on the focus of electives in this track, the graduate has profound knowledge of: Energy systems, their policy implications and policy solutions;</li> <li>- The water cycle and related risks, policy implications and policy solutions;</li> <li>- Basic functions of biodiversity and ecosystem services, the related challenges, policy implications and policy solutions.</li> </ul>
<b>B. Application of knowledge and insight</b>	<i>The graduate is able to:</i>
B1: The graduate is experienced in carrying out research	<ul style="list-style-type: none"> <li>- Apply and understand evaluation tools for policy assessment, such as stakeholder analysis, cost- benefit analysis, and multi-criteria analysis.</li> <li>- Apply GIS decision making techniques and modelling approaches on relevant global environmental change problems, and understand the interactions at the disciplinary interfaces.</li> </ul>
B2: The graduate is able to apply scientific knowledge to problems raised in society	<ul style="list-style-type: none"> <li>- Bridge the gap between industry, academia,</li> <li>- Government agencies and NGO's in dealing with Climate and energy systems, water resource Management, land use and ecosystem services.</li> <li>- Understand the positions in the political debate on the challenges and solutions for global environmental change.</li> </ul>
<b>C. Critical judgement</b>	<i>The graduate can:</i>
C1: The graduate is able to independently and critically judge (own) information	<ul style="list-style-type: none"> <li>- Understand professional literature and judge its quality and Usefulness for own research.</li> <li>- Understand the limitations of data, models, instruments and measurement techniques and how to take these into.</li> <li>- Account for critically evaluating measurements.</li> </ul>
C2: The graduate is able to think within a multidisciplinary framework	<ul style="list-style-type: none"> <li>- Think in a multidisciplinary way and recognise the Importance of (sub)disciplines and connect different types of factual information.</li> <li>- Understand and integrate various disciplinary perspectives with a view towards interdisciplinary perspectives.</li> </ul>
C3: The graduate has an understanding of his/her personal stronger and weaker points	<ul style="list-style-type: none"> <li>- Understand his/her personal stronger and weaker points, Affinities, development potential and preferences in relation to the discipline chosen and the related professional potential.</li> </ul>
<b>D. Communication</b>	<i>The graduate is able to:</i>
D1: The graduate is able to transfer knowledge and skills related to his/her subject area to other persons and is able to adequately reply to questions and problems posed within society	<ul style="list-style-type: none"> <li>- Clearly present information (on data, method, analysis, Findings) both written and orally to a public of specialists;</li> <li>- Actively and constructively participate in discussions on climate issues.</li> <li>- Convey scientific findings to a public of non-specialists (i.e. different disciplines, stakeholders, general public).</li> </ul>
<b>E. Learning Skills</b>	<i>The graduate is able to:</i>

E1: The graduate has developed learning skills that enable him/her to educate and develop him/herself further in a specific subject area	Get acquainted with subject areas related to global Environmental change and policy. Recognize the local reality of complex issues (i.e. livelihoods, cultural and Gender aspects, political preferences). Independently collect, analyse and summarize information on policy and governance options to extend his/her current knowledge.		
E2: The graduate functions in his/her discipline at an academic level, both mentally and in daily practice	Compete in the international market for positions related to global sustainability in academia, government, non- government organisations, private organisations, or elsewhere.		

## 10. Curriculum structure

### Article 10.1 Composition of the programme

1. The programme comprises at least a package of compulsory components and an individual Master's thesis or academic internship.	Ordinance CvB, see appendix 3
2. Additionally the programme can offer: - Practical exercises - Electives - Internships	Advice OLC; (7.13 a)
3. Educational components are categorized as specialized (400), research oriented (500) and highly specialized (600) level.	Ordinance CvB, see appendix 3

### Article 10.2 Compulsory educational components

A detailed description per educational component can be found in the Study Guide.

## I. Research specializations

Educational component: <b>Geology and Geochemistry</b> specialization	course code	nr of EC	level	Advice OLC; (7.13 a)
Master Thesis Geology and Geochemistry	AM_1186	27	600	
Research Project Geology and Geochemistry	AM_1187	27	600	
Tectonic Geomorphology	AM_450146	6	400	
Sedimentary Basins	AM_450154	6	400	
Regional Geology and Petroleum Systems	AM_450179	3	400	
Orogenesis	AM_450190	6	400	
Mantle Properties	AM_1211	6	400	
Geology & Geochemistry Field Excursion	AM_450229	3	400	

Educational component: <b>Earth and Climate</b> specialization	course code	nr of EC	level	Advice OLC; (7.13 a)
Master Thesis ESPCaR (from 2020 on Earth and Climate)	AM_1228	24	600	
Research Project Earth and Climate	AM_1227	27	600	
<b>Choose 36 EC out of these:</b>				
Climate Systems	AM_1124	6	400	
Landscape Dynamics	AM_450331	6	400	
Marine Geology & Paleoclimatology	AM_450330	6	400	
Tectonic Geomorphology	AM_450146	6	400	
Advanced Spatial Analyses	AM_1197	6	500	
Sedimentary Basins	AM_450154	6	400	

Climate Modelling	AM_450004	6	400
Environmental Remote Sensing	AM_450145	6	400
Orogenesis	AM_450190	6	400
Global Biogeochemical Cycles	AM_450332	6	400
Climate Dynamics and Processes	AM_1230	6	400
Imaging and Assessing Landscapes	AM_1183	6	400
Reflection Seismics	AM_450170	6	400
Scotland Excursion (not in 2019)	AM_450354	3	400
Practical: Paleoclimate Change	AM_1144	6	400

Educational component: <b>Global Environmental Change and Policy</b> specialization	course code	nr of EC	level	Advice OLC; (7.13 a)
Climate Systems	AM_1124	6	400	
Research Project GEC&P	AM_1238	12	400	
Master Thesis GEC&P (from 2020 on)	AM_1239	24 or 30	500	
Challenges and Solutions GEC&P	AM_1234	6	400	
Land Use Change and Ecosystems	AM_1235	6	400	
Methods of Environment and Resource Management	AM_1135	6	400	
Methods of Global Environmental Change	AM_1236	6	400	
Designing Interdisciplinary Research	AM_1237	6	400	
Climate Impacts & Policy (from 2020 onwards)	AM_1240	6	400	
Environmental Policy for GEC&P	AM_1241	6	400	
Advanced Spatial Analyses	AM_1197	6	500	
<b>Choose 48 EC out of these:</b>				
Environmental Economics for GEC&P	AM_1232	6	400	
Economics of Environmental Policy Instrument Design	E-STR-EEPID	6	400	
Sustainable Energy Challenges	AM_468018	6	400	
Ecohydrology	AM_450014	6	400	
Geothermal Energy	AM_450409	6	500	
Water Quality	AM_1166	6	400	
Groundwater Processes	AM_1164	6	400	
Applied Water Science	AM_1054	6	400	
Energy Governance	AM_1155	6	400	
Governance of Ecosystem Services	AM_468025	6	400	
Water Governance	AM_1192	6	400	

## II. Education

### i) Earth Sciences content (60 EC)

#### *Specialization Earth and Climate or Geology and Geochemistry*

Earth Sciences specific component	course code	nr of EC	level	Advice OLC; (7.13 a)
Sociale geografie II	AM_1051	12	400	
Research Project from one of the specialisations	AM_1227 or AM_1187	27	600	
Compulsory Courses from same specialization as chosen research project		12		
Article 10.3 Elective educational components		9		

### ii) Educational content (60 EC).

#### Compulsory units of the specialization

Education specific component	course code	nr of EC	level	Advice OLC;

Master Leraar VHO Aardrijkskunde	OM1_LAK15			(7.13 a)
Didactiek 1	O_MFDIDAC_1	6	400	
Didactiek 2	O_MFDIDAC_2	6	400	
Didactiek 3	O_MFDIDAC_3	9		
Praktijk 1	O_MFPRAK_1	6	400	
Praktijk 2	O_MFPRAK_2	9	400	
Praktijk 3	O_MFPRAK_3	15	400	
Praktijkonderzoek 1	O_MFPROZ_1	3		
Praktijkonderzoek 2	O_MFPROZ_2	6		

If the student is exempted for parts of the specialization in Education, the exempted EC have to be compensated with other mastercourses of the programme.

If the student wishes to take a different course than the units of study listed, advance permission must be obtained in writing from the Examinations Board.

### III. Science Communication

#### i) Earth Sciences content (60 EC)

##### *Specialisation Earth and Climate or Geology and Geochemistry*

Earth Sciences specific component	course code	nr of EC	level	Advice OLC; (7.13 a)
Research Project from one of the specialisations	AM_1227 or AM_1187	27	600	
Compulsory Courses from same specialization as chosen research project		24	400, 500	
Article 10.3 Elective educational components		9		

##### *Specialisation or Global Environmental Change and Policy*

Earth Sciences specific component	course code	nr of EC	level	Advice OLC; (7.13 a)
Research Project from one of the specialisations	AM_1238	12	600	
Compulsory Courses from same specialization as chosen research project		33	400, 500	
Article 10.3 Elective educational components		9		
Designing Interdisciplinary Research	AM_1237	6	400	

#### ii) Science Communication content compulsory courses (42 EC)

Science communication specific component	course code	nr of EC	level	Advice OLC; (7.13 a)
Science and Communication	AM_470587	6	500	
Research methods for analyzing complex problems	AM_1182	6	400	
<b>Choose one of these courses:</b>				
Research Internship Science Comm.	AM_1162	30	600	
Reflective Practice Int. SC. Comm.	AM_1163	30	600	
<b>Science Communication Restricted electives (18 EC required) choose 3 out of 4:</b>				
Science in Dialogue	AM_1002	6	500	
Communication, Org. and Management	AM_470572	6	500	
Science Museology	AM_470590	6	500	
Science Journalism	AM_471014	6	500	

## Article 10.3 Elective educational components

1. The student can take one or more of the following electives without prior consent from the Examination Board:				Advice OLC; (7.13 a)
Name of educational component	course code	nr of EC	level	
Biological Oceanography	AMU_0021	6	500	
Science Journalism	AM_471014	6	500	
Geothermal Energy	AM_450409	6	500	
Scotland Excursion (not in 2019)	AM_450354	3	400	
Global Biogeochemical Cycles	AM_450332	6	400	
Marine Geology & Paleoclimatology	AM_450330	6	400	
Petroleum Geology of the North Sea	AM_450317	6	400	
3D Seismic Interpretation and Geology	AM_450316	6	400	
Planetary Science	AM_450273	6	500	
Man and Climate	AM_450187	6	400	
Metamorphism and P-T Evolution	AM_450176	6	400	
Advanced Inorganic Geochemistry	AM_450172	6	400	
Advanced Geochronology	AM_450171	3	400	
Reflection Seismic for Geologists	AM_450170	6	400	
Diagenesis of Sedimentary Rocks	AM_450169	3	400	
Precambrian Geology	AM_450164	3	400	
Tectonic Geomorphology	AM_450146	6	400	
Environmental Remote Sensing	AM_450145	6	400	
Geomicrobiology	AM_450132	6	400	
Volcanism	AM_450061	3	500	
Sediment Petrography of Heavy Minerals	AM_450058	3	400	
Ecohydrology	AM_450014	6	400	
Climate Modelling	AM_450004	6	400	
Catchment Response Analysis	AM_450003	6	400	
NIOZ Marine Masters Summer Course	AM_1242	3	400	
Climate Impacts & Policy (from 2020 onwards)	AM_1240	6	400	
Designing Interdisciplinary Research	AM_1237	6	400	
Land Use Change and Ecosystems	AM_1235	6	400	
Climate Dynamics and Processes	AM_1230	6	400	
Petrophysics and Reservoir Engineering	AM_1212	6	400	
Advanced Spatial Analyses	AM_1212	6	400	
Capita Selecta Geology and Geochemistry	AM_1174	6	400	
Advanced Tectonics	AM_1173	6	400	
Climate Systems	AM_1124	6	400	
Specialistic Research Topic	AM_1056	6	600	
Sociale geografie II	AM_1051	12	400	

2. If the student wishes to take a different educational component than listed, advance permission must be obtained in writing from the Examinations Board.	Advice OLC; (7.13 a)			
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#### Article 10.4 Practical exercise

The following components can be considered as practical exercises:				Approval OLC (7.13 d)
Name of educational component	course code	nr of EC	level	
Practical: Paleoclimate Change	AM_1144	6	400	

#### Article 10.5 Participation in practical exercise

In the case of a practical training, the student must attend at least 90 % of the practical sessions. Should the student attend less than 90 %, he/she must repeat the practical training, or the Examinations Board may have one or more supplementary assignments issued.	Approval OLC (7.13 d)
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## 11. Evaluation and transitional provisions

#### Article 11.1 Evaluation of the education

1. The education provided in this programme is evaluated in accordance with the evaluation plan. The faculty evaluation plan offers the framework.	Approval OLC (7.13 a1)
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#### Article 11.2 Transitional provisions

By way of departure from the Teaching and Examination Regulations currently in force, the following transitional provisions apply for students who started the programme under a previous set of Teaching and Examination Regulations: non applicable	Advice OLC (7.13 a)
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Advice and approval by the Programme Committee, on May 14, 2018

Approved by the Faculty Joint Assembly, on June 26, 2018

Adopted by the board of the Faculty of Science on June 26, 2018

**Appendix I**

Overview of articles that must be included in the OER

*Based on Section 7.13, paragraph 2, of the WHW and other Sections of the Act.*

## Section B1: Programme specific – general provisions

<b>6. General programme information and characteristics</b>	
Article 6.1 Study programme information	7.13 paragraph 2 sub i, r
Article 6.2 Teaching formats used and modes of assessment	7.13 paragraph 2 sub l, x
[option:] Article 6.3 Academic student counselling	7.13 paragraph 2 sub u
<b>7. Further admission requirements</b>	
Article 7.2 Admission requirements	7.30b paragraph 2
<b>8. Interim examinations and results</b>	
Article 8.1 Sequence of interim examinations	7.13 paragraph 2 sub h, s, t
[option 1:] Article 8.2 Validity period for results	7.13 paragraph 2 sub k
[option 2:] Article 8.2 Validity period for results	7.13 paragraph 2 sub k

## Section B2: Programme specific – content of programme

<b>9. Programme objectives, specializations and exit qualifications</b>	
Article 9.1 Workload	7.13 paragraph 2 sub g
Article 9.2 Specializations	7.13 paragraph 2 sub a
Article 9.3 Programme objective	7.13 paragraph 2 sub a
Article 9.4 Exit qualifications	7.13 paragraph 2 sub b, c
<b>10. Curriculum structure</b>	
Article 10.1 Composition of the programme	7.13 paragraph 2 sub a
Article 10.2 Compulsory educational components	7.13 paragraph 2 sub a
[Optional] Article 10.3 Elective educational components	7.13 paragraph 2 sub a
[Optional] Article 10.4 Practical exercise	7.13 paragraph 2 sub d
Article 10.5 Participation in practical exercise	7.13 paragraph 2 sub d
<b>11. Evaluation and transitional provisions</b>	
Article 11.1 Evaluation of the education	7.13 paragraph 2 sub a1
Article 11.2 Transitional provisions	7.13 paragraph 2 sub a



**Appendix II**

## Table of right of advice and right of approval by the OLC and FGV

*(translation to English at a later stage)*

Onderwerpen Onderwijs – en Examenregeling (OER) 7.13 paragraph 2 WHW	FGV		OplC	
	I	A	I	A
a. de inhoud van de opleiding en van de daaraan verbonden examens				
a1. de wijze waarop het onderwijs in de desbetreffende opleiding wordt geëvalueerd				
b. de inhoud van de afstudeerrichtingen binnen een opleiding				
c. de kwaliteiten op het gebied van kennis, inzicht en vaardigheden die een student zich bij beëindiging van de opleiding moet hebben verworven				
d. waar nodig, de inrichting van praktische oefeningen				
e. de studielast van de opleiding en van elk van de daarvan deel uitmakende onderwijseenheden				
f. de nadere regels, bedoeld in de Articleen 7.8b, zesde paragraph, en 7.9, vijfde paragraph (BSA)				
g. ten aanzien van welke masteropleidingen toepassing is gegeven aan Article 7.4a, achtste paragraph ( <i>verhoogde studielast</i> )				
h. het aantal en de volgtijdelijkheid van de tentamens alsmede de momenten waarop deze afgelegd kunnen worden				
i. de voltijdse, deeltijdse of duale inrichting van de opleiding				
j. waar nodig, de volgorde waarin, de tijdvakken waarbinnen en het aantal malen per studiejaar dat de gelegenheid wordt geboden tot het afleggen van de tentamens en examens				
k. waar nodig, de geldigheidsduur van met goed gevolg afgelegde tentamens, behoudens de bevoegdheid van de examencommissie die geldigheidsduur te verlengen				
l. of de tentamens mondeling, schriftelijk of op een andere wijze worden afgelegd, behoudens de bevoegdheid van de examencommissie in bijzondere gevallen anders te bepalen				
m. de wijze waarop studenten met een handicap of chronische ziekte redelijkerwijs in de gelegenheid worden gesteld de tentamens af te leggen				
n. de openbaarheid van mondeling af te nemen tentamens, behoudens de bevoegdheid van de examencommissie in bijzondere gevallen anders te bepalen				
o. de termijn waarbinnen de uitslag van een tentamen bekend wordt gemaakt alsmede of en op welke wijze van deze termijn kan worden afgeweken				
p. de wijze waarop en de termijn gedurende welke degene die een schriftelijk tentamen heeft afgelegd, inzage verkrijgt in zijn beoordeelde werk				
q. de wijze waarop en de termijn gedurende welke kennis genomen kan worden van vragen en opdrachten, gesteld of gegeven in het kader van een schriftelijk afgenomen tentamen en van de normen aan de hand waarvan de beoordeling heeft plaatsgevonden				
r. de gronden waarop de examencommissie voor eerder met goed gevolg afgelegde tentamens of examens in het hoger onderwijs, dan wel voor buiten het hoger onderwijs opgedane kennis of vaardigheden, vrijstelling kan verlenen van het afleggen van een of meer tentamens				
s. waar nodig, dat het met goed gevolg afgelegd hebben van tentamens voorwaarde is voor de toelating tot het afleggen van andere tentamens				
t. waar nodig, de verplichting tot het deelnemen aan praktische oefeningen met het oog op de toelating tot het afleggen van het desbetreffende tentamen, behoudens de bevoegdheid van de examencommissie vrijstelling van die verplichting te verlenen, al dan niet onder oplegging van vervangende eisen				
u. de bewaking van studievoortgang en de individuele studiebegeleiding				
v. indien van toepassing: de wijze waarop de selectie van studenten voor een speciaal traject binnen een opleiding, bedoeld in Article 7.9b, plaatsvindt ( <i>excellentietraject binnen een opleiding</i> )				
x. de feitelijke vormgeving van het onderwijs				
<i>alle overige onderwerpen die in de OER zijn geregeld maar die niet als zodanig zijn genoemd in art. 7.13 WHW onder a t/m x.</i>				

De lettering komt overeen met de lettering van Article 7.13 paragraph 2 WHW

**Appendix III**

## Ordinances VU CvB and Binding Guidelines (richtlijn)

<b>Section A, article:</b>	<b>Concerns:</b>	<b>CvB ordinance / guideline</b>
2.1.1, 2.1.2	Year planning two semesters 8-8-4 (uniforme jaarkalender VU-UvA)	29-9-2008 (period 2009-2015) 22-05-2014 (periode 2016-2025)
2.1.3, 2.1.4	Educational components	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017
3.1	Compulsory signing up	CvB ordinance 30-09-2010, prior consent USR.
3.4.1	Determination and publication of the results (1) Grading deadline exams 10 workdays (2) Theses 20 workdays	(1) Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017 (2) Quality demand 11 from the VU assessment policy, CvB ordinance 15-05-2012
3.5.1	Two possibilities to take examinations per year	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017
3.5.2	Retake: most recent grade is valid. A pass can be retaken	Taken from the UvA guidelines, as part of the harmonization, CvB ordinance 24-02-2014
3.5.4	Extra retake last year	Included in (prior) model OER 16-17 following a request from committee O&O and adopted by CvB op 27-10-2015
3.6	Grades	CvB ordinance 30-09-2010, with University council's consent. As a result of harmonization UvA, the guideline: 5.5 is a pass, has been added. CvB ordinance 24-02-2014.
<b>Section B1, article:</b>	<b>Concerns:</b>	<b>CvB ordinance / guideline</b>
7.2.1	Admission criteria; at least WO Bachelor's degree	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017
7.2.3	Additional admission criteria; type of criteria	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017
<b>Section B1, article:</b>	<b>Concerns:</b>	<b>CvB ordinance / guideline</b>
10.1	Composition programme	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017
10.2	Categorization of components	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017