Programme-specific part of the Education and Examination Regulations 2019-2020 Master's degree programme in Earth Sciences Graduate School of Geosciences

The master's degree programme Earth Sciences offers the programmes Earth Life and Climate, Earth Structure and Dynamics, Earth Surface and Water, Marine Sciences and Water Science and Management.¹

art. 2.1 - requirements for admission to the degree programme

1. The following conditions for admission apply to the programmes that are subsidiary to the degree programme:

Earth, Life and Climate

Admission to the programme Earth, Life and Climate is given to a student holding a Dutch or foreign diploma confirming that he has gained the knowledge, insights and skills at university Bachelor's level. Furthermore, the student needs to prove that he has gained the following specific knowledge, insights and skills:

- a) knowledge in the field of Earth Sciences, Biology or Chemistry, at advanced level of the major Earth Sciences, Biology or Chemistry at Utrecht University, or equivalent to that level.
- b) insight in Earth Sciences at advanced level of the major Earth Sciences, Biology or Chemistry at Utrecht University, or equivalent to that level.
- c) academic and research skills of the major Earth Sciences, Biology or Chemistry at Utrecht University, or equivalent to that level.

Earth Structure and Dynamics

Admission to the programme Earth Structure and Dynamics is given to a student holding a Dutch or foreign diploma confirming that he has gained the knowledge, insights and skills at university Bachelor's level. Furthermore, the student needs to prove that he has gained the following specific knowledge, insights and skills:

- a) knowledge in the field of Earth Sciences or Physics, at advanced level of the major Earth Sciences or Physics at Utrecht University, or equivalent to that level.
- b) insight in Earth Sciences at advanced level of the major Earth Sciences or Physics at Utrecht University, or equivalent to that level.
- c) academic and research skills of the major Earth Sciences or Physics at Utrecht University, or equivalent to that level.

Earth Surface and Water

Admission to the programme Earth Surface and Water is given to a student holding a Dutch or foreign diploma confirming that he has gained the knowledge, insights and skills on a university Bachelor's level. Furthermore, the student needs to prove that he has gained the following specific knowledge, insights and skills:

- a) knowledge in the field of Earth Sciences, at advanced level of the major Earth Sciences at Utrecht University, or equivalent to that level.
- b) insight in Earth Sciences at advanced level of the major Earth Sciences at Utrecht University, or equivalent to that level.
- c) academic and research skills of the major Earth Sciences at Utrecht University, or equivalent to that level.

¹ The Water Science and Management programme is open for re-enrollment only until 31 August 2020.

Marine Sciences

Admission to the programme Marine Sciences is given to a student holding a Dutch or foreign diploma confirming that he has gained the knowledge, insights and skills at university Bachelor's level. Furthermore, the student needs to prove that he has gained the following specific knowledge, insights and skills:

- a) knowledge in the field of Earth Sciences or Biology, at advanced level of the major Earth Sciences or Biology at Utrecht University, or equivalent to that level.
- b) insight in Earth Sciences or Biology at advanced level of the major Earth Sciences or Biology at Utrecht University, or equivalent to that level.
- c) academic and research skills of the major Earth Sciences or Biology at Utrecht University, or equivalent to that level.
- 2. Students will be selected on the basis of objective standards concerning:
 - a) previous academic performance in a relevant subject area or areas;
 - b) relevant skills;
 - c) command of the language(s) used in the programme.

This information is used to consider whether the student concerned is able to complete the Master's Programme successfully within the nominal time period.

The admission requirements have been formulated clearly and transparently so that candidates are aware beforehand of the requirements they must meet in order to qualify for selection.

art. 3.1 – aim of the degree programme

The programme aims to

- equip students with specialist knowledge, skills and understanding in the field of Earth Sciences, and help them achieve the exit qualifications referred to part 2 of this article;
- 2. prepare students for a career in one or more sub-fields of Earth Sciences;
- 3. prepare students for undertaking a programme to train as a researcher in the field of Earth Sciences.

The graduate in Earth Sciences

- 1. has advanced knowledge in the field of the programme;
- 2. is able to think/develop/apply (partly) original ideas in a (semi) research context;
- 3. is able to apply knowledge and understanding, and problem solving abilities within broader contexts related to the field of the programme;
- 4. has obtained the ability to integrate / interpolate / extrapolate (incomplete) knowledge at a high level including those gathered from research-articles; shows professional and critical attitude towards social / environmental / ethical aspects of the knowledge acquired and the competencies gained;
- 5. has obtained expertise in the field of understanding / modelling / simulation of key underlying processes in the field of study;
- 6. has developed general listening / writing / presentation skills, also for non-specialist audiences;
- 7. has developed group / team / interpersonal skills, and demonstrates skills for pursuing advanced research.

More programme specific qualifications are listed in the prospectuses of the different programmes.

art. 3.6 - composition of the programmes

The composition of the programmes is specified in appendix 1.

art. 4.2 - entry requirements of courses

The Executive Board will decide the order in which the required components of a Master's degree programme must be completed. This will be announced in the prospectus and in the University Course catalogue.

art. 4.7 - evaluation of quality of the education

- 1. The Director of Education is responsible for monitoring the quality of education. To this end, the Director ensures that courses are evaluated as well as the curriculum. The Director takes the advice and suggestions given by the Education Committee on improving and ensuring the quality of the programme into consideration.
- 2. Students are informed of the outcomes of the course and curriculum evaluations.

Appendix 1: composition of the programmes

Earth, Life and Climate

Theoretical courses: required electives	45 EC
MSc research/thesis	30-45 EC
Individual programme/ internship	
Compulsory 2nd report	up to 30 EC
Additional theoretical courses, seminar	
modules, advanced-level courses	0- 45 EC

PROGRAMME	EARTH, LIFE AND CLIMATE			
PROGRAMME- BROAD COURSES	Earth, Life and Climate : GEO4-1412 Astronomical climate forcing and time scales; GEO4-1440 Microbes and biogeochemistry			
each block	Research Instruction Earth, Life and Climate : < GEO4-1430 Field research instruction Geology or GEO4-1431 Field research instruction Geochemistry or GEO4- 4418 Master excursion Earth Surface and Water or GEO4-1432 Environmental Hydrogeology > plus seminars and career development activities			
Recommended study path	Integrated stratigraphy and sedimentary systems	Climate reconstruction	Biogeosciences and evolution	Biogeochemistry
At least 4 courses from the complete offer of the programme	GEO4-1405 Paleoceanography and climate variability	GEO4-1405 Paleoceanography and climate variability	GEO4-1419 Dynamics of sedimentary systems	GEO4-1417 Earth materials: From atoms to planets
	GEO4-1418 Dynamics of basins and orogens	GEO4-1419 Dynamics of sedimentary systems	GEO4-1420 Organic Geochemistry	GEO4-1420 Organic Geochemistry
	GEO4-1419 Dynamics of sedimentary systems	GEO4-1420 Organic Geochemistry	GEO4-1422 Evolutionary paleobiology and proxies	GEO4-1421 Reactive transport in the hydrosphere
	GEO4-1438 Paleomagnetism	GEO4-4409 Reconstructing Quaternary environments	GEO4-1439 Aquatic and environmental geochemistry	GEO4-1426 Kinetic processes
	GEO4-4436 Fluvial systems	GEO4-4423 Hydrology climate change and cryosphere	GEO4-1514B Vertebrate evolution (tetrapods)	GEO4-1439 Aquatic and environmental geochemistry
0 to 2 courses from all programmes in the master's Earth Sciences	0 to 2 cours	ses from all programm	nes in the master's Ea	rth Sciences
Professional profile	Geologist Biogeologist Sedimentologist Stratigrapher	Geologist Biogeologist Sedimentologist Paleoclimatologist	Geologist Biogeologist Sedimentologist Paleontologist	Geochemist

Earth Structure and Dynamics

Theoretical courses: required electives	45 EC
MSc research/thesis	30-45 EC
Individual programme/ internship	
Compulsory 2nd report	up to 30 EC
Additional theoretical courses, seminar	
modules, advanced-level courses	0- 45 EC

PROGRAMME	EARTH STRUCTURE AND DYNAMICS			
PROGRAMME-BROAD COURSES At least 1 from each block	Earth Structure and Dynamics : GEO4-1401 Structure and composition of the Earth's interior; GEO4-1411 Structural analysis of deformed rocks; GEO4-1438 Paleomagnetism			
	Research instruction Earth Structure and Dynamics : < GEO4-1424a Applied geophysics or GEO4-1430 Field research instruction geology > plus seminars and career development activities			
Recommended study path	Physics of the solid earth and planets	Basins, orogens and the crust-lithosphere system	Earth materials	
At least 4 courses from the complete offer of the programme	GEO4-1408 Theoretical seismology	GEO4-1409 Tectonophysics	GEO4-1403 Petrological and Geochemical Evolution of the Earth	
	GEO4-1409 Tectonophysics	GEO4-1416 Dynamics of the Earth's mantle	GEO4-1410 Mechanisms of deformation and transport in rocks	
	GEO4-1415 Data processing and inverse theory	GEO4-1418 Dynamics of basins and orogens	GEO4-1417 Earth materials: From atoms to planets	
	GEO4-1416 Dynamics of the Earth's mantle	GEO4-1419 Dynamics of sedimentary systems	GEO4-1426 Kinetic processes	
	GEO4-1427 Computational geophysics	GEO4-1442 Modelling of crust and lithosphere deformation	GEO4-1435 Advanced mineralogy & petrology	
0 to 2 courses from all programmes in the master's Earth Sciences	0 to 2 courses from	all programmes in the mas	ster's Earth Sciences	
Professional profile	Geophysicist	Geophysicist Geologist	Geologist	

Earth Surface and Water

			1	
Theoretical courses: required electives		45 EC		
MSc research/thesis		30-45 EC		
Individual programm	ne/ internship			
Compulsory 2nd rep	ort	up to 30 EC		
Additional theoretica	al courses, seminar			
modules, advanced-	level courses	0- 45 EC		
PROGRAMME-	Earth Surface and	Water: GEO4-1434 F	Principles of groundwa	ter flow; GEO4-4412
BROAD COURSES	Statistics and data analysis in Physical Geography; GEO4-4433 Advanced GIS for			
At least 1 from	geoscientists			
each block	Research Instruction Earth Surface and Water : < GEO4-1431 Field research			
	Instruction Geochemistry or GEO4-1432 Environmental hydrogeology or GEO4-4418			
	Master excursion Eal	rth Surface and Water	r or GEO4-4423 Hydro tivitioc	biogy and climate >
	plus seminars and ca	areer development ac	livilles	
Recommended	Environmental	Hydrology	Coastal dynamics	Geohazards and
study path	geochemistry		and fluvial	earth observation
			systems	
At least 4 courses	GEO4-1421	GEO4-1421	GEO4-4403	GEO4-4404 Land
from the complete	Reactive transport	Reactive transport	Managing future	surface hydrology
offer of the			deitas	
programme				
	GEO4-1426 Kinetic	GEO4-1433	GEO4-4409	GEO4-4406 Land
	processes	Hydrogeological	Reconstructing	surface process
		transport	Quaternary	modelling
		phenomena	environments	
	GEO4-1433	GEO4-4404 Land	GEO4-4434	GEO4-4408 Remote
	Hydrogeological	surface hydrology	Morphodynamics of	sensing
	transport		wave-dominated	
	phenomena		coasts	
	GEO4-1439 Aquatic	GEO4-4417	GEO4-4435	GEO4-4420
	and environmental	Unsaturated zone	Morphodynamics of	Stochastic
	geochemistry	hydrology	tidal systems	hydrology
	GEO4-6001	GEO4-4420	GEO4-4436 River	GEO4-4425
	Quantitative Water	Stochastic	and Delta systems	Hazards and risk
	Management	hydrology		assessment
0 to 2 courses from		с и		
all programmes in	0 to 2 cours	ses from all programn	nes in the master's Ea	rth Sciences
Sciences				
Professional profile	Geochemist	Hydrologist	Physical	Physical
	Geochennist		aeoaranher	aeoaranher
			Specialist	Specialist
			morphodynamics	geohazards /
				remote sensing

Marine Sciences

Theoretical courses	45 EC
Elective courses	15-30 EC
MSc research / thesis	30-45 EC
Individual programme / internship	
Compulsory 2nd report	15-30 EC

Marine Sciences	Compulsory	GEO4-1451 Introduction to Marine Sciences GEO4-1452 Ocean Law and Policy
At least 1 course from different core disciplines		 GEO4-1453 Introduction to Physical oceanography NS-MO501M* Simulation of the ocean, atmosphere and climate NS-MO502M* Making, analyzing and interpreting observations NS-MO401M* Dynamical oceanography NS-MO428M* Ocean waves (bi-annual)
	Earth Sciences	GEO4-1405 Paleo oceanography & climate variability GEO4-1412 Astronomical climate forcing & time scales GEO4-1419 Dynamics of sedimentary systems GEO4-1422 Evolutionary paleobiology and proxies GEO4-4434 Morphodynamics of wave-dominated coasts GEO4-4435 Morphodynamics of tidal systems
	Chemistry	GEO4-1420 Organic geochemistry GEO4-1421 Reactive transport GEO4-1426 Kinetic processes GEO4-1431 Field research instruction Geochemistry GEO4-1439 Aquatic and environmental geochemistry
	Biology	GEO4-1440 Microbes and biogeochemistry GEO4-1450 Coastal Ecology