

Structure of the MSc program Earth System Science (120 ECTS)

Version HS2019

Skills (15 CP)

Code	CP	Module title	Semester
ESS 401	3	HS Seminar "Current topics in ESS" (compulsory)	GEO 878 3 FS Geovisualisation
GEO 441*	6	FS Colloquium & Seminar in Remote Sensing **	701-0461 3 HS Numerische Methoden in der Umweltphysik (German)
GEO 442*	6	HS Spectroscopy of the Earth System	UWW271 4 HS Contemporary analysis for ecology (R)
GEO 443*	6	HS SAR and LIDAR	STA 260 1 HS Practical Introduction to R
GEO 803	2	b Solving Geospatial Problems using Matlab	STA 120 5 FS Einführung in die Statistik (German)
GEO 871	3	HS Retrieving Geographic Information	GEO 812 1 HS.b Getting started with R for spatial analysis
GEO 872	3	HS Advanced Spatial Analysis	
GEO 873	3	HS Cognitive Issues in GIScience	
GEO 874	3	HS Introduction to Databases	
GEO 875	3	HS Spatial Databases	

** at least one of three, ** requires basic scripting skills (e.g. Matlab, Python, R, C++)*

Free choice (10 CP) Integrative project, Extra modules, Research project
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ESS511 Master Thesis (30+2 CP) Including colloquium and exam (ESS512)

Internship (15 CP) Industry related or academic

Competence (57 CP)

Legend
 UZH: Lecture codes starting with ESS, GEO, UWW
 ETH: Lecture codes starting with 101, 102, 651, 701, 751
 HS: Herbstsemester (Fall semester)
 FS: Frühjahrssemester (Spring semester)
 ir: Irregular, see course catalogue
 b: Block course, see course catalogue
 2: Two semesters, start semester indicated before the 2
 #: BSc specialization module, cannot be taken in both BSc and MSc, max. 12CP BSc specialization modules in MSc

Knowledge (48 CP)

Specialization ("Vertiefung") compulsory block (12 CP)

LIT I	Lithosphere
651-4041	3 HS Sedimentology I: physical processes and sedimentary systems
651-4049	3 HS Conceptual and quantitative methods in geochemistry
651-4032	3 FS Volcanology
GEO 463	6 HS Soil science I: current challenges in soil science
GEO 856	3 FS The high-mountain cryosphere: processes and risks

HYD I	Hydrosphere
GEO 471	6 HS Hydrological field measurements and calculations
GEO 731#	2 HS Gletscher und Permafrost (German) *
GEO 856	3 FS The high-mountain cryosphere: processes and risks
102-0488	3 FS Water resources management
651-4080	2 FS Fluvial sedimentology

** this course is suggested as preparation for the cryosphere blocks*

BIO I	Biosphere
651-4004	3 FS The global carbon cycle - reduced
GEO 463	6 HS Soil science I: current challenges in soil science
GEO 417	6 HS.2 Environmental archives and age determination
UWW 220	3 HS.b Concepts on Biodiversity
UWW 221	3 HS.b Species Interaction and Biodiversity

ANT I	Anthroposphere
GEO 423	6 HS Political Geography
GEO 682	6 HS Geographies of Global Change: Resources, Markets and Development
701-1551	3 HS Sustainability Assessment

Compulsory-choice blocks (3x12 CP)

Minimum of 2 spheres, maximum of 3 spheres (incl. specialization compulsory block). At least one block in specialization sphere. LIT I, HYD I, BIO I, ANT I are also eligible. Within each block you have free choice of modules. On (written) request, some modules may be eligible for another block or non-listed modules may qualify. Blocks of 11 or 13 CP are acceptable. Modules listed in multiple blocks can be taken once.

Block LIT2	Earth Surface Processes
651-4041	3 HS Sedimentology I: physical processes and sedimentary systems
651-4043	3 HS Sedimentology II: biochemical processes in marine systems*
651-4070	5 FS.ir Landslide analysis
651-4134	6 FS.ir Tectonic geomorphology
GEO 856	3 FS The high mountain cryosphere: processes and risks
651-4902	3 FS Quaternary geology and geomorphology of the Alps

** requires 651-4041*

Block HYD2	Catchment hydrology
GEO 471	6 HS Hydrological field measurements and calculations
GEO 475	6 FS Hydrological Modeling and Programming
102-1251	3 HS Hydrology II (rainfall-runoff processes, assumes Hydrology I)
102-0287	3 HS Fluvial systems (assumes Hydrology II)
651-4080	2 FS Fluvial sedimentology

Block BIO2	Paleontology and chronology
GEO 417	6 HS.2 Environmental archives and age determination
GEO 818	6 HS.2 Dendro-Ecology
651-1229	3 HS Advanced geochronology
651-4054	3 FS Micropaleontology
651-4057	3 HS Climate history and paleoclimatology
651-4056	3 FS Limnology

Block ANT2	Human - Environment interactions
701-0015	2 HS Transdisciplinary Research
701-1317	3 FS Global Biogeochemical Cycles and Climate
701-1551	3 HS Sustainability Assessment
701-1651	3 HS Environmental Governance
851-0594	3 HS International environmental politics

Block LIT3	Analytical methods for the lithosphere
651-4051	2 HS Reflected Light Microscopy and Ore Deposits Practical*
651-4113	2 HS Sedimentary Petrography and Microscopy
651-4055	3 HS Analytical Methods in Petrology & Geology
651-4117	3 HS Sediment Analysis
GEO 442	6 HS Spectroscopy of the Earth system
GEO 820	2 FS Stable isotopes in ecology and soil science

** requires 651-4037; both modules can be taken in LIT3 or in LIT4*

Block HYD3	Groundwater hydrology
651-4023	4 HS Groundwater
102-0448	6 FS Groundwater II
701-1260	2.5 FS.b Climatological and Hydrological Field Work
701-0423	3 FS Chemie aquatischer Systeme (German)

** requires 651-4023*

Block BIO3	Soil - Vegetation interactions
GEO 463	6 HS Soil science I: current challenges in soil science
GEO 819	4 FS The biogeochemistry of plant-soil systems in a changing world *
GEO 820	2 FS Stable isotopes in ecology and soil science*
GEO 412	6 FS.b Soil Science III: practical project *
701-1337	3 HS Forest soils - functions and responses to environmental changes

** requires GEO463*

Block TDG	Teaching degree Geography *
GEO 999	2 ir Exkursionen für Nebenfachstudierende (german)
GEO 992	3 FS Fachwissenschaft und außerschulische Lernorte (german)
GEO 410	4 HS Geography Matters
GEO_#	5 One specialization module (5. or 6. Semester) human geography (german)

** Please contact the study council for this track; fluency in german is required; all modules (13 CP) in this block are compulsory; additional "Inflagen" from the geography BSc may have to be fulfilled.*

Block LIT4	Geochemistry
701-1251	3 HS Land-climate Dynamics
651-4037	3 HS Ore deposits I
651-4004	3 HS The global carbon cycle - reduced
701-1317	3 FS Global Biogeochemical Cycles and Climate
701-1313	3 HS Isotopic and organic tracers in biogeochemistry
651-4235	3 ir Marine Geology and Geochemistry
GEO 820	2 FS Stable isotopes in ecology and soil science

Block HYD4	Cryosphere I: processes
GEO 856	3 FS The high-mountain cryosphere: processes and risks
GEO 857	3 FS Snow and avalanches: processes and risk management
GEO 805	3 HS.b Naturgefahren und Risikoanalyse im Gebirge (German)
101-0289	3 HS Angewandte Glaziologie (German)
651-1581	3 HS Seminar in glaciology
GEO 411	6 FS.ir Field studies on high mountain processes

Block BIO4	Terrestrial biogeosciences
651-4004	3 FS The global carbon cycle - reduced
651-4044-01	2 FS Snow microbiology and biogeochemistry lab practical
651-4044-02	2 FS Geomicrobiology and biogeochemistry field course
GEO 819	4 FS The biogeochemistry of plant-soil systems in a changing world *
GEO 820	2 FS Stable isotopes in ecology and soil science *
701-1251	3 HS Land-climate Dynamics

** requires GEO463*

Block HYD5	Cryosphere II: modelling and physics
GEO 413	6 HS.2 Quantification and modelling of the cryosphere
GEO 815	3 HS Modelling of the Cryosphere: dynamic processes
651-4101	3 HS Physics of glaciers

Block BIO5	Ecology and biodiversity
751-5118	2 FS Global Change Biology
UWW 210	2 ir.b Field Course
UWW 220	3 HS.b Concepts on Biodiversity
UWW 221	3 HS.b Species Interactions and Biodiversity
UWW 231	2 HS.b Analysis and Management of Biological Populations
UWW 250	2 HS.b Spatial Ecology and Remote Sensing
UWW 271	4 HS Contemporary analysis for ecology
UWW 273	3 HS Introduction to Theoretical Ecology

Block ATM1	Atmosphere
701-0471#	3 HS Atmosphärenchemie (German)
701-0475#	3 HS Atmosphärenphysik (German)
701-1252	3 FS Climate Change Uncertainty and Risk
701-0412	3 FS Climate systems
701-1251	3 HS Land-Climate Dynamics
701-1228	4 FS Cloud Dynamics
701-1232	3 FS Radiation and climate change
651-4095-0	1 HS Colloquium Atmosphere and Climate 1
651-4095-0	1 FS Colloquium Atmosphere and Climate 2