

Master Study program with double degree certificate “Master of Environmental Sciences”

Course offers at Nanjing University

Module: Environmental processes

Participation of the students is mandatory and consist of one course from each subject (total 5 subjects = 20 credits)

Following course offers are described for the module “Environmental processes” and will be provided alternately.

Subject area: 1. Ocean dynamics

L 1.1

Module/subject area: Environmental processes:L1.1Ocean Dynamics			
University/Department/Institute: NanjingUniversity, School of Geographic and Oceanographic Sciences			
Subject responsibility: Prof. Dr.GaoShu,NJU teachers			
Admission requirements: none			
Aims of qualification: The students will study the dynamic processes associated with the marine and coastal system and are able to understand the interrelationships between hydrodynamics, material transport, water quality and other environmental indices.			
Content: The characteristics of ocean environments; waves and tides; ocean basin and continental shelf circulation patterns; transport processes of suspended solids and dissolved materials; movement of nutrients, pollutants, and phytoplankton/zooplankton.			
Teaching andstudy form	Presence study (hrs/term)	Forms ofactiveparticipation	Work load (hrs)
Lecture, Seminar	32	Discussion, Presentation	Time of presence 32
			Pre/post preparation 68
			Preparationfortest, test 20
Courselanguage English, facultative Chinese			
Work load in total		120hours	4credits (CTS)
Duration ofthecourse		Oneterm	
Frequencyofthisoffer:		Every summerterm	
Applicability		Master (Post-Graduate), Earth Sciences, Environmental Sciences	

L1.2

Module/subject area: Environmental processes:L1.2Advanced Marine Geology			
University/Department/Institute: NanjingUniversity, School of Geographic and Oceanographic Sciences			
Subjectresponsibility: Prof. Dr. GaoShu, NJU teachers			
Admission requirements: none			
Aimsofqualification: The students will study the formation of sedimentary sequences on the continental shelf and deep sea bed, are able to understand the nature of sedimentary records and to interpret the records on a scientific basis.			
Content: The transport processes of sediment on continental shelves, continental margins, deep seas, caused by tidal currents, waves, ocean circulations and sediment gravity flows; the continuity and spital / temporal resolution of the sedimentary sequences formed in marine environments; interpretation of sedimentary records; Holocene sequences; environment, climate and ecosystem changes.			
Teaching andstudy form	Presence study (hrs/term)	Forms ofactiveparticipation	Work load (hrs)
Lecture/Seminar L1.2	32	Discussion, Presentation	Time of presence 32 Pre/post preparation 68
			Preparation for test, final test 20
Course language		English, facultative Chinese	
Work load in total		120hours	4 credits (CTS)
Duration ofthecourse		Oneterm	
Frequencyofthisoffer:		Every summer and winter term	
Applicability		Master (Post-Graduate), Earth Sciences, Environmental Sciences	

L1.3

Module/subject area: Environmental processes: L1.3 Introduction to coastal sciences			
University/Department/Institute: Nanjing University, School of Geographic and Oceanographic Sciences			
Subject responsibility: Prof. Dr. GaoShu, NJU teachers			
Admission requirements: none			
Aims of qualification: The students will study the coastal environmental dynamics, and be able to understand the importance of land-ocean interaction, in terms of the environment issues and its relation to human society.			
Content: Coastal systems, including tidal and non-tidal environments (beaches, estuaries, tidal inlets, tidal flats, tidal ridges, rocky coasts); land-ocean interaction in the coastal zone; river discharges and their causes and environmental consequences; the development of coastal areas; coastal zone management; the influence of sea level changes; coastal landform evolution; coastal wetland protection and restoration.			
Teaching and study form	Presence study (hrs/term)	Forms of active participation	Work load (hrs)
Lecture/Seminar L1.3	32	Discussion, Presentation	Time of presence 32
			Pre/post preparation 68
			Preparation for test, final test 20

Course language

Subject area: 2. Terrestrial Environmental systems

L 2.1

Module/subject area: Environmental processes: Terrestrial Environmental Systems – L2.1 Progress in Physical Geography		
University/Department/Institute: Nanjing University, School of Geographic and Oceanographic Sciences		
Subject responsibility: NJU teachers		
Admission requirements: none		
Aims of qualification: The students will gain detailed knowledge on recent research activities, results and scientific problems related to Physical Geography. They will be able to achieve specific knowledge on advanced methods and their scientific interpretation used within modern research. They will be able to compare and validate research efforts.		
Content: The lecture and seminar will provide advanced and new research topics in all fields of Physical Geography. Modern problems and ways of solution will be presented and discussed based on the state-of-the-art knowledge.		
Teaching and study form	Presence study (hrs/term)	Forms of active participation
Lecture/Seminar L2.1	32	Discussion, Presentation
		Time of presence 32 Pre/post preparation 68 Preparation for test, test 20
Course language	English, facultative Chinese	
Work load in total	120 hours	4 credits (CTS)
Duration of the course	One term	
Frequency of this offer:	Every summer and winter term	
Applicability	Master (Post-Graduate), Earth Sciences, Environmental Sciences	

L 2.2

Module/subject area: Environmental processes:Terrestrial Environmental Systems – L2.2 Interlinked environmental processes			
University/Department/Institute: NanjingUniversity, School of Geographic and Oceanographic Sciences			
Subject responsibility: Prof. Dr. B. Wuennemann, NJU and FUB teachers			
Admission requirements: none			
Aims of qualification: The students realize the interaction of various geo-processes which contribute to environmental changes of local and regional dimension. They also learn to differentiate between processes and their responses that affect the land- ocean and atmospheric interplay. The students will learn to transfer subject-specific knowledge into a linked dynamic system of the earth.			
Content: Lectures, seminars and exercise units as case studies on regional dynamic processes of land, ocean and atmosphere interaction are the main foci in order to demonstrate the close interrelationship between them and how natural conditions and human activities interfere. Every lecture/seminar is supplemented by training/exercise units that support theoretical knowledge by adequate experiments.			
Teaching and study form	Presence study (hrs/term)	Forms of active participation	Work load (hrs)
Lecture/Seminar/	16	Presentations, Discussions	Time of presence 32 Pre/post preparation 68
Exercise/Practice	16	Practicaltraining	Preparation for test, final test 20
Course language		English	
Work load in total		120hours	4 credits (CTS)
Duration ofthecourse		Oneterm	
Frequencyofthisoffer:		Every summer and winter term	
Applicability		Master (Post-Graduate), Earth Sciences, Environmental Sciences	

L 2.3

Module/subject area: Environmental processes: Terrestrial Environmental Systems – L2.3 Watersheds and environmental change			
University/Department/Institute: Nanjing University, School of Geographic and Oceanographic Sciences			
Subject responsibility: NJU teachers			
Admission requirements: none			
Aims of qualification: The students learn to understand the relationship between water resources and environmental effects with respect to water availability, storage and consumption.			
Content: Lectures on hydrologic/hydrographic problems at selected areas will be used to demonstrate the sensitivity of water resources and water use/management to environmental change. Exercises/training on selected problems will enhance the student's ability on identifying and qualifying environmental impact.			
Teaching and study form	Presence study (hrs/term)	Forms of active participation	Work load (hrs)
Lecture/Seminar/	16	Presentation, Discussion	Time of presence 32
Exercise	16	Individual and group training	Pre/post preparation 68
			Preparation for test, test 20
Course language		English	
Work load in total		120 hours	4 credits (CTS)
Duration of the course		One term	
Frequency of this offer:		Every summer term	
Applicability		Master (Post-Graduate), Earth Sciences, Environmental Sciences	

Subject area: 3. Global change and geochemical processes

L3.1

Module/subject area: Environmental processes: Global change and geochemical processes. L3.1 Recent Advance in Mineral Deposit Research ()			
University/Department/Institute: Nanjing University, School of Geological Sciences			
Subject responsibility: Profs. JIANG, Shao-Yong & JIANG, Yao-Hui, teachers School of Earth Science and Engineering			
Admission requirements: none			
Aims of qualification: This course introduces recent achievements in the fields of mineral deposit geology and geochemistry for graduate students, in an attempt to guide students to learn new ideas and new findings recently developed in the international community.			
Content: The course will choose a series of recently published papers in international earth science journals, and let students to read and discuss these papers. One theme will be focused each time, and 1 or 2 students will give keynote presentation and other students will join in discussion. The themes include: stable isotope application in mineral deposit research; isotope geochronology and dating of ore-forming processes; fluid evolution and fluid inclusion study; water-rock interaction; granite and related mineralizations; gold deposits; massive sulfide deposits; W-Sn mineralizations; gas hydrates; oil and gas genesis, etc.			
Teaching and study form	Presence study (hrs/term)	Forms of active participation	Work load (hrs)
Seminar	32	Presentation and discussion	Time of presence 32
			Pre/post preparation 68
			Preparation for test, test 20
Course language		English, facultative Chinese	
Work load in total		120 hours	4 credits (CTS)
Duration of the course		One term	
Frequency of this offer:		Every summer and winter term	
Applicability		Master (Post-Graduate), Earth Sciences, Environmental Sciences	

L3.2

Module/subject area: Environmental processes: Global change and geochemical processes. L3.2 Global changes (全球变化)		
University/Department/Institute: Nanjing University, School of Earth Science and Engineering		
Subject responsibility: Prof. Zheng, Hong-Bo, teachers School of Earth Science and Engineering		
Admission requirements: Completion of courses “General Introduction of Earth Science”、 “Mineralogy”、 “Environmental Science” and “General Introduction of Ocean Science”.		
Aims of qualification: The study of global changes aimed at understanding the Earth's past environment in order to make predictions for the future. Introduction to the ideas and approaches of past Global Changes, include both the special challenges and viewpoints of this science as well as the ways in which geology, climate, biology and geochemistry are interrelated. The topics cover such issues as the general spatial-temporal environmental changes, the geologic paleo-environmental records, the absolute and relative dating methods, applying geochemistry to reconstruct the paleo-environment.		
<ul style="list-style-type: none"> ● Content: General introduction of global changes ● Global changes and social sustainable development ● Glaciations of the Quaternary Period ● Oceanic evidences of ancient climate changes in the Quaternary Period ● Paleontology and Human evolution of the Quaternary Period ● Brief introduction of ancient environment in the Quaternary Period ● Dating method of the Quaternary Period 		
Teaching and study form	Presence study (hrs/term)	Forms of active participation
Seminar/Lecture	32	Presentation/ Discussion
		Time of presence 32
		Pre/post preparation 68
		Preparation for test, test 20
Course language		English, facultative Chinese
Work load in total		120 hours 4 credits (CTS)
Duration of the course		One term
Frequency of this offer:		Every summer and winter term
Applicability		Master (Post-Graduate), Earth Sciences, Environmental Sciences

Subject area: 4. Atmospheric processes

L 4.1

Module/subject area: Environmental processes: Atmospheric processes L4.1 Hydrometeorology			
University/Department/Institute: Nanjing University, School of Atmospheric Sciences			
Subject responsibility: Prof. Yuan, Huiling, School of Atmospheric Sciences, NJU teachers, School of Atmospheric Sciences			
Admission requirements: none			
Aimsofqualification: The students obtain knowledge in fundamental concepts of the water cyclewith focus on land-surface-atmospheric interaction.They are able to combine theory and modeling of hydrologic processes and atmospheric effects, including measurement techniques for components of the water cycle.			
Content: The topic covers the general introduction of hydrologic cycle, historical development of hydrometeorology, hydroclimatic system, atmospheric moisture, cloud and precipitation processes, precipitation measurements, surface energy balance, hydrologic modeling and forecasting, underground water, and global change of the water cycle.			
Teaching andstudy form	Presence study (hrs/term)	Forms ofactiveparticipation	Work load (hrs)
Seminar	32	Lecture, Presentations	Time of presence 32
			Pre/post preparation 68
			Preparationfortest, test 20
Course language		English, facultative Chinese	
Work load in total		120hours	4 credits (CTS)
Duration ofthecourse		Oneterm	
Frequencyofthisoffer:		Every summer and winter term	
Applicability		Master (Post-Graduate), Earth Sciences, Environmental Sciences	

L 4.2

Module/subject area: Environmental processes: Atmospheric processes L4.2 Atmospheric chemistry (大气化学)		
University/Department/Institute: Nanjing University, School of Atmospheric Sciences		
Subject responsibility: Prof. Ding, Aijun,NJU teachers, School of Atmospheric Sciences		
Admission requirements: none		
Aimsofqualification: The students will learn basic concept of several important air pollutants like ozone, sulfur dioxide, nitrogen oxides, and aerosols etc in this course. The fundamental chemistry processes of several well-known atmospheric environmental issues like photochemical smog, stratospheric ozone depletion, acid rain and haze etc. will be introduced. The students will learn the measurement instrumentation of several key trace gases and aerosols though practice. Also the principal of numerical modeling of air quality will be introduced		
Content:		
<ul style="list-style-type: none"> ● General Introduction to Atmospheric Chemistry and Air Pollution ● Processes related to Air Pollution and Atmospheric Chemistry ● TroposphericOzoneandPhotochemistry ● Stratospheric Ozone and Related Chemistry ● Acid Rain and Acid Deposition ● Aerosol and Visibility ● Impact of Atmospheric Composition on Climate Change ● Measurement of Atmospheric Components ● Numerical Modeling of Atmospheric Chemistry 		
Teaching andstudy form	Presence study (hrs/term)	Forms ofactiveparticipation
Lecture/Seminar	24	Discussion, Presentation
Practice andExercise	8	Practicaltraining
		Time of presence 32
		Pre/post preparation 68
		Preparationfortest, test 20
Course language		English
Work load in total		120 hours 4 credits (CTS)
Duration ofthecourse		Oneterm
Frequencyofthisoffer:		Every summer and winter term
Applicability		Master (Post-Graduate), Earth Sciences, Environmental Sciences

Subject area: 5. Laboratory and computer analysis

L 5.1

Module/subject area: Environmental processes: Laboratory and computer analysis			
University/Department/Institute: Nanjing University, School of Atmospheric Sciences, School of Earth Science and Engineering, School of Atmospheric Sciences			
Subject responsibility: : NJU teachers			
Admission requirements: none			
Aims of qualification: The students know how to prepare and analyze sample material by using sophisticated laboratory equipment and how obtained data have to be handled by the use of related computer software. They also know how to interpret results in terms of global environmental change			
Content: Laboratory pretreatment and measurement of material by the use of lab technology Data acquisition and management Implementation of multivariate statistics Data interpretation and presentation			
Teaching and study form	Presence study (hrs/term)	Forms of active participation	Work load (hrs)
Lab-training	16	Practice	Time of presence 32 Pre/post preparation 68
Exercise, computer training	16	Practice, Homework, Presentation	Preparationforpresentation 20
Course language		English	
Work load in total		120hours	4 credits (CTS)
Duration ofthecourse		Oneterm	
Frequencyofthisoffer:		Every summer and winter term	
Applicability		Master (Post-Graduate), Earth Sciences, Environmental Sciences	

Module: Chinese Language Training (2nd term) mandatory for German students

Module/subject area: Basic Chinese language				
University/Department/Institute: Nanjing University				
Subject responsibility: : NJU teachers				
Admission requirements: none				
Aims of qualification: The students know substantial in Chinese language (A1-A2 level) and are able to communicate on a basic level				
Content: Chinese spoken and written language training				
Teaching and study form	Presence study (hrs/term)	Forms of active participation		
Lecture/Exercise	64	Practice	Time of presence	64
			Pre/post preparation	136
			Preparation for test, test	40
Course language		Chinese		
Work load in total		240 hours	10 credits (CTS)	
Duration of the course		One term		
Frequency of this offer:		Every summer and winter term		
Applicability		Master (Post-Graduate), Earth Sciences, Environmental Sciences		

Module: German Language Training1 (1st and/or 2nd term), recommended for Chinese students

Module/subject area: Basic German language training (A1 level)			
University/Department/Institute: Nanjing University			
Subject responsibility: : NJU teachers			
Admission requirements: none			
Aims of qualification: The students know substantial in German language (A1-level) and are able to communicate on a basic level			
Content: German spoken and written language training			
Teaching and study form	Presence study (hrs/term)	Forms of active participation	Work load (hrs)
Lecture/Exercise	64	Practice	Time of presence 64
			Pre/post preparation 136
			Preparationfortest, test 40
Course language		German	
Work load in total		240 hours	10 credits (CTS)
Duration of the course		Oneterm	
Frequency of this offer:		Every summer and winter term	
Applicability		Master (Post-Graduate), Earth Sciences, Environmental Sciences	

Module: German Language Training 2 (3rd and/or 4th term), mandatory for Chinese students

Module/subject area: Basic German language training (A2-level)			
University/Department/Institute: Freie Universität Berlin			
Subject responsibility: FUB teachers			
Admission requirements: none			
Aims of qualification: The students know substantial in German language (A2-level) and are able to communicate on an advanced level			
Content: German spoken and written language training			
Teaching and study form	Presence study (hrs/term)	Forms of active participation	Work load (hrs)
Lecture/Exercise	64	Practice	Time of presence 64
			Pre/post preparation 136
			Preparation for test, test 40
Course language		German	
Work load in total		240 hours	10 credits (CTS)
Duration of the course		One term	
Frequency of this offer:		Every summer and winter term	
Applicability		Master (Post-Graduate), Earth Sciences, Environmental Sciences	