Research Topics

The following is a list of selected Master Theses completed by TropHEE students, to give an idea on the research topics that our students work on:

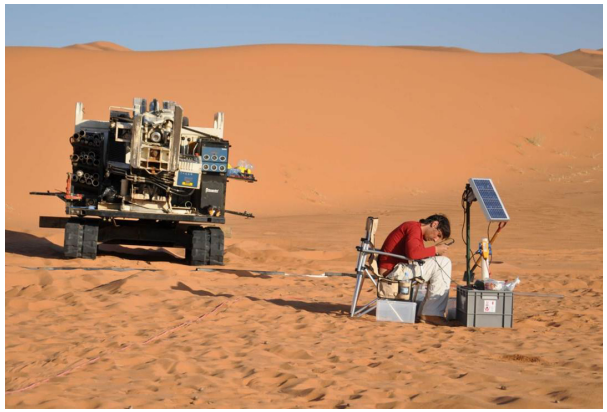
- Chlorine Isotope Effects During Sorption of Organic Compounds on Carbonaceous Materials
- GIS-based landslide susceptibility and hazard modelling in the Lesser Himalaya of Nepal
- Hydrochemical Investigation of Groundwater Quality in Viotic Kifissos Basin (Greece) with Special Focus on Nitrate pollution
- Environmental Impact Assessment of Ordovician Oil Shale using ARCGIS: a case study of Northern Estonia
- Hydraulic Characteristics and Hydrochemistry of Nairobi Area, Kenya
- GIS-based Water Budget Model and Stable Isotope Variation in Surface Waters of the Western East African Rift
- The use of Multipurpose Artificial Reefs for Coastal Protection
- The Geothermal Potentials of the Middle and Lower Benue Trough Nigeria
- Composition of Groundwater from Hand-dug Wells within the Precarious Settlements of Southern Abidjan, Cote d'Ivoire
- Water Quality in Western Uganda - Evaluation of Human Impact
- Using Surface and Borehole Geophysics to Detect Permeability in Silts at Cape Cod, Massachusetts
- Experimental Investigation of Thermal In-situ Remediation of a CHC Contamination in Low Permeability Zones using Steam Flow
- Reservoir Characterization of the Paleozoic Wajid Sandstone Aquifer, Saudi Arabia
- Potential for Groundwater Recharge in an Arid Catchment in Mexico

Further Information

TU Darmstadt doesn't raise tuition fees. Course participants must cover all their personal expenses and study costs (books, photocopies etc.). A buddy service will support you after your arrival in Germany. Intercultural workshops are offered to help you overcome cultural barriers. The TropHEE team is offering all necessary assistance and support.

TropHEE is part of the DAAD scholarship program for developing countries.

www.trophee.tu-darmstadt.de



Contact

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TropHEE
Master of Science

Tropical Hydrogeology and Environmental Engineering

Institute of Applied Geosciences

General Information

The Master Course TropHEE aims at combining a comprehensive understanding of geoscientific fundamentals with applied topics that are essential in hydrogeology and environmental management. Special focus is put on arid to semi-arid regions with strong water scarcity, but emphasis is also placed on water and soil quality problems within growing mega-cities with dense population and industrial areas. In the broader context of international development cooperation, TropHEE offers a research-oriented education that prepares graduates to work in international organizations, consultancies, and administrations.

The Institute of Applied Geosciences at TU Darmstadt offers an international study environment with modern infrastructure and up to date laboratories enabling hands-on experience.

Main Subjects

Hydrogeology Water is the essential resource for life and the provision of water in sufficient quantity and quality is one of the major challenges of our society. Hydrogeology deals with the presence, flow, and chemical properties of groundwater, including interactions with surface water, soils, and rocks. TropHEE addresses the practical relevance of e.g. exploration, exploitation, treatment, and protection of groundwater, but also modern approaches to groundwater management are included.

Environmental Engineering addresses geoscientific aspects in land planning and engineering. TropHEE places its emphasis on the management of water scarcity, saltwater intrusions, soil erosion, and persistent pollutants and presents engineering solutions.

Preliminary Phase

Special online course material is offered to give prospective students the opportunity to refresh their geoscientific knowledge even before joining the course. Additionally, an intensive four-week German language course is part of the welcome phase at TU Darmstadt.

Practical Experiences

Field work is an essential part of the Geoscientist's tasks. Therefore, the curriculum contains field trips and a two-week excursion to a semiarid region.

Many of the different lectures of the syllabus contain exercises including practical work on the computer, in the laboratory and in the field.

The Scientific Training is a special form of independent study. During this part of the program students will learn special geoscientific methods such as terrain analysis and mapping, chemical analyses, or the collection and interpretation of external data to investigate a specific topic. The results will be summarized in a final report and presented in a seminar.

Course Syllabus

	1st Semester	2nd Semester	3rd Semester	4th Semester
Compulsory Modules		• Scientific Methods	• Scientific Training • Semiarid Hydrology Field Course	Master Thesis
Basic Modules (elective)	• Geology • Rocks and Minerals • Hydrogeology • Hydrochemistry	• GIS I	• GIS II	
Special Modules (elective)	• Hydraulic Engineering • Integrated Water Resources Management • Soil and Unsaturated Zone • Hydrogeological Lab and Field Methods	• Aquifer Sedimentology • Hydrogeochemistry • Geophysical Methods	• Remote Sensing and Statistics • Hydrogeology of Semiarid Areas • Isotope and Tracer Techniques • Water Treatment	• Clay Mineralogy • Groundwater Modelling • Geoenvironmental Engineering

Master programme *Tropical Hydrogeology and Environmental Engineering (M.Sc.)*

TECHNISCHE UNIVERSITÄT DARMSTADT

PO 2021 Study and Examination Plan

(English translation is for information purposes only - the legally binding document is the German version)

Legend		Examinations						Courses			CP	Semester			
Grading scheme:	St = Standard (with grades); bnb = pass/no pass (no grades)											The assignment of exams/ credits to semesters is recommendational only.			
Examination type:	B = report, H = homework, HÜ = home assignments, K = written exam, Kq = colloquium, mP = oral exam, Pt = presentation, R = paper, Th = thesis														
Status:	o = compulsory; f = optional														
Course type:	VL = lecture; Ü = excercise; VÜ = lecture with exercise; S = seminar; EK = excursion, field trip; PR = practical training											Workload per Semester (CP)			
CP:	Credit points														
TUCaN nos. and assignment of CP to module components are purely informative. Credits are given only after completion of the module.		Technical examination (FP, Fachprüfung)	Study examination (SL, Studienleistung)	Examination type	Duration (min)	Weighting for module grade	Weighting for total grade (GPA)	Hours per week during lecture term	Status	Course type	CP total	1.	2.	3.	4.
Compulsory Modules (18 CP)									o		18				
11-02-3402	Scientific Methods		St	Pt	-	1	1	2	o		6				
11-02-3402-se	Project Seminar							2	o	S			6		
11-02-3431	Semiarid Field Hydrogeology		bnb	B	-	0	0	6	o		6				
11-02-3272-ek	Field Trip to a Semiarid Region							6	o	EK				6	
11-02-3400	Scientific Training		St	B	-	1	1	-	o		6				
-	Scientific training / internship							-	o	PR				6	
Interdisziplinary Modules (0 - 6 CP)									f		0-6				
Module catalogue	Interdisziplinary Modules (type §30 para. 6 APB *area with unrestricted module change* , 0 - 6 CP)						1	0-4	f		0-6				
-	Gesamtkatalog aller Module der TU					1		0-4	f	-		0 - 6			
Specialisation in Hydrogeology (66 - 72 CP; type §30 para. 4 APB *elective specialisation*)									f						
Elective Modules for Hydrogeology specialisation (type §30 para. 6 APB *area with unrestricted module change* , at least 66 - 72 CP, with max. 24 CP taken from C2)									o		66-72				
C1 Specialisation-related Elective Modules									o						
11-02-3401	Fundamentals of Geosciences	St		K	90	1	1	4	f		6				
11-02-3404-vu	Geological Methods							2	f	VÜ		3			
11-02-3405-vu	Practical Mineralogy and Petrology							2	f	VÜ		3			
11-02-2238	Clay Mineralogy	St		K	90	1	1	4	f		6				
11-02-2044-vu	Clay Mineralogy							2	f	VL			3		
11-02-2045-vu	Applied Clay Mineralogy							2	f	VL				3	
11-02-3462	Geoinformation Systems						1	6	f		6				
11-02-1326-vu	GIS I (Techniques)	St		H	-	1		3	f	PR			3		
11-02-2243-vu	GIS II (Case studies)	St		K	90	1		3	f	VÜ				3	
11-02-3416	Remote Sensing and Statistics						1	2	f		3				
11-02-2183-vu	Statistics	St		K	60	1		2	f	VÜ			3		
11-02-2244-vu	Remote Sensing in Geology		St	H	-	1		2	f	VÜ				3	
13-L1-M007	Integrated Water Management	St		mP	15	1	1	4	f		6				
			bnb	H	-	0									
13-L1-0006-vu	Integrated Water Management							4	f	VU		6			
11-02-3406	Hydrogeology I						1	4	f		6				
11-02-3406-vu	Hydrogeology I	St		K	90	1		3	f	VÜ		4			
11-02-3271-ek	Hydrogeological Field Trips		bnb	B	-	0		2	f	EK		2			
11-02-3464	Soil and Groundwater Physics						1	4	f		6				
11-02-3407-vl	Physical Hydrogeology	St		K	60	1		2	f	VL		3			
11-02-3410-vu	Unsaturated Zone Processes/Groundwater Recharge	St		K/H	90/-	1		2	f	VÜ			3		
11-02-3466	Hydrochemistry I						1	5	f		6				
11-02-2031-vu	Hydrochemistry	St		K	90	1		2	f	VL		3			
11-02-3214-vu	Water Analysis		St	B	-	1		3	f	VU		3			
11-02-3468	Hydrogeology II						1	4	f		6				
11-02-2032-vu	Hydrogeology II	St		K	90	1		2	f	VÜ			3		
11-02-3417-pr	Hydrogeological Field Course		St	B	-	1		2	f	PR			3		
11-02-6023	Hydrochemistry II	St		K	90	1	1	4	f		6				
11-02-2111-vu	Hydrogeochemistry							4	f	VÜ			6		
11-02-2219	Groundwater Modelling						1	4	f		6				
11-02-2134-vu	Introduction to Groundwater Modelling	St		K	90	1		2	f	VÜ			3		
11-02-2133-vu	Advanced Groundwater Modelling		St	H	-	1		2	f	VÜ				3	
11-02-2229	Isotope Hydrology and Dating	St		K	60	1	1	2	f		3				
11-02-3253-vl	Isotope Hydrology and Dating							2	f	VÜ				3	
11-02-2239	Tracer Techniques		St	H	-	1	1	2	f		3				
11-02-3254-vu	Tracer Techniques							2	f	VÜ				3	
11-02-2310	Geohydraulics and Well Construction	St		K	90	1	1	4	f		6				
11-02-2163-vu	Geohydraulics and Well Construction							4		VÜ				6	

11-02-2336	Sedimentology II						1	4	f	X	5					
11-02-2175-vl	Basin Analysis	St		K	90	3	X	2	f	VL			3			
11-02-2176-pr	Sequence Stratigraphy Field Course (3 days)		St	B	-	2	X	2	f	PR			2			
11-02-2337	Sedimentology III	St		K	90	1	1	3	f	X	5					
11-02-2177-vl	Sedimentary Petrology and Provenance Analysis						X	1	f	VL			2			
11-02-2178-ue	Microscopy of Sandstones						X	2	f	Ü			3			
11-02-2338	Sedimentology IV		St	B	-	1	1	3	f	X	5					
11-02-2172-pr	Sedimentological Field Course						X	3	f	PR			5			
11-02-2339	Sedimentology V	St		K	90	1	1	3	f	X	5					
11-02-2179-vu	Erosion: Processes and methods						X	3	f	VÜ				5		
11-02-3413	Geophysical Methods						1	5	f	X	6					
11-02-1232-vu	Geophysical Field Methods		St	K	90	1	X	3	f	PR			3			
11-02-2253-pr	Ground Penetrating Radar (GPR)		St	K/B	90/-	1	X	2	f	PR			3			
C2 Other Elective Modules (0 - 24 CP)									**f**							
	Possibility to choose modules from the Environmental Engineering specialisation that are not included in C1.								f							
Specialisation in Environmental Engineering (66 - 72 CP; type §30 para. 4 APB *elective specialisation*)									**f**							
Elective Modules for Environmental Engineering specialisation (type §30 para. 6 APB *area with unrestricted module change*, at least 66 - 72 CP, with max. 24 CP taken from C2)									**o**	X	**66-72**					
C1 Specialisation-related Elective Modules									**o**							
13-L1-M007	Integrated Water Management	St		mP	15	1	1	4	f	X	6					
			bnb	H	-	0	X									
13-L1-0006-vu	Integrated Water Management						X	4	f	VU		6				
11-02-3406	Hydrogeology I						1	4	f	X	6					
11-02-3406-vu	Hydrogeology I	St		K	90	1	X	3	f	VÜ		4				
11-02-3271-ek	Hydrogeological Field Trips		bnb	B	-	0	X	2	f	EK		2				
11-02-3466	Hydrochemistry I						1	5	f	X	6					
11-02-2031-vu	Hydrochemistry	St		K	90	1	X	2	f	VL		3				
11-02-3215-pr	Water Analysis		St	B	-	1	X	3	f	PR		3				
13-K0-M008	Water Treatment Processes	St		mP/K	15/90	1	1	4	f	X	6					
			bnb	HÜ	-	0	X									
13-K0-0008-vl	Water Treatment Processes						X	2	f	VL		6				
13-K0-0008-ue	Water Treatment Processes - Exercise							2	f	Ü						
13-K6-M006	Drinking Water	St		mP/K	15/60	1	1	4	f	X	6					
			bnb	HÜ	-	0	X									
13-K6-0006-vl	Drinking Water						X	2	f	VL		6				
13-K6-0006-ue	Drinking Water - Exercise						X	2	f	Ü						
13-K5-M009	Water Supply Systems	St		mP	15	1	1	2	f	X	3					
			bnb	H+Pt	-	0	X									
13-K5-0002-vl	Water Supply Systems						X	2	f	VL		3				
13-K8-M002	Oxidative Processes in Water Treatment	St		K	90	3	1	4	f	X	6					
			St	B+Pt	-	2										
13-K8-0002-vu	Oxidative Processes in Water Treatment						X	4	f	VU			6			
13-K6-M001	Applied (Environmental) Microbiology for Engineers	St		mp/K	15/60	3	1	4	f	X	6					
			St	H/B+Pt	-	2										
13-K6-0001-se	Applied (Environmental) Microbiology for Engineers						X	4	f	S			6			
13-K6-M002	Mathematical Simulation in Wastewater Treatment	St		mP/K	15/90	3	1	4	f	X	6					
			St	HÜ/B/Pt	-	2										
13-K6-0002-se	Mathematical Simulation in Wastewater Treatment						X	4	f	S			6			
13-K8-M001	Pollutants in the Water Cycle	St		K	90	1	1	4	f	X	6					
			bnb	B+Pt	-	0	X									
13-K8-0001-vu	Pollutants in the Water Cycle: Sources and Fate in the Aquatic Environment						X	4	f	VU				6		
11-02-2219	Groundwater Modelling						1	4	f	X	6					
11-02-2134-vu	Introduction to Groundwater Modelling	St		K	90	1	X	2	f	VÜ			3			
11-02-2133-vu	Advanced Groundwater Modelling		St	H	-	1	X	2	f	VÜ				3		
11-02-2229	Isotopes Hydrology and Dating	St		K	60	1	1	2	f	X	3					
11-02-3253-vl	Isotopes Hydrology and Dating						X	2	f	VÜ				3		
11-02-2239	Tracer Techniques	St		H	-	1	1	2	f	X	3					
11-02-3254-vu	Tracer Techniques						X	2	f	VÜ				3		
11-02-2310	Geohydraulics and Well Construction	St		K	90	1	1	4	f	X	6					
11-02-2163-vu	Geohydraulics and Well Construction						X	4		VÜ				6		
11-02-3460	Geothermal Engineering	St		K	90	1	1	4	f	X	6					
11-02-3460-vu	Geothermal Engineering						X	4	f	VÜ		6				
11-02-3408	Geoinformation Systems						1	6	f	X	6					
11-02-1326-vu	GIS I (Techniques)	St		H	-	1	X	3	f	PR			3			
11-02-2243-vu	GIS II (Case studies)	St		K	90	1	X	3	f	VÜ				3		
11-02-3416	Remote Sensing and Statistics						1	4	f	X	6					
11-02-2244-vu	Remote Sensing in Geology		St	H	-	1	X	2	f	VÜ				3		
11-02-2183-vu	Statistics	St		K	60	1	X	2	f	VÜ				3		
13-K3-J021	Sustainable Waste Management and Life Cycle Assessment Application	St		K	90	1	1	4	f	X	6					
			bnb	Pt	-	0	X									
13-K3-0021-vl	Sustainable Waste Management and LCA Application						X	2	f	VL			6			
13-K3-0021-ue	Sustainable Waste Management and LCA Application - Exercise						X	2	f	Ü						
C2 Other Elective Modules (0 - 24 CP)									**f**							
	Possibility to choose modules from the Hydrogeology specialisation that are not included in C1.								f							
Master-Thesis									**o**	X	**30**					
11-02-5001	Master Thesis	St		Th		1	1	-	o	X	30					
-	Master Thesis						X	-	o	-						30
							Total				**120**	30	30	30	30	

Status: 15.01.2021