



TU Clausthal

Semester kick-off

Semester kick-off on 25.10.2023



[Bild von [Gerd Altmann](#) auf [Pixabay](#)],

Institute of Geo-Engineering (IGE)

www.ige.tu-clausthal.de



Agenda

- The IGE
 - Research
 - Teaching
- Study orientation and organization
 - Facilities of the TU Clausthal (especially the “Schreibwerkstatt”)
 - Useful advices for a good start in the semester



Institute of Geo-Engineering - Research

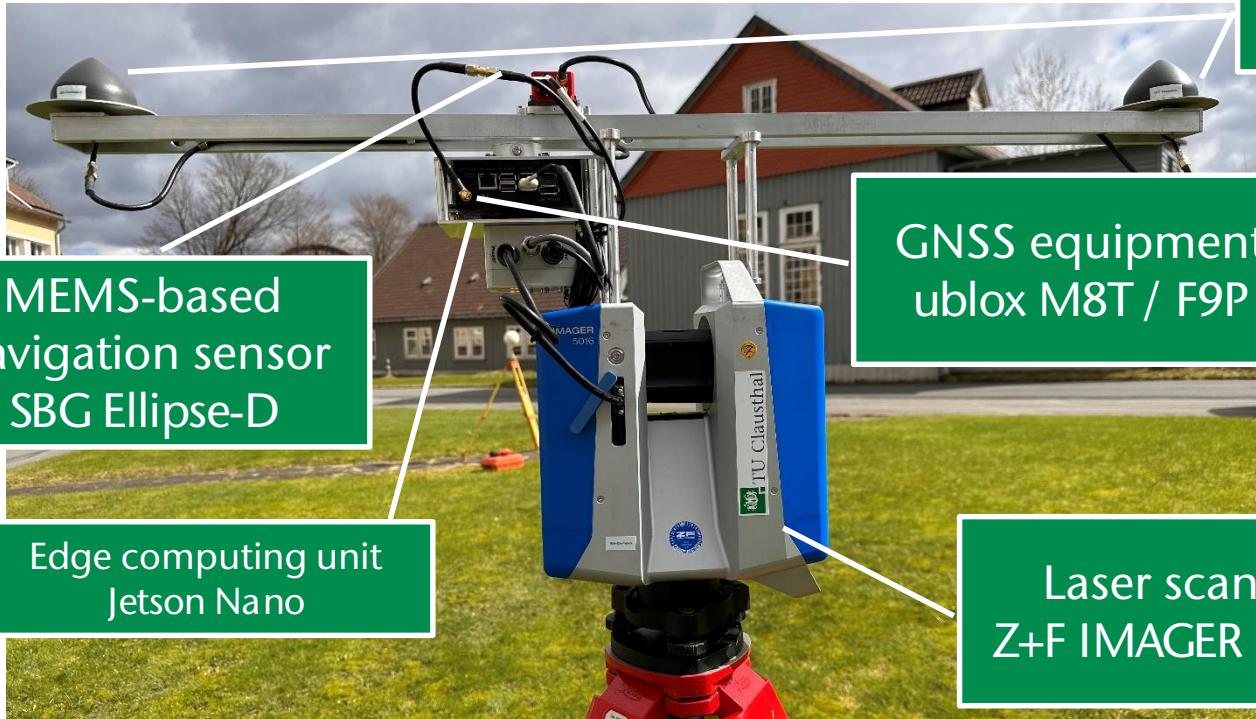
Geomatics

- Spatio-temporal monitoring over scales
- Sensor technology and multi-sensor systems for efficient measurement of three-dimensional (3D) environmental data
- Laserscanning in various settings

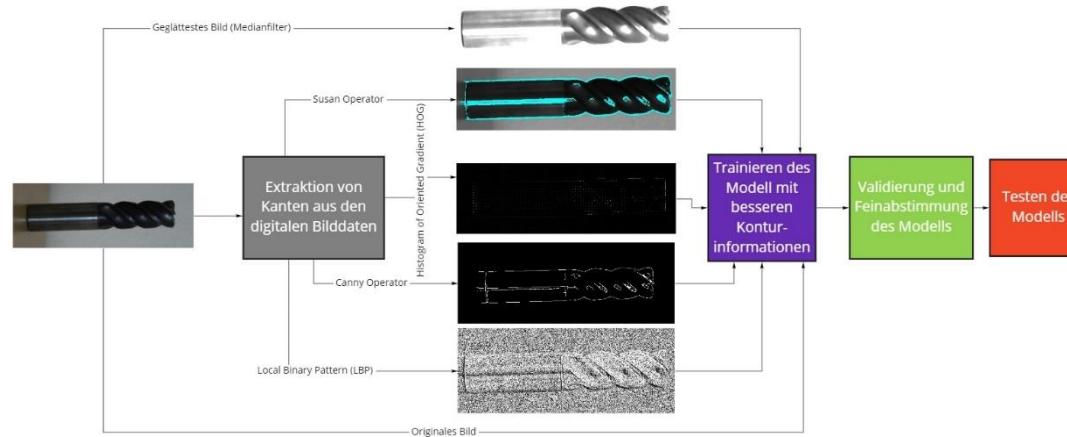
Geotechnics

- Geosynthetics in roadways and airfield surfaces
- Soil mechanical behaviour of tailings
- Investigations of construction material technology for sealing structures in salt rock

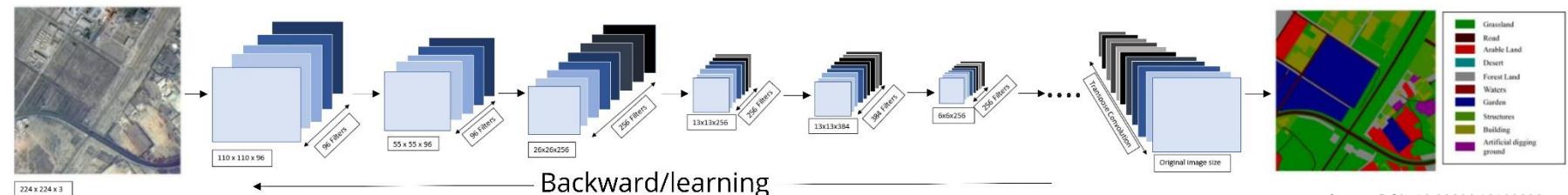
The multi-sensor system and its components



Deep Learning Photogrammetry and Remote Sensing



Forward/inference

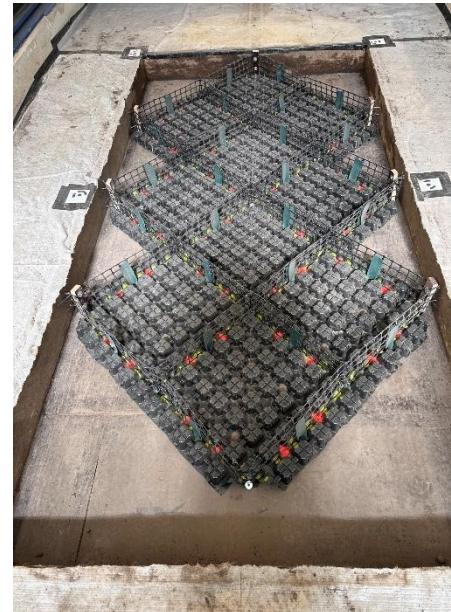


Source: DOI: [10.3390/s18103232](https://doi.org/10.3390/s18103232)

Geocomposite-system and testing machine in action

Can a laser scanner be used to enrich the results of the rolling wheel testing machine?

- Documentation and detection of soil layer differences/deformations induced by wheels
- 3D description of rut depth





Institute of Geo-Engineering - Teaching



BACHELOR GEOENVIRONMENTAL ENGINEERING

Der Studiengang Geoenvironmental Engineering bildet einen Ingenieur heran, der in der Lage ist, interdisziplinär in den Bereichen Geotechnik, Angewandte Geologie und Umwelttechnik zu arbeiten.



MASTER MINING ENGINEERING

Our Mining Engineering students will be trained in a diversity of fields regarding the raw material production.



MASTER GEOENVIRONMENTAL ENGINEERING

Der Masterstudiengang zeichnet sich durch sein interdisziplinäres Programm aus den Bereichen der angewandten Geowissenschaften, Geoinformatik, Geomatik, Umweltgeotechnik und Umweltschutztechnik aus.

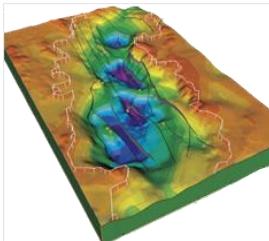


MASTER INFORMATIK

Die Master-Studierenden vertiefen einige Grundlagen der Informatik und der Mathematik und erhalten die Möglichkeit, sich in einem Bereich der Informatik zu spezialisieren.

Bachelor Geoenvironmental Engineering (Geoumwelttechnik)

Geologie



Umweltschutz



Bautechnik



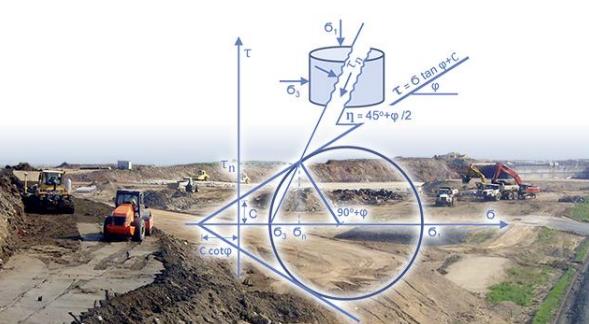
[Bilder u.a. von www.pixabay.com]

„Ein interdisziplinärer Studiengang für alle,
die sich sowohl für Natur als auch Technik begeistern können.“

Master Geoenvironmental Engineering

- Based on the bachelor
- with 3 directions of study

Geotechnik



https://www.auf.uni-rostock.de/storages/uni-rostock/Alle_AUF/AUF/IW/Bilder/Logos/Banner6_NEU-A_1200x340px.jpg

Management & Endlagerung radioaktiver Abfälle



<https://deutsch.radio.cz/atommuell-endlager-tschechien-innerhalb-von-jahrzehnten-moeglich-8738396>

Geomatics and Geomonitoring



<https://altexacademy.com/product/intro-to-drone-survey-and-geomatics/>



Specializations in Geomatics and in Geotechnik

SWS	1. Semester (WS)	2. Semester (SS)	3. Semester (WS)	4. Semester (SS)
1				
2	Ingenieurmathematik III (6 LP)	Geoenvironmental Monitoring (6 LP)	Erdfrüstungen und Sicherungsmaßnahmen (3 LP)	Analyse von geogenen Gefahren (3 LP)
3			Geologische und geotechnische Barrieren (3 LP)	
4				Erdbeben (3 LP)
5				
6	Adjustment Computations and Approximation of Spatial Data (6 LP)	GIS-based Environmental Monitoring (6 LP)	Life Cycle Assessment (3 LP)	
7			Modellierung mit LCA-Software (3 LP)	
8				
9	Building Information Modeling (3 LP)	3D Point Cloud Based Monitoring of Natural and Anthropogenic Structures (6 LP)	Student Research Project (12 LP)	
10				
11	Projektmanagement für Ingenieure (3 LP)			
12				
13	Grundlagen des Managements radioaktiver Abfälle und der Endlagerung (3 LP)			
14				
15	Endlagerung: Geologie und Erkundung (3 LP)	Optical Remote Sensing and Synthetic Aperture Radar Interferometry (6 LP)		
16				
17				
18	Spatio-Temporal Analysis and Modeling of Geodata (6 LP)	LV aus Wahlpflichtmodulkatalog A (6 LP)	Multi Sensor Systems: Design, Calibration and Realization (6 LP)	
19				
20				
21				
22				
Σ	21	22	21	21
SWS				
Σ	30	30	30	30
LP				

SWS	1. Semester (WS)	2. Semester (SS)	3. Semester (WS)	4. Semester (SS)
1				
2	Ingenieurmathematik III (6 LP)	Geoenvironmental Monitoring (6 LP)	Erdfrüstungen und Sicherungsmaßnahmen (3 LP)	Analyse von geogenen Gefahren (3 LP)
3			Geologische und geotechnische Barrieren (3 LP)	
4				Erdbeben (3 LP)
5				
6	Adjustment Computations and Approximation of Spatial Data (6 LP)	GIS-based Environmental Monitoring (6 LP)	Life Cycle Assessment (3 LP)	
7			Modellierung mit LCA-Software (3 LP)	
8				
9				
10	Building Information Modeling (3 LP)	Gekoppelte Phänomene in der Geomechanik (3 LP)	Student Research Project (12 LP)	
11				
12	Projektmanagement für Ingenieure (3 LP)	Numerische Verfahren für multi-physikalische Prozesse (3 LP)		
13				
14	Grundlagen des Managements radioaktiver Abfälle und der Endlagerung (3 LP)	Tunnelbau (3 LP)		
15	Endlagerung: Geologie und Erkundung (3 LP)	Spezialtiefbau (2 LP)		
16				
17	Rechnergestützte Nachweisverfahren in der Geotechnik (3 LP)	LV aus Wahlpflichtmodulkatalog B (6 LP)	Tunnelstatik (3 LP)	
18				
19	Angewandte Finite Elemente (3 LP)			
20				
21				
22				
Σ	20	19	21	21
SWS				
Σ	30	29	31	30
LP				



Studienrichtung „Management und Endlagerung radioaktiver Abfälle“

Klaus-Jürgen Röhlig,
Institut für Endlagerforschung

25.10.2023



Master Mining Engineering

Module 3: Geomatics

- GIS-based spatio-temporal analysis and modeling
- Remote Sensing

Anlage 2: Modellstudienplan des Masterstudiengangs Mining Engineering
(Studienbeginn im Wintersemester) _AFB 22.06.2021_3. Änd. 13.06.2023

SWS	Semester 1	Semester 2	Semester 3	Semester 4
1				
2	Underground Mining Equipment 6 CP	Responsible Mining 6 CP	Student Research Project 6 CP	
3				
4				
5	Shaft Sinking and Advanced Ventilation 6 CP			
6				
7				
8	Mineral Resources 6 CP	IoT and Digitalization for Circular Economy 6 CP	Mining and Environment 6 CP	
9				
10				
11		Advanced Surface Mining		
12	International Mining 6 CP		8 CP	
13				
14				
15	Mineral Processing 4 CP	Advanced Rock Mechanics 6 CP	Applied Rock Mechanics 6 CP	
16				
17			Electives	
18	Geomatics 6 CP		12 CP	
19				
20				
21		Seminar 6 CP		
22				
ECTS:	28	32	30	30

Master Informatik

Specialization in geomatics is possible through the elective courses “Application Subjects of Computer Science”

Wahlpflicht-Block „Vertiefung Informatik“		30 LP
Seminar Forschungsmethoden Wahlpflicht-Block „Theoretische und methodische Grundlagen“		2 LP 12 LP
Wahlpflicht-Block „Anwendungen der Informatik“		12 LP
Wahlpflicht-Block „Allgemeine Grundlagen“		4 LP
Ohne Research Track		
Wahlpflicht-Block „Vertiefung Informatik“	zusätzlich 18 LP	
Hauptseminar Projekt im Master	4 LP 8 LP	
Masterarbeit		30 LP
Summe		120 LP



(a) Modellstudienplan für den Masterstudiengang Informatik (Studienbeginn im Wintersemester)

SWS	Semester 1 (WS)	Semester 2 (SS)	Semester 3 (WS)	Semester 4 (SS)
1	Wahlpflicht Vertiefung „Informatik“ 3V + 1Ü 6 LP	Wahlpflicht Vertiefung „Informatik“ 3V + 1Ü 6 LP	Wahlpflicht Vertiefung „Informatik“ 3V + 1Ü 6 LP	
2				
3				
4				
5				
6	Wahlpflicht Vertiefung „Informatik“ 3V + 1Ü 6 LP	Wahlpflicht Vertiefung „Informatik“ 3V + 1Ü 6 LP	Wahlpflicht Vertiefung „Informatik“ 3V + 1Ü 6 LP	
7				
8				
9				
10	Wahlpflicht Theoretische und metho- dische Grundlagen 3V + 1Ü 6 LP	Wahlpflicht Vertiefung „Informatik“ 3V + 1Ü 6 LP	Wahlpflicht Vertiefung „Informatik“ 3V + 1Ü 6 LP	
11				
12				
13	Forschungsmethoden 2S			
14				
15				
16				
17				
18				
19				
20				
21				
22				
Σ SWS	22	20	18	20
Σ LP	30	30	30	30



Abb. 1. Übersicht über die Module des Master-Studiengangs Informatik

Starting the semester together



Master Informatik - Module overview

We offer 5 modules with 6 credit points each

- Geomatics
- Adjustment Computations and Approximation of Spatial Data
- Spatio-Temporal Analysis and Modelleing of Geodata
- Optical Remote Sensing and Synthetic Aperture Radar Interferometry
- Multi Sensor Systems: Desgin, Calibration and Realization

Bezeichnung des Moduls bzw. der Lehrveranstaltung	LV-Nr.	LV-Art, SWS	LP	Prüf.- form	Gewich- tung	Beno- tet?	Prüf.- typ	Verantw. Prüfer/in	WS	SS
Anwendungsgebiet Geomatik										
Modul										
Geomatics <small>(davon können nur Studierende wählen, wenn bisher keines oder nur eines der bisherigen Module „Geoinformation Systems“ oder „Remote Sensing“ bereits absolviert wurden.)</small>										
GIS-based Spatio-Temporal Analysis and Modeling (Anrechnung des entfallenen Moduls Geoinformation Systems.)	S 6309	2V + 1Ü	3	K/M	0,5	ben.	MTP	Paffenholz		x
Remote Sensing (Anrechnung des entfallenen Moduls Remote Sensing.)	W 6354	1V + 1Ü	3	K/M	0,5	ben.	MTP	Paffenholz	x	
Modul										
Adjustment Computations and Approximation of Spatial Data										
Adjustment Computations and Approximation of Spatial Data	W 6306	3V + 1Ü	6	K/M	1	ben.	MP	Paffenholz	x	
Homework to Adjustment Computations and Approximation of Spatial Data			0	HA	0	unben.	PV			
Modul										
Spatio-Temporal Analysis and Modeling of Geodata <small>(Nur wählbar, wenn das entfallene Modul Spatiotemporale Analysemethoden noch nicht absolviert wurde.)</small>										
Spatio-Temporal Analysis and Modeling of Geodata	W 6310	3V + 2Ü	6	K/M	1	ben.	MP	Paffenholz	x	
Homework to Spatio-Temporal Analysis and Modeling of Geodata			0	HA	0	unben.	PV			
Modul										
Optical Remote Sensing and Synthetic Aperture Radar Interferometry										
Optical Remote Sensing and Synthetic Aperture Radar Interferometry	S 6313	3V + 2Ü	6	K/M	1	ben.	MP	Paffenholz	x	
Homework to Optical Remote Sensing and Synthetic Aperture Radar Interferometry			0	HA	0	unben.	PV			
Modul										
Multi Sensor Systems: Design, Calibration and Realization										
Multi Sensor Systems: Design, Calibration and Realization	W 6312	3V + 2Ü	6	K/M	1	ben.	MP	Paffenholz	x	
Homework to Multi Sensor Systems: Design, Calibration and Realization			0	HA	0	unben.	PV			



Where do you find this information?

- On the website of your study program
- Sidebar with all the documents about the structure
- More information about each module and its subjects
→ **Module handbook**

Elective catalogs
for AFB 2020 only

- [Elective catalog WS 23/24 and SoSe 24 update 13.10.2023](#)

for AFB 2013 only

- [Elective catalog WS 23/24 and SoSe 24 update 13.10.2023](#)

Module Handbook

for AFB 2020 only

- [Module Handbook](#)

for AFB 2013 only

- [Module Handbook](#)

Computer science (Master)

Demanding studies in computer science in all areas of our daily life. It is usually engineering, technology as well as applied science. Computer science is one of the driving factors behind technological progress in today's business and society. It develops innovative software and hardware solutions for the benefit of society. The study of computer science creates essential theoretical, technical and practical prerequisites for the increasing digitization of all areas of society.

PROGRAM OUTLINE
Type of degree: Bachelor Duration: 4 years Language: German, English Degree master of science (FH) Doctoral studies: No Further studies: Master's degree in computer science, but also in other fields such as mathematics, physics, chemistry, geology, etc. FH Master's degree

STUDYING YOUR STUDIES

Welcome students! Before the start of term(s) the Institute of Geotechnical Engineering supports the transition from school to university.

FREQUENCIES IN MATHEMATICS

Mathematics offers a great variety of courses. Most of them are taught in small groups. Master students who would like to take part in the frequency of the first year classes are welcome to do so.

PREREQUISITES

The admission requirement for the admission to Bachelor's programs in mechanical engineering or civil engineering is the completion of a secondary school leaving certificate with a grade of at least 4.00 in mathematics.

DOCUMENTS

Study program fees

- [Bachelor's degree](#)
- [Master's degree](#)

Examination fees

- [FH 2023/24](#)
- [Master's degree](#)
- [FH 2023/24 \(international\)](#)
- [FH 2023/24 \(international, English\)](#)
- [FH 2023/24 \(international, English, Master's degree\)](#)

Enrolment fees

- [FH 2023/24](#)
- [FH 2023/24 \(international\)](#)
- [FH 2023/24 \(international, English\)](#)
- [FH 2023/24 \(international, English, Master's degree\)](#)

Administrative regulations

- [Administrative regulations](#)
- [Bachelor's admission](#)
- [Bachelor's admission \(international\)](#)
- [Bachelor's admission requirements](#)
- [Bachelor's admission \(international\)](#)

Elective catalogues

- [Elective catalog WS 23/24 and SoSe 24 update 13.10.2023](#)
- [Elective catalog WS 23/24 and SoSe 24 update 13.10.2023](#)

Information for students

- [Prerequisites for admission](#)
- [Programs offered](#)
- [Current students](#)
- [Research](#)
- [Contact](#)

VOM BACHELOR, ZUM MASTER



Institute of Geo-Engineering - Theses

You would like to write a thesis...

...and are still looking for a topic?

- You can find current topic suggestions on the IGE-Homepage (contact the person named there).
- Contact us to find a common topic

...and have an idea for a topic yourself and are looking for a supervisor?

- Contact us to arrange an appointment.



Study orientation and organization

- Facilities of the TU Clausthal (especially the “Schreibwerkstatt”)
- Useful advices for a good start in the semester





Facilities of our university that you should know

- The helpdesk of the computer centre (RZ-helpdesk)
- International Center Clausthal
- Student Office
- Examination Office
- „Schreibwerkstatt“

A graphic composed of several question words ('what', 'why', 'where', 'when', 'who') in different sizes and orientations, creating a sense of inquiry and interconnectedness.



The computer centre

- Helpdesk
- Open: Mon. - Fri.
8:00 am - 3:00 pm



Building B5,
Erzstraße 18,
room number 043



CONSULTING & SUPPORT

- Instructions for using the RZ services
- RZ Helpdesk
- top up print credit
- User Management





International Center Clausthal

- Language courses at the language center
- Events and excursions
- Study buddy program
- International Student Guide



Building A2,
Graupenstraße 11





Student Office

- General information about study at the university
- Your TU card
- Semester dates
- Semester fee
- Certificates
- ...

✉ studierendensekretariat@tu-clausthal.de



TUC main building (A1)
Adolph-Roemer-Straße 2A,
room number 103a and 103b



Examination Office

- Examination periods/exam dates
- Important information on exam regulations
- Forms
- Thesis submission
- FAQs
- ...



☎ 05323-723168

✉ pruefungsamt@tu-clausthal.de

TUC main building (A1),
Adolph-Roemer-Straße 2A,
room number 106



Schreibwerkstatt

- Workshops and events
- Open writing and learning space
- Material for
 - self-organization
 - dealing with literature
 - writing process
 - requirements for scientific writing
 - language guides
 - digital tools





Schreibwerkstatt

The screenshot shows the TU Clausthal website with a green header bar. The main content area features a large image of people working at desks in a study room. Below the image, the breadcrumb navigation reads: Home > Studieninteressierte > Bewerbung & Beratung > Zentrale Studienberatung > Studierende > Schreibwerkstatt.

Schreibwerkstatt

WORKSHOPS
Die Digitalisierung unserer Angebote ist abgeschlossen.

SCHREIBBERATUNG
Wir helfen gerne bei allen Problemen rund ums Schreiben.

KONTAKT UND TEAM
Hier stellt sich das Team der Schreibwerkstatt vor.



Benefit from the offer even before your final thesis!

✉ schreibwerkstatt@tu-clausthal.de

**Building C9,
Arnold-Sommerfeld-Str. 6,
room number 326**



Useful advice for a good start into the semester

- Know your **study plan** and **module handbook**
- We are a face-to-face university - Attend **lectures** and **tutorials**
- Stay informed
 - Use your **@tu-clausthal.de** address
 - Read the **Stud.IP** announcements
- Visit **group workplaces** and **TUC learning sites**
 - Library
 - Institutes
 - PC-Pools





Any Questions?





Contacts - Institute of Geo-Engineering

Prof. Dr.-Ing. Jens-André Paffenholz

Chair of Geomatics for Underground
Systems

Team Geomatics

- Alexander Dorndorf, M.Sc.
- Waseem Iqbal, M.Sc.
- Yu Lan, M.Sc.
- Marc Neumann
- Jana Thomas, B.Sc.

Prof. Dr.-Ing. Norbert Meyer

Chair of Geotechnical Engineering

Team Geotechnik

- Dr.-Ing. Ansgar Emersleben
- Mathias Martin, M.Sc.
- Tina Waldow, M.Sc.
- Annika Zellmann, M.Sc.



www.ige.tu-clausthal.de