

# Geodesy and Geoinformation

## Master of Science

Dr.-Ing. Felix Müller (Academic Program Coordination and Study Advice)

- **1. semester**
  - 4 required basic modules + interdisciplinary compulsory module + elective modules (25 Credits)
- **2. to 3. semester**
  - Selection of 3 out of 9 possible study lines
  - Completion of main module and elective modules from the study line (45 Credits)
- **During first three semesters**
  - Selection and completion of elective modules from study line modules (not chosen) and/or discipline-specific elective module catalog (20 Credits)
  - Study progress control:
    - Verification of 30 credits from 3<sup>rd</sup> semester
    - Verification of 60 credits from 4<sup>th</sup> semester
- **4. semester**
  - Master's thesis 6 months (30 Credits)
- **Mobility window:**
  - Best possible in the 3rd semester

# Example: G&G M.Sc. Curriculum

1st Semester (Winter)		2nd Semester (Summer)		3rd Semester (Winter)		4th Semester (Summer)	
ECTS		ECTS		ECTS		ECTS	
Computer Vision and Machine Learning - Basics (PF+LMF)	5	Study Line 1 (required)	5	Study Line 1	5	Master's Thesis	30
Geodetic Engineering and Consulting (LEW, GDS)	5	Study Line 1	5	Study Line 2	5		
Satellite geodesy for Earth System applications (APG, SAT, DGFI)	5	Study Line 2 (required)	5	Study Line 3	5		
Spatial Data Management and Geovisualization (LfK, GIS)	5	Study Line 2	5	Study Line 3	5		
Geodetic Seminar (all chairs)	5	Study Line 3 (required)	5	Elective	5		
Elective	5	Elective	5	Free Elective (Languages, Soft Skills, Transfer Credits etc.)	5		
Sum of Credits (semester)	30	Sum of Credits (semester)	30	Sum of Credits (semester)	30	Sum of Credits (semester)	30
Examinations	6	Examinations	6	Examinations	6	Examinations	6

Study Lines
Navigation and GNSS
Physical Geodesy and Earth System
Space Geodetic Techniques
Engineering Geodesy
Land Management
Geoinformatics
Cartography and Visual Analytics
Photogrammetry
Remote Sensing

# Study Line Information sessions

Info-Session (Study Lines)	Date	Room
1 (Nav.), 5 (LM.), 9 (RS)	15.01.2024 11:30 – 13:00	1713
2 (PhyG.), 7 (Cart.), 8 (Photog.)	22.01.2024 11:30 – 13.00	1713
3 (SpaceGT.), 6 (GeoInf.), 4 (EngG.)	24.01.2024 11:30 – 13.00	1713

- Please be there in-person

# Choice form – Study Lines

[..\Auswahlformular Study Lines 2023\\_12\\_06.docx](#)

- Choice form only for:
  - Selection of 3 Study Lines incl. compulsory module
  - Selection of compulsory elective modules (extent 10 Credits) per chosen Study Line
  - Depending on the number of credits, this can be 2 - 4 compulsory elective modules
- All remaining courses (free electives, further courses) are selected via TUMonline (no form)
  
- Please check the module catalog for more information regarding the scope and content of the study lines as well as individual modules (e.g. language etc.).

Find the module catalog here:

➤ TUM-Wiki → Master Geodesy and Geoinformation → Documents → Module Catalog (FPSO2022)

Location of choice form:

➤ TUM-Wiki → Master G&G → Forms

# Discipline-specific elective module catalog

Winter term



Module no.	Module name	Credits	SWS	Language	Module coordinator	Import module
ED110089	Causal Inference in the Climate and Earth System	3	2	English	Niklas Boers	
ED110087	Data Science in Earth Observation	5	5	English	Xiaoxiang Zhu	
BGU31005T2	Image Understanding – Recent Trends in Machine Learning	3	2	English	Marco Körner	
ED110127	Intercultural Science Communication and Ethics in Science	3	2	English	Simon Schneider	
BV450022	Interdisciplinary Project	5	6	English / German	Roland Pail	
BV450023	Interdisciplinary Project	3	3	English / German	Roland Pail	
BGU40067	International land rights	5	4	English	Walter de Vries	
LRG5400	Inverse Problems in Radiative Transfer Theory	3	2	English	Marco Körner	ESPACE
ED110065	Machine Learning in Earth System Modelling	3	2	English	Niklas Boers	
ED110088	Mathematics of Climate and Earth System Science	6	6	English	Niklas Boers	
BV530017	Practical course in Engineering Surveying	3	3	English	Christoph Holst	
ED110063	Practical Course in Laser Scanning	3	3	English	Christoph Holst	
ED110050	Precise GNSS Satellite Orbit Determination and Time Synchronization	3	2	English	Bingbing Duan	
BGU46038	Principles and Applications of Land Management	6	4	English	Walter de Vries	
ED110040	Principles of Programming	5	5	English	Martin Werner	
LRG1500	Principles of Spatial Data Mining and Machine Learning	3	3	English	Martin Werner	
ED110048	Professional Internship - M.Sc. Geodesy and Geoinformation	5	-	English / German	Christoph Holst	
BGU40059	Real estate economics	5	4	English	Gero Suhner	
BV610013	Receiver Technology	4	2	English	Urs Hugentobler	
BGU40064	Scientific Paper Writing - Theory and Practice	5	4	English	Walter de Vries	
ED110068	Scientific Programming and Dynamical Modelling in Julia	5	3	English	Niklas Boers	
LRG1501	Selected Topics in Big Geospatial Data	3	3	English	Martin Werner	
BV570009	Seminar Earth System Dynamics	2	1	English	Florian Seitz	
BV450015	Solid Earth Processes	2	2	English	Roland Pail	
ED110128	System Earth from Space - an Introduction to the Interpretation of Remote Sensing Data	3	2	English	Xiaoxiang Zhu	
ED110066	Tipping Points in Earth System Dynamics	3	2	English	Niklas Boers	
BV120005	Unterirdisches Bauen / Tunnelbau II	3	2	German	Jochen Fillibeck	Civil Engineering
BGU61024	Language Course for Geodesists	3	2	Language taught		

Free selection of discipline-specific elective modules

You can find the table in the TUM-Wiki → M.Sc. Geodesy and Geoinformation

# Discipline-specific elective module catalog

Summer term

Module no.	Module name	Credits	SWS	Language	Module coordinator	Import module
ED110070	Astronomy Seminar	3	3	English	Anja Schlicht	
LRG2000	Big Geospatial Data	3	3	English	Martin Werner	
BGU65016	BIM fundamentals	6	4	English	André Borrmann	Civil Engineering
ED110087	Data Science in Earth Observation	5	5	English	Xiaoxiang Zhu	
ED110064	Earth System Dynamics in Models and Observations	3	2	English	Niklas Boers	
ED110103	GIS with Volunteered Geographic Information	3	3	English	Martin Werner	
BV470003	Harmonisation of Geospatial Data	3	2	English / German	Thomas H. Kolbe	
ED110056	Ingenieurgeodäsie im Tunnelbau	3	2	German	Christoph Holst	
BV450022	Interdisciplinary Project	5	6	English / German	Roland Pail	
BV450023	Interdisciplinary Project	3	3	English / German	Roland Pail	
ED110065	Machine Learning in Earth System Modelling	3	2	English	Niklas Boers	
BV530024	Methoden und Kompetenz des Prüfsachverständigen für Vermessung im Bauwesen	2	1	German	Christoph Holst	
BV450014	Numerical Methods in Satellite Geodesy	3	3	English	Roland Pail	
BV530017	Practical course in Engineering Surveying	3	3	English	Christoph Holst	
ED110048	Professional Internship - M.Sc. Geodesy and Geoinformation	5	-	English / German	Christoph Holst	
BGU65006	Professional Software Development	4	3	English	André Borrmann	Civil Engineering
BGU57013	Realization and Application of Global Geodetic Reference Systems	3	2	English	Florian Seitz	
BGU40064	Scientific Paper Writing - Theory and Practice	5	4	English	Walter de Vries	
ED110068	Scientific Programming and Dynamical Modelling in Julia	5	3	English	Niklas Boers	
ED110128	System Earth from Space - an Introduction to the Interpretation of Remote Sensing Data	3	2	English	Xiaoxiang Zhu	
ED110116	Theoretical Physics approaches in climate and Earth system science	3	3	English	Niklas Boers	
BV000045	Tunnelbau	4	5	German	Jochen Fillibeck	Civil Engineering
BV340006	Verkehrswegebau II für Geodäten	4	2	German	Stephan Freudenstein	Civil Engineering
ED110066	Tipping Points in Earth System Dynamics	3	2	English	Niklas Boers	
BGU61024	Language Course for Geodesists	3	2	Language taught		

Free selection of discipline-specific elective modules

You can find the table in the TUM-Wiki → M.Sc. Geodesy and Geoinformation

# Study Line 1: Navigation and GNSS

Module ID	Name	Semester	Credits
ED110007	<b>Positioning and Navigation*</b>	2	5
ED110009	Seminar Navigation and GNSS	3	5
ED110006	Navigation and Sensor fusion	3	5
ED110005	Mobile Laser Scanning	2	5
ED110010	Data Analysis and Numerical Methods in Satellite Geodesy	2	5
BV610015	Time and Frequency	2	3
BV610016	Geodetic Astronomy	3	3
ED110008	Receiver Technology	3	3
BGU57012	Ionosphere Monitoring and Modeling	3	3
BGU57011	Advanced Aspects of Height systems	3	3
BGU45026	Earth Observations Mission Design Seminar	3	3
BGU45027	Earth Observations Mission Development Seminar	2	3

\* Mandatory module



# Study Line 2: Physical Geodesy and Earth System

Module ID	Name	Semester	Credits
ED110013	<b>Gravity field*</b>	2	5
ED110011	Earth System Modelling	2	5
ED110015	Seminar Earth System	3	5
ED110010	Signal Analysis and Numerical Methods	2	5
BV450005	Satellite Altimetry and Physical Oceanography	3	3
ED110012	Geophysics and Solid Earth Processes	3	2
BGU57014	Hydrogeodesy: Monitoring Surface Waters from Space	3	3
ED110014	Climate Signatures in the Hydrosphere	2	3
BGU57011	Advanced Aspects of Height systems	3	3
BGU45025	Selected Topics of Physical Geodesy	2	3
BGU45026	Earth Observations Mission Design Seminar	3	3
BGU45027	Earth Observations Mission Development Seminar	2	3

\* Mandatory module

# Study Line 3: Space Geodetic Techniques

Module ID	Name	Semester	Credits
ED110016	<b>Observation Techniques and Data Analysis of Space Geodesy*</b>	2	5
ED110019	Satellite Orbits and Sensors	2	5
ED110018	Reference Systems and Earth Rotation	3	5
ED110020	Seminar Geodetic Space Techniques	3	5
ED110010	Signal Analysis and Numerical Methods	2	5
BV610015	Time and Frequency	2	3
BV610016	Geodetic Astronomy	3	3
BV450005	Satellite Altimetry and Physical Oceanography	3	3
BGU45026	Earth Observations Mission Design Seminar	3	3
BGU45027	Earth Observations Mission Development Seminar	2	3
ED110017	Project Monitoring of Geodetic Fundamental Stations	3	3

\* Mandatory module

# Study Line 4: Engineering Geodesy

Module ID	Name	Semester	Credits
ED110021	<b>Geodetic Monitoring*</b>	2	5
ED110023	Project Engineering Geodesy	3	5
ED110022	Metrology and Quality	3	5
ED110005	Mobile Laser Scanning	2	5
BGU57011	Advanced Aspects of Height systems	3	3
ED110017	Project Monitoring of Geodetic Fundamental Stations	3	3

\* Mandatory module

# Study Line 5: Land Management

Module ID	Name	Semester	Credits
BGU40063	<b>Land management international - theory and practice*</b>	2	5
ED110025	Development of Municipalities and Rural Areas	2	5
ED110024	Applied Land Management	3	5
BGU40060	Spatial planning and policies	3	5
BGU40062	Instruments of land mobilisation - theory and practice	2	5
BGU40068	International rural development	3	5
BV400010	Grundstücks- und Immobilienwertermittlung	3	3

\* Mandatory module

# Study Line 6: Geoinformatics

Module ID	Name	Semester	Credits
ED110028	<b>Spatial and Semantic Modeling of the Environment*</b>	2	5
ED110029	Spatial Data Management and System Architectures - Advanced Methods	3	5
ED110026	Big Geospatial Data Analysis and Management	2	5
ED110027	Geo Sensor Networks and the Internet of Things	2	5
BV470007	Advanced GIS Project	3	3
BV470009	Professional Applications of Geoinformatics	3	3

\* Mandatory module

# Study Line 7: Cartography and Visual Analytics

Module ID	Name	Semester	Credits
ED110036	<b>Spatial Visual Analytics*</b>	2	5
ED110035	Spatial Data Integration	2	5
ED110031	Geostatistics and Geomarketing	3	5
ED110033	Mapping for a Sustainable World - Seminar	2/3	5
ED110032	High Mountain Cartography	2	3
ED110034	Mixed Reality and Cognition	3	3
ED110030	Archaeologic Cartographic Project	2	5

\* Mandatory module

# Study Line 8: Photogrammetry

Module ID	Name	Semester	Credits
ED110037	<b>Computer Vision and Machine Learning 2*</b>	2	5
BGU48035	Photogrammetry - Selected Chapters	2/3	5
ED110039	Project Photogrammetry and Remote Sensing	3	5
ED110038	Industrial Photogrammetry	3	3
LRG4800	Point Cloud Processing	2	3
ED110058	Sensors and Applications in Close-Range-Photogrammetry	2	3

\* Mandatory module

# Study Line 9: Remote Sensing

Module ID	Name	Semester	Credits
ED110055	<b>Remote Sensing Methods*</b>	2	5
BV480018	Remote Sensing Applications	3	5
ED110061	Remote Sensing – Advanced Methods	3	3
ED110062	Remote Sensing - Seminar	2	3
ED110037	Computer Vision and Machine Learning 2	2	5
ED110039	Project Photogrammetry and Remote Sensing	3	5
ED110053	Atmospheric Remote Sensing 1	2	3
ED110054	Atmospheric Remote Sensing 2	3	3

\* Mandatory module



# Questions?

