

# **Study and Examination Regulations for the Master's Program in Remote Sensing, geoInformation, and Visualization at the University of Potsdam**

**Dated February 15, 2017**

## **First Amendment of the Study and Examination Regulations for the Master's Program in Remote Sensing, geoInformation, and Visualization (RSIV) at the University of Potsdam**

**Dated January 16, 2019<sup>1</sup>**

The Faculty Committee of the Faculty of Science at the University of Potsdam has approved on February 15, 2017 the following degree and examination regulations on the basis of Section 19 subsection 1, Section 22 subsection 1, Section 22 subsections 13, and Section 31 in combination with Section 72 subsection 2 no. 1 of the Brandenburg Higher Education Act (BbgHG) of April 28, 2014 (Law and Ordinance Gazette [GVBl.] I/14, [no. 18]), last amended by Section 2 of the Act of July 1, 2015 (Law and Ordinance Gazette [GVBl.] I/15 [no. 18]) in combination with the Ordinance on the Design of Examination Regulations to Guarantee the Equivalency of Studies, Examinations, and Degrees (University Examination Ordinance - HSPV) of March 4, 2015 (GVBl. II/15 [no. 12]), and with Section 14 subsection 1 no. 2 of the Basic Constitution of the University of Potsdam dated December 17, 2009 (Bulletin UP no. 4/2010 p. 60) in the Third Amended Version of the Basic Constitution of the University of Potsdam (GrundO) of April 22, 2015 (Bulletin UP no. 6/2015 p. 235) and Section 1 subsection 2 of the new version of the General Admission Regulations for Bachelor's and Master's Degree Programs at the University of Potsdam Not Related to Teacher Education dated January 30, 2013 (BAMA-O) (Bulletin UP no. 3/2013, p. 35), last amended on February 24, 2016 (Bulletin UP 7/2017, p. 560):<sup>2</sup>

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<sup>1</sup> Approved by the President of the University of Potsdam on March 18, 2019.

<sup>2</sup> Approved by the President of the University of Potsdam on March 28, 2017.

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### **§ 1 Applicability**

(1) These regulations apply to the Master's program in Remote Sensing, geoInformation, and Visualization at the University of Potsdam. These discipline-specific regulations supplement the new version of the General Regulations for Study and Examinations for Bachelor's and Master's Degrees (not for teachers in training) at the University of Potsdam (BAMA-O).

(2) In the event that these regulations contradict the BAMA-O, then the provisions in the BAMA-O supersede these regulations.

(3) The Master's program is suitable for part-time study. Part-time study requires advising from the relevant faculty so that an individualized plan of study can be created. Proof of this advising must be attached to an application in accordance with Section 3 of the Regulations for Part-Time Studies at the University of Potsdam (Part-Time Regulations). The provisions of the Part-Time Regulations also apply.

### **§ 2 Degree**

The Faculty of Science at the University of Potsdam awards the degree of "Master of Science" (abbreviated as "MSc") to students who have completed the necessary credit points and graduation requirements.

### **§ 3 Objectives of Master's Program**

(1) The research-oriented Master's program in Remote Sensing, geoInformation, and Visualization builds upon the knowledge, skills, abilities, and methods acquired during the Bachelor's degree course. The students will:

- Develop an advanced understanding of remote sensing in theory and practice, including its fundamental principles, how to obtain and process spatial data, and how such data is typically acquired using remote sensing methods
- Have a general understanding of the wide range of available remote sensing technologies and data processing methods and be able to apply these to solving individual problems in scientific and applied fields

- Be able to process remote sensing data and combine it with other environmental observation data and the results of environmental models
- Develop skills for effectively communicating scientific issues, data processing, and the outcomes of remote-sensing investigations
- Have a critical awareness of the strengths and limitations of remote sensing and their variable role in environmental modeling and monitoring
- Recognize the value of professional data visualization as a tool for strategically communicating scientific results and understand the physical, chemical, biological, and other scientific principles underlying remote sensing and the processes it records
- Develop, by monitoring the environment, an interdisciplinary understanding and a critical perspective on how to resolve and assess scientific inquiries
- Possess practical skills for applying modern data processing techniques in remote sensing, for making computer-assisted scientific calculations, and for obtaining, processing, and storing large quantities of data
- Be able to skillfully define a scientific problem, formulate suitable hypotheses, design a research project, guide it to a funding application, and administer it if funded
- Be able to comprehensibly communicate complex and rapidly shifting scientific findings and their uncertainties, especially forecasts, in discipline-specific essays and talks as well as present them to members of other disciplines and decision-makers outside the field

#### § 4 Duration and Organization of Master's Studies

The consecutive, research-oriented Master's program in Remote Sensing, geoInformation, and Visualization is offered at the University of Potsdam as a single-discipline program with a standard period of study (full-time program) of four semesters and 120 credit points (CPs).

#### § 5 Modules and Degree Programs

(1) The Master's program in Remote Sensing, geoInformation, and Visualization is comprised of the following components:

Master's Degree		
Module Abbreviation	Name of Module	CP
I Core modules (30 CP)		
GEW-RCM01	Remote Sensing of the Environment	6

GEW-RCM02	Earth System Science	6
GEW-RCM03	Data Analysis and Statistics	6
GEW-RCM04	Geoinformation Systems	6
GEW-RCM05	Visualization and Communication	6
II Elective Modules (60 CP)		
Elective modules worth 60 credit points must be successfully completed, including at least one module from each of the elective areas:		
1st Elective Area: Remote Sensing Methods (RSM)		
GEW-RSM01	Optical Remote Sensing	6
GEW-RSM02	Terrestrial and Airborne Lidar and Photogrammetry Systems	6
GEW-RSM04	Earth Surface Deformation and Radar Satellite Interferometry (InSAR)	6
GEW-RSM05	Advanced Topics of Remote Sensing	6
2nd Elective Area: Objects of Observation (OBS)		
GEE-OBS01	Soilscape Processes	6
GEW-OBS02	Erosion and Earth surface dynamics	6
BIO-OBS03	Biosphere of the Earth	6
GEW-OBS04	Remote Sensing and Permafrost Regions	6
GEW-OBS05	Earthquake and Volcano deformation	6
GEW-MGEW26	Coastal Dynamics	6
GEW-OBS08	Planetary Remote Sensing	6
GEW-OBS09	Planetary Physics	6
GEE-M-V02	Atmospheric Science in the Anthropocene	6
GEW-OBS11	Advanced Topics of Objects of Observation	6
3rd Elective Area: Data Analysis and Programming (DAP)		
MAT-DAP01	Bayesian Inference and Data Assimilation	6
GEW-DAP02	Nonlinear Data Analysis Concepts	6
GEW-DAP03	Big Data Analytics	6
GEW-DAP04	Spatial data analysis with numerical methods	6
GEW-DAP05	Advanced Topics of Data Analysis and Programming	6
GEW-DAP06	Earth Surface Process Modelling	6
4th Elective Area: Geoinformation Systems and Applications (GIS)		
GEW-GIS01	Analysis of Digital Elevation Models	6
GEW-GIS02	Mapping and Geoinformation	6

	tion Systems	
GEE-GIS03	Environmental Spatial Statistics and Models	6
GEW-GIS05	Advanced Topics Geoinformation System Applications	6
5th Elective Area: Visualization and Communication Methods (VCM)		
GEW-VCM01	Examples of Visualization and Communication Methods	6
GEW-VCM02	Industry Internship or Practical Application	6
GEW-VCM03	Extended Industry Internship or Practical Application	6
GEW-VCM04	Advanced Topics of Visualization and Communication Methods	6
Total CPs for mandatory and elective modules to be completed		90
III. Final Thesis		30

(2) The language of instruction and examinations for the program is English. Most modules are offered in English.

(3) The descriptions of the modules named in subsection 1 are given in the Module Catalog in Appendix 1 of these regulations.

(4) Sample courses of study for the Master's program are provided in Appendix 2 of these regulations.

## § 6 Master's Thesis

(1) As soon as the student has completed at least 75 percent of the total credit points to be earned in the degree program, excluding the credit points for the thesis (72 points), and has successfully completed the core/mandatory modules, he or she must immediately propose a topic for his/her Master's thesis.

(2) The Master's thesis, including the oral defense, is equivalent to 30 credit points.

## § 7 Passes

In the Master's program in Remote Sensing, geoInformation, and Visualization, students have two passes. Section 13 of BAMA-O also applies.

## § 8 Stay Abroad

If a stay abroad is intended during the Master's program, the second, third, or fourth semester is recommended.

## § 9 Weighting of Modules for Grading Purposes

The final MSc grade is calculated by finding the average of all module grades weighted by their credit points and giving the Master's thesis triple weight.

## § 10 Application, Termination, and Transfer Regulations

(1) These regulations take effect on the day after their publication in the Official Public Notices of the University of Potsdam.

(2) These regulations apply to all students who enroll in the Master's program in Remote Sensing, geoInformation, and Visualization at the University of Potsdam after these regulations are published officially.

## Appendix 1: Module Catalog

The descriptions of the program's modules listed in Section 5 subsection 1 and the tables below are governed by the statutes of the module catalog of the Faculty of Science as a supplement to the Bachelor's and Master's programs at the University of Potsdam (MK MNF). Supplementary regulations and/or deviations from the MK MNF are indicated in the tables that follow.

List of modules:

Module Number	Module Name	CP	Mand./Elec.	Prerequisites
GEW-RCM01	Remote Sensing of the Environment	6	Mand.	see the MK MNF
GEW-RCM02	Earth System Science	6	Mand.	see the MK MNF
GEW-RCM03	Data Analysis and Statistics	6	Mand.	see the MK MNF
GEW-RCM04	Geoinformation Systems	6	Mand.	see the MK MNF
GEW-RCM05	Visualization and Communication	6	Mand.	see the MK MNF
GEW-RSM01	Optical Remote Sensing	6	Elec.	see the MK MNF
GEW-RSM02	Terrestrial and Airborne Lidar and Photogrammetry Systems	6	Elec.	Recommended: GEW-RCM01 Remote Sensing of the Environment and GEW-RCM03 Data Analysis and Statistics.
GEW-RSM04	Earth Surface Deformation and Radar Satellite Interferometry (InSAR)	6	Elec.	Recommended to have knowledge of the basics of digital data processing and programming.
GEW-RSM05	Advanced Topics of Remote Sensing	6	Elec.	see the MK MNF
GEE-OBS01	Soilscape Processes	6	Elec.	see the MK MNF
GEW-OBS02	Erosion and Earth surface dynamics	6	Elec.	see the MK MNF
BIO-OBS03	Biosphere of the Earth	6	Elec.	see the MK MNF
GEW-OBS04	Remote Sensing and Permafrost Regions	6	Elec.	see the MK MNF
GEW-OBS05	Earthquake and Volcano deformation	6	Elec.	see the MK MNF
GEW-MGEW26	Coastal Dynamics	6	Elec.	see the MK MNF
GEW-OBS08	Planetary Remote Sensing	6	Elec.	see the MK MNF
GEW-OBS09	Planetary Physics	6	Elec.	see the MK MNF
GEE-M-V02	Atmospheric Science in the Anthropocene	6	Elec.	see the MK MNF
GEW-OBS11	Advanced Topics of Objects of Observation	6	Elec.	see the MK MNF
MAT-DAP01	Bayesian Inference and Data Assimilation	6	Elec.	Recommended to have basic skills in statistics and analysis and elementary programming skills (e.g. Matlab, R, or Python).
GEW-DAP02	Nonlinear Data Analysis Concepts	6	Elec.	see the MK MNF
GEW-DAP03	Big Data Analytics	6	Elec.	Recommended to have basic skills in statistics and analysis and elementary programming skills (e.g. Matlab, R, or Python).
GEW-DAP04	Spatial data analysis with numerical methods	6	Elec.	Recommended to have basic skills in statistics and analysis.
GEW-DAP05	Advanced Topics of Data Analysis and Programming	6	Elec.	see the MK MNF

GEW-DAP06	Earth Surface Process Modelling	6	Elec.	see the MK MNF
GEW-GIS01	Analysis of Digital Elevation Models	6	Elec.	Recommended to have programming skills (MATLAB, Python).
GEW-GIS02	Mapping and Geoinformation Systems	6	Elec.	see the MK MNF
GEE-GIS03	Environmental Spatial Statistics and Models	6	Elec.	see the MK MNF
GEW-GIS05	Advanced Topics Geoinformation System Applications	6	Elec.	see the MK MNF
GEW-VCM01	Examples of Visualization and Communication Methods	6	Elec.	see the MK MNF
GEW-VCM02	Industry Internship or Practical Application	6	Elec.	see the MK MNF
GEW-VCM03	Extended Industry Internship or Practical Application	6	Elec.	Recommended to have completed VCM02 Industry Internship or Practical Application
GEW-VCM04	Advanced Topics of Visualization and Communication Methods	6	Elec.	see the MK MNF

CP = Number of credit points; Mand. = Mandatory/core module; Elec. = Elective module