UNITED NATIONS UNIVERSITY
UNU-EHS
Institute for Environment and Human Security

UNIVERSITÄT BONN

International Joint Master of Science Programme
MSc Geography of Environmental Risks and Human Security

SYLLABUS

COURSE NAME: ***GIS and Mapping using QGIS and GEE***

February / March, 2023

TRAINERS: **David Daou** (daou@ehs.unu.edu), UNU-EHS, MCII
Martin Hilljegerdes (martin.hilljegerdes@un.org), UN-SPIDER
Mostapha Harb (mostapha@ubicube.eu), Ubicube GmbH
TUTORS: **Christina Widjaja** (widjaja@ehs.unu.edu), **Uzabi Baidar** (baidar@ehs.unu.edu)

COURSE HOURS: **10:00-12:00 CET**

TARGET GROUP: Students with all levels of knowledge of GIS

FORMAT: in person

VENUE: UN Campus Bonn, Room LE2309

COURSE AIMS AND LEARNING OUTCOMES:

Course aims	Learning outcomes
The course will provide the students with a basic introduction to GIS, Google Earth Engine tools and analytical methods (specifically, QGIS Software and GEE) alongside an overview of web-based GIS, GEE platforms and methodologies to develop information products for floods and droughts.	• Basic concepts on the GIS and remote sensing fundamentals • Basic techniques and functionalities of GIS software to produce geographic information • Identify Earth observation data sources, software, and methodologies for monitoring natural hazards • First introduction to the use of Google Earth Engine • Produce underlying maps using GIS software, Google Earth Engine, and other web-based systems with UN-SPIDER Recommended Practices on flood and drought mapping •

ASSESSMENT METHODS:

Assignment
Presentation (group work of three to four members) Support by tutors during the group work

SCHEDULE:

Session	Session topic	Lecturer	Room
21 February (Tuesday) 10:00-12:00 *Week 1: Focus on GIS and QGIS*	**Session 1: What is a Geographic Information System (GIS)** • Introduction to course concept and final assignment • What is a map? • What is GIS? • A quick tour of the software • Data types • Data import/export and join • Mapping the real world • Map documents and layers • Map design and content in QGIS	**Mostapha Harb**	**LE2309**
22 February (Wednesday) 10:00-12:00 *Week 1: Focus on GIS and QGIS*	**Session 2: Mapping Things** • Working with map scale in QGIS • Vector data model • Creating vector data through digitizing • Raster data model • Longitude and latitude • Geographic coordinate system • Vector – Raster conversions • Geo-referencing • Precision & accuracy	**Mostapha Harb**	**LE2309**
24 February (Friday) 10:00-12:00 *Week 1: Focus on GIS and QGIS*	**Session 3: Droughts Workflow Using QGIS** • Benefits of Earth observation data for monitoring natural hazards • UN-SPIDER Knowledge Portal • Knowledge management cycle • Monitoring drought from space • Overview of readily available information products (Maps, Web GIS) • UN-SPIDER Recommended Practices on exposure mapping (QGIS)	**Martin Hilljegerdes**	**LE2309**
28 February (Tuesday) 10:00-12:00 *Week 2: Focus on Google Earth Engine*	**Session 4: Lidar Basics and Introduction to Google Earth Engine (GEE)** • Basic concepts of lidar remote sensing for flood monitoring, droughts and DEM • Introduction to GEE • GEE basics working with images • GEE basics splitting, merging, filtering images • Importing and exporting data • Objects, cloud masking, and reducers	**David Daou**	**LE2309**

01 March (Wednesday) 10:00-12:00 *Week 2: Focus on Google Earth Engine*	**Session 5: Drought Using GEE** • Introduction to supervised and unsupervised classification • Introduction to machine learning • Introduction to Deep learning • Learning the basics of supervised classification • Drought classification as an example	**David Daou**	**LE2309**
03 March (Friday) 10:00-12:00 *Week 2: Focus on Google Earth Engine*	**Session 6: Floods Workflow Using GEE** • Introduction to satellite-based flood mapping • Basic concepts of radar remote sensing for flood monitoring • Overview of readily available information products (Maps, Web GIS) • UN-SPIDER Recommended Practices on flood mapping and damage assessment (Google Earth Engine and QGIS)	**Martin Hilljegerdes**	**LE2309**
8 or 9 March (Wednesday/ Thursday) 10:00-12:00	**Session 7: Student Presentations** • Presentation session ~ 6*10 min + 5 min Q&A	**all lecturers**	**LE2309**

All course related info can be found in the following folder on Sciebo:
https://uni-bonn.sciebo.de/s/e3LOAmcGnBWEfbP