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

UNIVERSITÄT BONN

Programme MSc Geography of Environmental Risks and Human Security

SYLLABUS

COURSE NAME: *GIS and Mapping*

March, 2022

TRAINERS: **David Daou** (daou@ehs.unu.edu), UNU-EHS, MCII
Martin Hilljegerdes (martin.hilljegerdes@un.org), UN-SPIDER
Mostapha Harb (harbmostapha@gmail.com), UNU-EHS, VARMAP

TUTORS: **Preeti Koirala** (koirala@ehs.unu.edu), UNU-EHS, MCII
Teresa de Jesus Arce-Mojica (arce-mojica@ehs.unu.edu), UNU-EHS, MCII

COURSE HOURS: **14:00-16:00 CET**

TARGET GROUP: Students with all levels of knowledge of GIS

FORMAT: In-person, online

VENUE: Room Ü9, Geozentrum, Meckenheimer Allee 176, 53115 Bonn, University of Bonn

Online sessions (Zoom): https://ehs-unu-edu.zoom.us/j/94703102161?pwd=QTREdFFFdFJhTytxVXZDVlM3dHRUQT09

Meeting ID: 947 0310 2161; Passcode: 274327

COURSE AIMS AND LEARNING OUTCOMES:

Course aims	Learning outcomes
The course will provide the students with a basic introduction to GIS tools and analytical methods (specifically, QGIS Software) alongside an overview of web-based GIS 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 • Produce underlying maps using GIS software and web-based systems with UN-SPIDER Recommended Practices on flood and drought mapping • First introduction to the use of Google Earth Engine

ASSESSMENT METHODS:

Assignment
Poster (group work of three to four members)

SCHEDULE:

Session	Session topic	Lecturer	Room
21 March (Monday) 14:00-16:00 *Week 1: Focus on GIS and QGIS*	**Session 1: What is a Geographic Information System (GIS)** • 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 Click here to download QGIS 3.22	**Mostapha Harb** **Teresa de Jesus Arce-Mojica**	Online Zoom link Meeting ID: 947 0310 2161 Passcode: 274327
23 March (Wednesday) 14:00-16:00 *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** **Preeti Koirala**	Online Zoom link Meeting ID: 947 0310 2161 Passcode: 274327
24 March (Thursday) 14:00-16:00 *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** **Teresa de Jesus Arce-Mojica**	Ü9, Geozentrum
28 March (Monday) 14:00-16:00 *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 Click here to create your account on GEE	**David Daou** **Preeti Koirala**	Ü9, Geozentrum

29 March (Tuesday) 14:00-16:00 *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** **Teresa de Jesus Arce-Mojica**	Ü9, Geozentrum
30 March (Wednesday) 14:00-16:00 *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** **Preeti Koirala**	Ü9, Geozentrum
7 April (Thursday) 14:00-16:00	**Session 7: Student Presentations** • Poster session ~ 6*10 min + 5 min Q&A • Or presentation	**all lecturers**	Online Zoom link Meeting ID: 947 0310 2161 Passcode: 274327