Module	**GIS and the Management of Spatial Data**
Code	MSLS_AF-53
Degree Program	Master of Science in Life Sciences (MSLS)
ECTS Credits	5
Workload	150 h: Lectures 45 h; Exercises 55 h; Self-study 50 h
Module Coordinator	**Name** Luuk Dorren **Phone** +41 031 910 29 78 **Email** luuk.dorren@bfh.ch **Address** Bern University of Applied Sciences, School of Agricultural, Forest and Food Sciences, Länggasse 85, 3052 Zollikofen
Lecturers	• Alexandra Erbach (QGIS) • Hannes Horneber (QGIS) • Mark Günter (ArcGIS Pro + ArcGIS Online for Organizations)
Entry Requirements	• Install ArcGIS Pro on your laptop (Windows users) • Ensure access to ArcGIS Pro on Citrix (virtual desktop) • Install QGIS Long Term Release (LTR) on your laptop • Install the QField App on your mobile or tablet
Learning Outcomes and Competences	After completing the module, students will be able to: • understand, how Geographical Information Systems (GIS) can make a significant contribution to challenging projects in a spatial context • organize and name spatial data in a sensible way • feel comfortable in working with ArcGIS Pro and QGIS as powerful GIS tools • understand the significance of spatial reference • apply GDB domains to features classes • edit/digitize spatial data • perform vector and raster analyses • understand the Model Builder to facilitate GIS workflows • configure web and smartphone apps for the capturing of spatial data in field work (ArcGIS Mobile / QField) • present project results in meaningful maps
Module Content	• Introduction to GIS • Geodata organization • Introduction to ArcGIS Pro • Mapping and Editing in ArcGIS Pro • Geodatabase and Spatial Reference in ArcGIS Pro • Vector Analysis and Model Builder in ArcGIS Pro • Working with Rasters in ArcGIS Pro • GPS and Mobile GIS (ArcGIS Pro and ArcGIS for Organisations) • Introduction to QGIS

	• Creating Maps with QGIS • Vector Analysis and Graphical Modeler in QGIS • Working with Rasters in QGIS
	• Editing features and Digitizing in QGIS • QField for Outdoor GIS projects
Teaching / Learning Methods	Lectures, guided exercises, attestation exercises, self-studies, individual project work
Assessment of Learning Outcome	All but one of the attestation exercises in each of the ArcGIS Pro and QGIS blocks need to be completed and passed to qualify for the final projects. Mobile GIS Project: 50% of final grade QGIS Project: 50% of final grade
Bibliography	Law, M. Collins, A. 2019, Getting to Know ArcGIS Pro Allen DA, 2011. Getting to know ArcGIS Model Builder. Chang KT, 2016. Introduction to geographic information systems. Longley PA, 2011. Geographical information systems and science. Fox, L., 2015, Essential earth imaging for GIS. Fu P, Sun J, 2011. Web GIS: principles and applications. Clemmer G, 2010. The GIS 20: essential skills. Gabathuler E, 2012. Mapping and geoprocessing tools in support of rural advisory systems: virtual globes, global positioning system, and geographic information systems: simple applications, case studies, and guidelines. Universität Bern, CDE. Wade T, 2006. A to Z GIS: an illustrated dictionary of geographic information systems. Cutts, A. 2019, QGIS Quick Start Guide: A Beginner's Guide to Getting Started with QGIS 3.4 Cutts, A., Graser, A. 2018, Learn QGIS (4th Edition) Menke, K. 2022, Discover QGIS 3.x (2nd Edition)
Language	English
Comments	Some sequences, such as most of the attestation exercises and final projects, are compulsory for students. For more information on compulsory sequences, please refer to the detailed schedule of the module, which will be uploaded on Moodle before the start of the module.
Last Update	02.02.2023 / Mark Günter