Geomatics

Fields of education: Construction and Planning

1. Professional qualification

Professional career outline

Graduates of the profile Geomatics hold leading positions in their field of expertise as well as in interdisciplinary settings. They lead the conceptual design, the realisation, the implementation and evaluation of ambitious, often novel, geoinformation systems and geomatics technologies for a range of application are-as. The graduates are specialised experts working for all tasks and challenges that involve data and information with a geospatial reference and with regard to localisation. They often work in interdisciplinary set-tings and communicate competently with partners and specialists from a range of different application areas.

Graduates of the profile Geomatics apply their knowledge and expertise in challenging, leading positions in applied research and development, in ambitious engineering projects, as well as in positions with service providers for the geoinformation and geomatics industry, both in private companies and public administration. Typical work areas and job providers are, for example, infrastructure providers of energy, transportation, water or communication technologies or municipal, state or national GIS and geographic information departments with different application areas, such as safety, environmental and urban planning.

Graduates of the profile Geomatics hold a recognised Master's degree for the admission to the 'Eidgenössischen Patent für Ingenieur-Geometerinnen und Ingenieur-Geometer[1]. Passing the state exams they can be registered to be-come accredited cadastral surveyors with leading functions in private geomatics engineering and cadastral surveying companies and administration.

Professional skills

Graduates of the profile Geomatics have the knowledge and the skills to carry out and manage challenging engineering, development, implementation and service projects. They are capable of planning, devising, specifying, implementing, evaluating and making available highly specialised and task-adapted geoinformation processes and system architectures for a range of - often interdisciplinary - application areas.

Their professional and technical competences cover the whole spatio-temporal data and geoinformation process chain. Occasionally they are specialised on selected sub-processes. The processes and tasks range from problem analysis, to organisation and data modelling, to data collection, processing and management, to the analysis and visualisation of data with a spatial reference and of geoinformation. Their specific strengths lie in the knowledge and competences regarding geodetic reference systems, methods and processes for the efficient and market-oriented collection of spatial data meanwhile considering specific requirements such as accuracy and reliability. Graduates are well prepared to devise, implement and extend suitable workflows and system architectures for the sustainable management, analysis and processing of very large spatio-temporal data sets. They possess the knowledge and the skills to analyse spatio-temporal data with regard to a multitude of questions and applications as well as to communicate and represent the obtained results and explanations through different media to domain experts or a wider audience. The graduates also have acquired the knowledge about the legal, economic and political contexts which become more and more important when working

[1] cf. Art. 1 (Hochschulausbildung) and Art. 2 (Theoretische Vorbildung) of the 'Verordnung über die Ausbildung und Berufsausübung der patentierten Ingenieur-Geometerinnen und Ingenieur-Geometer' (Geometerverordnung, GeomV)); http://www.admin.ch/ch/d/sr/c211_432_261.html

with geoinformation. Their degree has extended their management competences so that they can productively be involved in team work as well as taking over leading positions early on in their careers. They are enabled to take responsibility for development projects, for the organisation and operation of geoinformation systems or for the realisation of challenging engineering projects along the geoinformation process chain.

Entry skills

Specific skills are required to enrol in this profile. Students holding one of the following Bachelor degrees generally fulfil these entry requirements.

- BSc in Geomatics
- BSc in Spatial Planning

The assessment of the entry skills is part of the enrolment process of the respective school. Students who do not hold one of the above mentioned Bachelor degrees will be individually assessed for their suitability by the respective University of Applied Sciences.

Differentiation to bachelor level

In comparison to Bachelor of Science Geomatics graduates, the graduates of the MSE profile Geomatics possess more in-depth and/or wider theoretical and conceptual knowledge and skills as well as the competency to network and apply those skills and their knowledge task- and goal-oriented. They are able to develop and implement innovative and sustainable solutions for novel, challenging and ambitious applied problems and tasks. They do so independently or by competently leading in relevant disciplinary and inter-disciplinary collaborations and settings. They are able to suitably abstract, evaluate, and develop (further) ideas, concepts and technologies and to implement those in goal-oriented approaches for solving problems and finding new solutions for specific tasks. Thus, they provide a valuable contribution to the innovation processes in private and public companies and industry.

2. Profile contents

The profile covers the following content:

Spatio-temporal indoor and outdoor data collection: MSE students competently apply and implement methods and technologies for multidimensional spatio-temporal data capture in indoor and outdoor settings. They apply their knowledge of related topics such as statistics or (geospatial) reference systems to comply with the specific requirements of the data collection tasks. They are knowledgeable in kinematic data collection methods and technologies including non-standard and emerging geosensors.

Spatio-temporal data modelling and analytics: MSE students model and analyse multidimensional and spatio-temporal data with regard to specific requirements and tasks. They know about the specific characteristics of spatio-temporal data and data structures and can apply and devise methods of analysis for a range of application areas. They are particularly competent in designing and implementing geoinformation solutions and analysis methods involving mobile and distributed sensors and agents.

Spatio-temporal data processing and visualisation: MSE students are knowledgeable and able to handle and work with large spatio-temporal data sets programmatically. They know and can apply techniques for handling spatio-temporal (big) data and multi-dimensional data sets. For analysis and presentation they can devise and implement suitable visualisation methods or apply visual analytics concepts.