
Job profile for M.Sc. BI-CE “Structural Health Monitoring“ („Structural Health Monitoring“)

1.1. Description

Every structure, such as bridges, wind turbines, water, gas and oil pipelines, tunnels, oil platforms, road surfaces, roads and railways, as well as ships, aeroplanes, trains and others, are subject to various internal and external factors that can lead to signs of abrasion or malfunction. Triggers can be, for example, ageing, a deficient construction process, a lack of quality control or an extreme incident caused by an accident or environmental pollution. To observe these material changes and to be able to react adequately before serious damage occurs, the implementation of a monitoring system for damage detection (= Structural Health Monitoring) is of central importance. Monitoring structural behavior can detect irregularities in a timely manner, enabling maintenance and repair measures to be implemented more effectively, which leads directly to a reduction in operating costs.

The primary purpose of infrastructure monitoring is to replace plan-orientated maintenance with condition-based maintenance. The main advantages are increased (lifetime) reliability / automation of maintenance / early damage detection for prompt responses / extended maintenance cycle / cost and time savings / and much more.

The job profile of ‘Structural Health Monitoring’ is directly at the interface between structural-mechanical modelling and measurement. You can calculate / simulate and predict the static and dynamic (deformation) behavior of structures, but also examine and validate them using measurement technology and, if necessary, recalibrate the models. This makes you a sought-after specialist in the construction industry as well as in large transport and energy supply companies.

1.2. Module Recommendation

Basic research modules totalling 36 CP (12 CP per research subject)

Research subject “Structural (Health) Monitoring and dynamics) “

- Sensortechnik und Analyse (13-B1-M037), 6 CP
- Structural Monitoring I (13-B1-M055), 6 CP

Research subject “Construction Mechanics“

- Finite-Elemente-Methoden I (13-E1-M001), 6CP
- Theory of Plasticity (Mechanics) (13-E2.M001), 6 CP

Research subject “Structural Analysis“

- Structural Analysis III (13-M2-M003), 6 CP
- Structural Analysis IV III (13-M2-M004), 6 CP

Research specialization modules amounting to 12 CP

Research subject “Structural (Health) Monitoring and dynamics“

- Baudynamik I – Grundlagen (13-M3-M002), 6 CP
- Structural Monitoring II (13-B1-M015), 6 CP

Modules from the subject-related elective area amounting to 36 CP

- Finite-Element-Methoden II (13-E1-M002), 6 CP
- Bauschäden und Bauwerksanalyse (13-D3-M005), 6 CP
- Parameterschätzung II (13-H0-M002), 6 CP
- Satellitengeodäsie (13-H02-M044), 6 CP
- Einwirkungen auf Tragwerke und Tragwerkzuverlässigkeit (13-M2-M008), 6 CP
- Computational Methods for Building Physics and Construction Materials (13-D3-M020), 6 CP

1.3. Further Information on the Job Profile:

- The recommended modules in the Subject-related compulsory elective area are relatively non-binding. If you wish to focus on the metrological component of the job profile, you can also integrate other topics here, e.g. “Messungen zur Tragwerksanalyse“. In this case, we recommend choosing the ‘Project Geodetic Metrology’ in the Specialization research modules.

1.4. Advice on the Job Profile:

Contact person from the department of “Geodetic Measuring Systems and Sensor Technology“:

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