



1. General information about course

An introduction to (sensory-based) structural identification

Simona Bogoevska, PhD

Civil Engineering Faculty in Skopje

University of Ss. Cyril and Methodius

simona.bogoevska@gf.ukim.edu.mk



2. Description of the course

The course guides students through **four topics** which provide an essential understanding of the field of monitoring-based structural identification.

Section 1 Sensory-based structural identification: introduction & concept

Section 2 Modal analysis in civil engineering: what it is & why do we need it

Section 3 Signal analysis: fundamentals & mathematical transformations

Section 4 Structural identification: fundamentals & application of basic methods

Section 1 covers the basic concepts of structural health monitoring and output only analysis.

Sections 2 and 3 deliver fundamental knowledge regarding modal analysis (why it represents an important approach in civil engineering?) and signal analysis (how to obtain healthy signals and transform necessary information from collected sensory information?).

Section 4 gives a brief theoretical overview and conceptual outlook of most commonly applied structural identification methods in the field of civil engineering (what are their advantages and disadvantages, as well as examples of application).



3. Target group and prerequisites

Target group/Learners profile

Civil engineers/Civil engineering master students interested to conduct professional work/research related to the field of structural health monitoring and are completely new to the area, or in beginners stage.

Prerequisites (required pre-knowledge and experiences)

Understanding of the behavior of vibrating systems, relevant for civil engineering structures and basic programming skills. No pre-experience in the area of SHM is required.



4. Learning outcomes

- The student will get initial experience in producing useful outputs from gathered sensory information from operational structures. Consequently, will develop a primary understanding of the field and concept of structural health monitoring applied in the area of civil engineering. **Understand concept in general**

- Furthermore, will become equipped with fundamental skills and knowledge for recognizing healthy data, as well as for carrying out simple signal analysis of collected time-history data. **Gain general preprocessing skills**

- Eventually, will increase knowledge about structural dynamics in modal domain, and will be able to understand and apply simple structural identification methods for modal identification of civil engineering structures. **Application targeted at civil engineering**



5. Training and learning methods

- **Learning algorithm provided**

Presentations which cover the 4 Sections of the course providing concept and guidance in comprehending the topic

- **Topic dive-in**

Provided further reading material as chapters from relevant books and papers, discussion topics and state of the art in the field. Supportive material for individual research, offered reading and research directions for advance learning etc.

- **Knowledge assessment**

Self-assessment exercises and demo tests for practicing and verifying the material