



## ***Experimental Investigation of Shape Memory Materials***

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Dynamical development of technology, a need for materials meeting the requirements in certain conditions, and environment protection make that recently a great interest is observed in smart and multifunctional materials. Such materials are able to adapt its property according to a change in a certain factor of environment, while the adaptation may be used as a driver for another physical factor. Virtually, it means that such materials can combine the property of sensor and actuator, assuring miniaturization of mass and dimensions, very important for applications. This group of materials comprises shape memory alloys (SMA), shape memory polymers (SMP) and shape memory composites (SMC).

The proposed course contains the fundamentals of the experimental mechanics, shape memory alloys, polymers and composites.

The course is dedicated to the students being interested in experimental investigation of new multifunctional materials properties.

### **Main topics:**

1. Introduction to experimental mechanics.
2. Introduction to shape memory materials.
3. Application of shape memory alloys in engineering and medicine.
4. Experimental studies on shape memory alloys.
5. Thermo-mechanical properties of TiNi shape memory materials, subjected to various kinds of loadings.
6. Introduction to thermodynamics of martensitic forward and reverse transformations.
7. Why infrared camera is so useful tool in shape memory alloys study?
8. Problems to be solved in the future.

**The total number of lecture hours: 20, laboratory exercises: 5 hours, self-teaching: 40, direct tutoring and consultations: 10 hours.**

**ECTS Points: 3**