

The Faculty of Technology and Education conducts scientific research in the areas of technical and social sciences. Faculty's research areas are closely related to the degree programmes offered by the Faculty.

**The main directions of research:**

**Materials Science and Engineering**

- technology of hard, wear resistant coatings on tools and machine parts
- surface processing and heat treatment of metals and alloys
- design and technology of ceramic composites for abrasive machining of metals
- design and construction of technological equipment for vacuum and plasma based technology

**Mechatronics**

- modelling, computer simulation and computer-supported design of mechatronic systems
- development of active vibration reduction systems that are used in machinery
- vibro-acoustic field analysis, tribological analysis of mechatronic micro-systems
- development of control units in heating systems and solar systems
- modelling of the kinematics and movement dynamics of robots including exoskeletons that are also used in rehabilitation processes

**Biomedical Engineering**

- modification of the surfaces of biomaterials, especially those in the form of diamond nano-powders
- production of nano-fibres with the use of electrospinning (for targeted delivery of medications and biological material (stem cells, genes))
- analysis techniques and methods related to the dose and irradiated volume during the radiotherapy treatment of malignant tumour
- dosimetry procedures conducted both during brachytherapy and teletherapy
- conformal teletherapy procedures with modulation of the dose intensity and a daily image analysis (IGRT)

**Pedagogy**

- integration of technical, humanistic, and social fields of knowledge
- use of new technologies in the organization of a modern model of education based on the stimulating

methods of teaching and learning

- development of skills in acquiring specialist knowledge, ability of lifelong vocational learning and ability to communicate both in personal and institutional areas