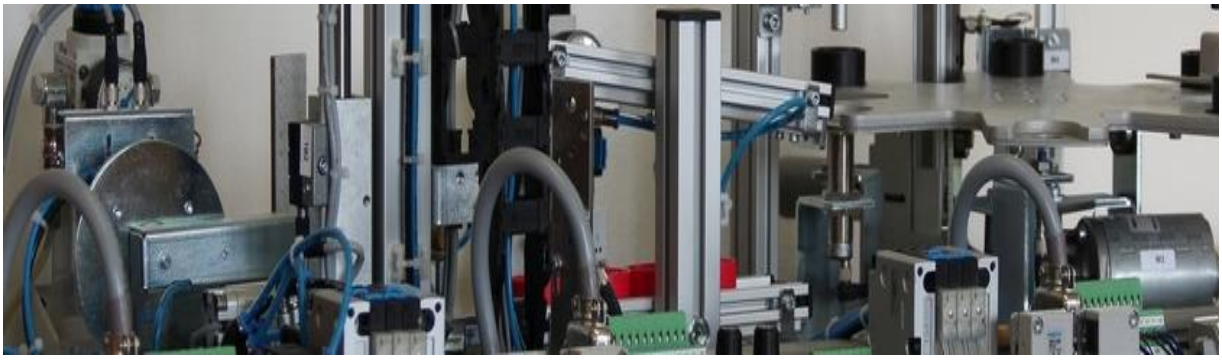
Research program

AUTOMATION / CONSTRUCTION

Research in the field of control and applications in control of special experimental, mechatronic applications in cooperation with other TUL departments. Construction of bioreactor for dynamic cell culture. Construction of equipment for production of nanofibres by electrospinning method on rotating collector. Development of equipment for production of nanofibrous yarns and their optimization for ophthalmic implants. Development of polymer dosing equipment for production system of nanofibrous yarns. Automation of production line of multilayer nanofibrous tubular structures. Identification and automatic control of mechanical dynamic systems, shock absorbers, springs, pneumatic and hydraulic systems.



Research activity

RESEARCH AND CONSTRUCTION OF SPECIAL EXPERIMENTAL EQUIPMENT, MECHATRONIC SYSTEMS, ROBOTIC APPLICATIONS

- Development of construction of complex devices for production of nanofibres by electrospinning method on rotating collector.
- Innovation of previously designed and implemented nano (micro) fiber production equipment.
- Development of bio cultivator for tissue culture.
- Development of equipment for synthetic biology (microfluidics).

RESEARCH IN LIQUID MECHANISMS

- Development and construction of autonomous device based on artificial pneumatic muscles, robotic device with elements of artificial intelligence.
- Research of pneumatic muscle control in interaction with adaptive controllers including implementation of artificial intelligence elements.

RESEARCH IN ACTIVE VIBRATION SOFTENING

- Development of ambulance beds. Development of a new version of active ambulance.
- Research on impact of shock-absorber description regarding the methodology of shock-absorber testing and design of new testing solutions.
- Development of the seat control system with variable stiffness. Development of improved control algorithms based on frequency analysis of the road signal.

RESEARCH AND DEVELOPMENT IN THE FIELD OF DRONES

- Development of drone construction, optimization of algorithms (topology), 3D printing.
- Research to increase drone safety in civilian environment.
- Research on the use of drones in military, police and firefighters.
- Research on the use of artificial intelligence (Bayesian networks) for drone control.
- Drone development on a simple microprocessor and its use for testing and research (various control options, application of algorithms).