

ERASMUS+ INTERNSHIP, SUMMER 2015
FACULTY OF MECHANICAL ENGINEERING AND COMPUTER SCIENCE,
UNIVERSITY OF BIELSKO-BIAŁA

The Faculty of Mechanical Engineering and Computer Science offers an Erasmus+ Internship for Students in different Laboratories of our Faculty.

The Student should chose **two** of the five modulus listed below (A, B, C, D , E).

- A. Mechanical Engineering – designing, modelling, analysis (1 month),
- B. Robotics and Mechatronics (1 month),
- C. Measuring, Analysis of materials, Manufacturing processes and Production Engineering (1 month),
- D. Computational methods and Computer Science (1 month),
- E. Cars and Engines (1 month).

Internship dates: From 1st June to 31st July 2015.

If you require more information about the internship availability, please contact:

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Please find all necessary documents on the Academic Exchange Office' page:

<http://www.eng.ath.bielsko.pl/index.php/erasmus-application-forms/for-traineeships>

Detailed program of the training period:

- A. Mechanical Engineering – designing, modelling, analysis (1 month)
 - 3D modeling and designing using Inventor or Unigraphics or CATIA system,
 - Finite Element Method Analysis using FEMAP or Nastran or Ansys system,
 - Stamping die modeling using Dynaform or Autoform system,
 - Experimental research of fatigue life of gear teeth,
 - Presentation of power-closed loop test stand,

- Calculating the geometric dimensions of sample of geared wheel for the strength tests,
- Study of flange coupling using the power-closed loop test stand,
- Calculating the flange coupling parameters and experimental verification of the results,
- Measurement of the actual torque transmitted by the coupling using the sensor,
- Dynamics of robots,
- Basics of MATLAB,
- Basics of C++,
- Modeling of mechanical systems using MATLAB software,
- Dynamic analysis of multibody systems using ADAMS software,
- Fundamentals of Finite Element Method (FEM) and Rigid Finite Element Method (RFEM).

B. Robotics and Mechatronics (1 month)

- Analog electronics,
- Digital electronic,
- Introduction of communication and Wireless Sensor Network,
- Robot elements, controlling devices,
- Start up and moving of the robot,
- Robot programming,
- Operation of CNC machine tools (SINUMERIK),
- Programming of the CNC machine tools (SINUMERIK),
- Flexible programming of the CNC machine tools (SINUMERIK),
- Programming of robots (Kuka, Motoman),

C. Measuring, Analysis of materials, Manufacturing processes and Production Engineering (1 month)

- Metallographic specimen preparation,
- Analysis of a materials microstructure,
- Electrospinning as a method of materials production,
- Crystallization process of casting aluminum alloys on the base of the ATD method (thermal-derivative analysis),
- metallographic microscopic testing and dispersion hardening of cast machinery parts,
- measurements with use of coordinate measuring machine (CMM),
- programming of measurement on CMM,
- measurements with use of laser interferometer,
- Static tensile test of metal specimens,
- Static compression test of metal specimens,
- Strength tests of plastics,
- Static and dynamic tests of structures using the MTS system,
- Reynolds experiment,

- Determination of losses for flows in pipes,
- Relative liquid equilibrium,
- Turbulent free jet,
- Modelling and simulation of production processes,
- Management of Health and Safety at Work.

D. Computational methods and Computer Science (1 month)

- Operating systems,
- Web services – history,
 - SOAP type Web services,
 - REST type Web Services,
- OData web Services architecture,
- Querying OData WebServices – Basic techniques,
- Creating OData Web Service i .NET,
- Connecting to OData Web Service in client application,
- Querying OData Web Services – Advanced techniques,
- Decision support systems,
- Calculus with Maxima CAS System,
- Elements of Statistics,
- Fourier analysis,
- Variational Calculus.

E. Cars and Engines (1 month)

- Alternative fuels for CI and SI engines,
- Dual -fuel CI and SI engines,
- Numerical simulation of work cycle of combustion engines,
- Modeling and investigations of fuel injection systems for CI and SI engines,
- Modeling and investigations CR fuel systems,
- Optimization of the algorithm for CI and SI engines control,
- Investigations of dynamics of vehicle,
- Investigations of transmission systems of vehicle,
- Electric and hybrid drive,
- Thermodynamics of real gases.