Topics for program Automotive Electronics and Electromobility (MPA-AEE)

Cybersecurity (foundation of encryption and cryptography, foundation of computer networks and network security; TCP/IP protocols).

Signal processing (correlation, convolution, spectral analysis of signals, Fourier transform, Z-transform; random variables and processes, PDF, CDF, moments, Gaussian distribution; linear digital systems, digital filters; transfer function, impulse response).

Electromagnetic waves, antennas, and lines (propagation of waves in free space, on conductors and waveguides; types of antennas, antenna parameters, impedance matching, antenna arrays).

Electronic circuits (digital: multiplexor, buffer, level shifter, memories (ROM, RAM, flash, EEPROM, non-volatile), communication busses (RS-232, RS-485, CAN); analog: passive and semiconductor components, amplifiers, filters, mixers, sources of harmonic signals).

Power electronics (relations between quantities such as energy, power, force, speed, mass, acceleration; torque, angular speed, angular acceleration; knowledge of electrical quantities such as voltage, current, charge, resistance, inductance, capacitance, reactance, impedance, and relations between them; awareness of power semiconductors).

Optics and photonics (optical radiation, light characteristics of laser diodes and LEDs, refractive index, spectral linewidth, monochromaticity, divergence angle, optical lenses, attenuation of optical radiation).

Communications (digital communication system architecture, fundamentals of formatting and source coding, channel coding, baseband and band-pass modulations, synchronization, equalization, multiple access techniques, spread spectrum; RF transmitter and receiver; WLAN, WPAN; satellite communications).

Mathematics (fundamentals of differential and integral calculus; matrix and vector calculus; analytical description of a line, circle, ellipse, parabola, and hyperbola; goniometric, exponential, and logarithmic functions).

Others (test of logical thinking).

Evaluation of the entrance exam

The entrance exam consists of two parts, which will take place online and will be held on one day. The first part, which will take place in the morning, consists of a written exam. The second afternoon part consists of an oral exam. Only applicants who successfully pass the first part of the exam, i.e., obtain a higher number of points than the set minimum score, can take the second part.

The first part of the entrance examination consists of 20 multiple-choice questions (3 points each) and 5 open questions (8 points each). In the case of multiple-choice questions, one or more correct answers may be selected. The number of obtained points is proportional to the number of correct answers. However, if you choose one answer wrong, the total score for that question is zero. The subject areas and their content are determined by the Board of Study Programs. The written exam lasts 50 minutes.

The second oral part of the entrance examination takes approximately 20 minutes. The committee consisting of academic staff of FEEC BUT and external academic staff even from abroad and specialists from the industry will ask you questions from the above technical topics as well as on your motivation for studying and your plans. The maximum number of points that can be obtained is 30.

Both parts of the examination are in English. They will be evaluated immediately after their completion. The results will be accessible in the BUT website (https://www.vutbr.cz/eprihlaska/en/).