Electrical Engineering BSc

Study Abroad Course List

Tuition-fee/credit: 120 USD

For course syllabi, please contact the Study Abroad Office!

Course title	Semester	Credits (ECTS)
Engineering Mathematics 1.	Fall	4
Basic Laws, Equations and Models 1.	Fall	4
Basic IT 1.	Fall	3
Computer Programming 1.	Fall	3
Electrical Materials	Fall	4
Electrical Engineering 1.	Fall	5
Digital Logic Design 1.	Fall	4
Project Management 1.	Fall	3
Basic Laws, Equations and Models 3.	Fall	4
Enterprises and Labour Market	Fall	3
Design and Product Technology	Fall	4
Basic Laws, Equations and Models 2.	Spring	4
Quality Management 1.	Spring	3
Electronics 1.	Spring	4
Industrial Law	Spring	3
Work, Fire and Health Safety	Spring	3
Microelectronics	Spring	3

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Detailed information about the courses:

Engineering Mathematics 1.

Language of instruction:	English
Form of teaching:	lecture, practice
Class hours per week:	2 L, 2 P
Credits (ECTS):	4
Course description:	This lecture and practical based course aims to give students a solid mathematics basis through covering the following topics: sets of numbers (natural, integer, rational, real and complex numbers); vectors and operations with vectors, scalar and vector products and their applications; sets and operations with sets; matrix and determinant, solving linear equation systems definition of functions. Presentation of elementary functions. Sequences of real numbers (definition of monotonicity, limit, convergence and divergence); limit and continuity of functions; types of discontinuity; definition of tangents; differential calculus of functions in one variable, differential coefficient, derivatives, relations between differentiability and continuity; rules of derivation, derivatives of elementary functions; osculating circles, tangent of the plane curve at a given point.
Assessment methods:	Active participation, homework, exam
Semester:	Fall Semester

Basic Laws, Equations and Models 1.

Language of instruction:	English
Form of teaching:	lecture, practice
Class hours per week:	2 L, 2 P
Credits (ECTS):	4
Course description:	The aim of this course is to present the basic concepts of physics. To emphasize that physics is a tool for understanding the real world. To teach transferable problem solving skills. Physics is the branch of science that describes matter, energy, space, and time in the most fundamental level. The goal is to find the most basic laws that govern the universe and to formulate those laws in the most precise way possible. The topics are the following: Kinematics, Newton's Laws, Forces, Work-Energy Theorem, Conservation of Energy, Conservation of Momentum, Multi-particle Dynamics, Rotational Dynamics, Conservation of Angular Momentum, Oscillatory Motion, Lagrangian Formalism.
Assessment methods:	exam
Semester:	Fall Semester

Basic IT 1.

Language of instruction:	English
Form of teaching:	Lecture, laboratory
Class hours per week:	2 L, 1 Lab
Credits (ECTS):	3
Course description:	The aim of this course is to present the basic concepts of classical optics. The topics are the following: Geometric Optics, Photometric Units, Interference of Light, Interferometers, Diffraction of Light, Polarization of Light, and Interaction of Electromagnetic Waves with a Substance, Waveguides and Opticalal Fibers. Learning Objectives: problem-solving skills are remain important, these include: Thinking logically and analitically, Making simplifying assumptions, Constructing mathematical models, Using valid approximations.
Assessment methods:	semester mark
Semester:	Fall Semester

Computer Programming 1.

Language of instruction:	English
Form of teaching:	Lecture, laboratory
Class hours per week:	1 L, 2 lab
Credits (ECTS):	3
Course description:	This course is mainly laboratory work helped with presentations live by the lecturer using the AutoCAD program. The application of this generally usable technical program provides an example about the CAD programs. It helps to study their structure and to learn their practical use. Students are required to complete the technical drawing of small parts of different technical tools. It is carried out in 2D in multi view orthographic projections and in so called 3D drawings in orthogonal axonometric projection based on printed figures showing the objects in the opposite projections. The drawings are completed with dimensioning and annotation. Different parts of the drawings can have different scaling. The preparation of plotted and printed drawings can be carried out in the so called model or paper spaces. The control of the result happens by printing in pdf files.
Assessment methods:	semester mark
Semester:	Fall Semester

Electrical Materials

Language of instruction:	English
Form of teaching:	Lecture, laboratory
Class hours per week:	2 L, 1 Lab
Credits (ECTS):	4
Course description:	The aim of this course is to present the basic concepts of Material Science that students need to know for later courses and future careers. Learning Objectives: Excel in careers related to the entire life cycle of materials—from synthesis and processing, through design and development, to manufacturing, performance, reclamation and recycling. Know the fundamental science and engineering principles relevant to materials. Understand the relationship between nano/microstructure, characterization, properties and processing and design of materials. Possess a knowledge of the significance of research, the value of continued learning and environmental/social issues surrounding materials.
Assessment methods:	Examination grade
Semester:	Fall Semester

Electrical Engineering 1.

Language of instruction:	English
Form of teaching:	lecture, practice
Class hours per week:	2 L, 2 P
Credits (ECTS):	5
Course description:	This subject covers the fundamental principles of the electricity that is required to the study of students attending the B.Sc. program. It aims to increase students' knowledge and expertise and determine whether they satisfy the requirements of the course. The aim of the subject is to convey fundamental knowledge on the governing relations of electrical and magnetic fields as well as characteristics, laws and computation methods of linear, time-invariant electrical circuits. Modeling of electrical networks with concentrated parameters, fundamentals of dipole theory and network topology. Computation procedures and methods of network analysis for linear, time-invariant dipole networks. The aim of the subject is also to convey knowledge on methods of alternating current network analysis. Mathematical representation of sinusoidal quantities and AC power analysis.
Assessment methods:	Examination grade
Semester:	Fall Semester

Digital Logic Design 1.

Language of instruction:	English
Form of teaching:	lecture, practice
Class hours per week:	2 L, 2 P
Credits (ECTS):	4
Course description:	The majority of the instruments in information technology are digital systems. The course helps the students to understand the mathematical and electronic basics of these systems and gives instructions for the planning and creation of them. Starting from the simplest building elements, the level of digital computers is reached systematically.
Assessment methods:	Examination grade
Semester:	Fall Semester

Project Management 1.

Language of instruction:	English
Form of teaching:	lecture
Class hours per week:	2 L
Credits (ECTS):	3
Course description:	The goal of the course is to introduce how the professional project management works in large enterprise environment using the related processes (like Integration management, Scope management, Quality management, HR management, Communication Management, Risk management and Change management). Over the basic project management we will also have a focus on the agility as well, will introduce some international business processes and show them how important are the strategy, the organization development and the leading in our changing world where the digitalization's role is bigger day by day. The course is based on up-to-date practical knowledge and on the operating methods of IT Services Hungary Kft.
Assessment methods:	Examination grade
Semester:	Fall Semester

Basic Laws, Equations and Models 3.

Language of instruction:	English
Form of teaching:	Lecture, practice
Class hours per week:	1 L, 2 P
Credits (ECTS):	4
Course description:	The aim of this course is to present the basic concepts of classical optics. The topics are the following: Geometric Optics, Photometric Units, Interference of Light, Interferometers, Diffraction of Light, Polarization of Light, Interaction of Electromagnetic Waves with a Substance, Waveguides and Opticalal Fibers. Learning objectives: problem-solving skills are remaining important, these include: thinking logically and analitically, making simplifying assumptions, constructing mathematical models, using valid approximations.
Assessment methods:	Examination grade
Semester:	Fall Semester

Enterprises and Labor Market

Language of instruction:	English
Form of teaching:	Lecture
Class hours per week:	2 L
Credits (ECTS):	3
Course description:	The purpose of the class is to introduce the adaptability of the connection between enterprises and engineering. The most important connections between engineering innovation and organizational management and integration within labour market; Challenges and opportunities related with the a fore mentioned topics. The course focuses on the role of companies and enterprises in economy.
Assessment methods:	Examination grade
Semester:	Fall Semester

Design and Product Technology

Language of instruction:	English
Form of teaching:	Lecture, laboratory
Class hours per week:	2 L, 1 Lab
Credits (ECTS):	4
Course description:	Acquiring advanced technical knowledge essential to the 21st century to the work of an engineer who wants to be knowledgeable and creative in the world of State of The Art technology. Knowledge of the basics and methods of manufacturing technology. Insight into small series and mass production manufacturing processes and design methods. Independent design task.
Assessment methods:	Examination grade
Semester:	Fall Semester

Basic Laws, Equations and Models 2.

Language of instruction:	English
Form of teaching:	Lecture, practice
Class hours per week:	2 L, 1 P
Credits (ECTS):	4
Course description:	The aim of this course is to present the basic concepts of thermodynamics. To teach transferable problem solving skills. Classical thermodynamics is the description of the states of thermodynamic systems at near-equilibrium, that uses macroscopic, measurable properties. It is used to model exchanges of energy, work and heat based on the laws of thermodynamics. Transport processes concerns the exchange of mass, energy, charge, momentum and angular momentum between observed systems. Examples of transport processes include heat conduction, fluid flow, molecular diffusion and electromagnetic radiation.
Assessment methods:	Examination grade
Semester:	Spring Semester

Quality Management 1.

Language of instruction:	English
Form of teaching:	Lecture
Class hours per week:	2 L
Credits (ECTS):	3
Course description:	The purpose of the class is to introduce the way quality oriented approach should be implemented in engineering practice; the way quality, quality assurance and quality management appears in technical development processes and in the general technological fields; how non-special innovative developing projects can be supported via professional quality-centered practices. The course focuses on the concept of "quality" and the way it appears concerning products and services.
Assessment methods:	Examination grade
Semester:	Spring Semester

Electronics 1.

Language of instruction:	English
Form of teaching:	Lecture, laboratory
Class hours per week:	2 L, 2 Lab
Credits (ECTS):	4
Course description:	The aim of this course is to provide an introduction to the fundamentals of analogue electronics. Methods of electronic circuit analysis and synthesis are presented and illustrated at laboratory practice. Passive devices. Methods of passive circuit analysis. First order filters. Resonance filters. Characteristics of quadrupoles, amplifiers.
Assessment methods:	Examination grade
Semester:	Spring Semester

Industrial Law

Language of instruction:	English
Form of teaching:	lecture
Class hours per week:	2 L
Credits (ECTS):	3
Course description:	To familiarize students with the basic types of intellectual property protection, to help participate in R&D activities. The course focused on topics such as the European patent system, developing IP strategies, patent search and research success stories. The programme included lectures and presentations, Q&A sessions, hands-on exercises and case studies on success stories from the field.
Assessment methods:	Examination grade
Semester:	Spring Semester

Work, Fire and Health Safety

Language of instruction:	English
Form of teaching:	Lecture, laboratory
Class hours per week:	2 L, 1 Lab
Credits (ECTS):	3
Course description:	The fields and basics of the work safety. Institutes and regulation in Hungary and the EU. The main role of work and fire safety in the system of human. Definitions of the security system. Job hazards and hurts. Prevention of the accidents. Human health. Types of the fire and the classes of flammability. Rules of the fire safety. Methods and Equipments of the fire fighting. Important accidental and fire safety rules on the work places. Requirements of the work safety and the using of the life support system. Transport and storage of the dangerous and toxical materials. Ergonomical views and rules. Types of coveralls. First aid. The using of BLS (Basic Life Support), reanimation technics, rules and the life supporting systems.
Assessment methods:	Examination grade
Semester:	Spring Semester

Microelectronics

Language of instruction:	English
Form of teaching:	lecture
Class hours per week:	2 L
Credits (ECTS):	3
Course description:	This course provides insight into state of the art electronic technologies. Introduction to microelectronic technologies. Component suite of monolithic integrated circuits. Implementation examples of digital, analogue and radiofrequency circuits. Design methods for very large scale integration. Debugging procedures. Monolithic memories. Programmable devices (microcontrollers, PLD, FPGA). Programming, speed and signal level adjustment.
Assessment methods:	Semester mark
Semester:	Spring Semester