Faculty of Natural Sciences

IMPORTANT NOTES

If for one subject you can find several different types (lecture, practice, laboratory) of courses then please choose one and only one course from each type in order to be able to perform the subject's requirements successfully.Civil Engineering courses are on the website seperately. Courses chosen from the offer of Faculty of Civil Engineering will be checked and arranged individually by the departmental coordinator.

Subject code	Subject name	Requirement	ECTS credit
BMETE11AF05	Introduction to Solid State Physics	Exam	2

Course type	Course code	Course language	Timetable information
Lecture	E0	English	TUE:12:15-14:00;

Symmetries of crystals, crystal structures, Bravais lattices. Theory of diffraction, structural factor, atomic scattering factor. X-Ray, electron and neutron scattering experiments. Lattice vibrations in harmonic approximation, dynamical matrix, normal coordinates, dispersion relation, density of states. Quantum description of lattice vibrations, energy and momentum of phonons, experimental measurement of the dispersion relation. Bose-Einstein statistics, heat capacity of solid bodies, Debye approximation. Drude model of electrons, transport and optical properties. Fermi-Driac statistics, Sommerfeld expansion, heat capacity, magnetic susceptibility of an electron gas. Electrons in the periodic potential of a crystal, Bloch electrons. Band structure in the nearly free and tight binding approximation, effective mass.

Subject code	Subject name	Requirement	ECTS credit
BMETE11AF06	Practical Course in Solid State Physics	Mid-semester mark	2

Course type	Course code	Course language	Timetable information
Practice	E1	English	WED:10:15-12:00;

Crystal structures, Bravais lattices: basis, unit cell, reciprocal lattice, packing faction. Theory of diffraction: structural factor, atomic scattering factor. Noncrystalline solids, liquid crystals. Real crystals, classification of defects, thermodynamics of point defects. Lattice vibrations in harmonic approximation: dispersion relation, effects of lattice vibration in the scattering pattern. Quantum description of lattice vibrations, energy and momentum of phonons, density of state, melting point of the crystal (Lindemann criterion). Bose-Einstein statistics, heat capacity of solid bodies, Debye approximation. Drude model of electrons, transport and optical properties. Fermi-Driac statistics, Sommerfeld expansion, heat capacity, magnetic susceptibility of an electron gas. Electrons in the periodic potential of a crystal, Bloch electrons. Band structure in the nearly free and tight binding approximation, effective mass.

Subject code	Subject name	Requirement	ECTS credit
BMETE11AX13	Physics for Civil Engineers	Mid-semester mark	2

Course type	Course code	Course language	Timetable information
Lecture	EN0	English	TUE:14:15-16:00(K375);

Electric charge, Coulomb's law, electric field, electric flux. Work and energy in electricfields. Electric potential. Capacitors, dielectrics. The piezoelectric effect and itsapplications. The contact potential, its application for temperature measurements.Electric current, Kirchhoff's laws, electric circuits. Magnetic field. The Biot-Savart law,Ampere's law. Forces in magnetic fields, practical applications. Magnetic flux, Faraday'slaw. Practical applications of Faraday's law in sensors. Self induction, mutual induction.Varying electromagnetic fields. Magnetic properties of matter, magnetic circuits. ACcircuits,impedance. Sensors in measurements. Measurement of basic electricquantities. Resistance, capacitance and magnetic induction based sensors. Magnetic,thermoelectric and piezoelectric sensors. Measurement of displacement, force,acceleration. Measurement of flow of gases and liquids. Measurement of liquid level.Measurement of humidity and temperature. Thermovision, thermograms.

Subject code	Subject name	Requirement	ECTS credit
BMETE11AX14	Nobel Prize Physics in Everyday Application	Exam	2

Course type	Course code	Course language	Timetable information
Lecture	T0	English	TUE:14:15-16:00;

Scope: The amazing and explosive development of technology is our everyday experience in various fields of life from informatics and medicine. It is less well known how this development is supported by scientific research. As an example a notebook computer applies numerous Nobel Prize awarded ideas, like the integrated circuits (2000), semiconducting laser (2000), liquid crystal display (1991), CCD camera (2009), GMR sensor of the hard disk (2007) and several further achievements from earlier days of quantum mechanics and solid state physics. The course is intended to give insight to a range of amazing everyday applications that are related to various Nobel Prizes with a special focus on recent achievements. The topics below are reviewed at a simplified level building on high school knowledge of physics. Syllabus:- Textbook applications from the early days of Nobel prizes: wireless broadcasting, X -rays, radioactivity, etc.- Optics in everyday application: lasers, CCD cameras, optical fibers, liquid crystal displays, holography- Quantum physics: from atom models to quantum communication- Measurements with utmost precision: application of Einstein's theory of relativity in GPS systems, atomic clocks, Michelson interferometry, etc.- Nuclear technology from power plants to medical and archeological applications- Advanced physics in medicine: magnetic resonance imaging, computer tomography and positron emission tomography- Semiconductors from the first transistor to mobile communication- Fundamental tools of nanotechnology (scanning probe microscopes, electron beam lithography, etc)- Spintronics from the discovery of electron spin to everyday application in data storage devices- Exotic states of solids in everyday application: superconducting magnets and levitated trains- Towards quot;all carbon electronicsquot;: envisioned and already realized applications of graphene

Subject code	Subject name	Requirement	ECTS credit
BMETE11AX21	Physics 1	Exam	4

Course type	Course code	Course language	Timetable information
Lecture	VE0	English	MON:14:15-16:00(T601/2); TUE:14:15-15:00(T601/2);
Practice	VE1	English	TUE:15:15-16:00(T601/2);

Mechanics: Measurements, units, models in physics. Space, time, different frames of references. Motion of a particle in 3D. Newton's laws. Work, kinetic energy, potential energy. Work-energy theorem. Conservation laws in mechanics. Motion in accelerated frames, inertial forces. Newton's law of gravitation. Basics of the theory of special relativity. System of particles, conservation laws. Kinematics and dynamics of a rigid body. Oscillatory motion, resonance. Wave propagation, wave equation, dispersion, the Doppler effect. Thermodynamics: Heat and temperature. Heat propagation. Kinetic theory of gases. Laws of thermodynamics. Reversible and irreversible processes, phase transitions. Entropy, microscopic interpretation of entropy. Elements of statistical physics. Static electric and magnetic fields: Electric charge. Electric field, electric flux, electric potential. Basic equations of electrostatics. Applications of Gauss's law. Capacitors, energy of the static electric field. Dielectrics, boundary conditions. Electric current. Magnetic field. Current carrying wire in magnetic field. Magnetic field produced by an electric current, the Biot-Savart law.

Subject code	Subject name	Requirement	ECTS credit
BMETE11AX23	Physics 1i	Exam	4

Course type	Course code	Course language	Timetable information
Lecture	IE0	English	MON:14:15-16:00(T601/2); TUE:14:15-15:00(T601/2);
Lecture	IT0	English	
Practice	IE1	English	TUE:15:15-16:00(T601/2);
Practice	IT1	English	

KINEMATICS: Motion in one dimension. Motion in two dimensions. Position vector. Average velocity, instantaneous velocity. Average acceleration, instantaneous acceleration. Position, velocity and acceleration in Cartesian and polar coordinates. Projectile motion. Circular motion. Curvilinear motion, tangential and radial accelerations. THE LAWS OF MOTION: Inertial frames. Newton's laws. Force, mass. Normal force, tension, spring force, gravitational force, static and kinetic friction. Free body diagrams. The 1st cosmic speed. WORK AND ENERGY: Work of a varying force. Kinetic energy and the work-energy theorem. Power. POTENTIAL ENERGY: Work done by a spring. Work done by gravity. Work done by kinetic friction. Conservative and nonconservative forces. Potential energy. Conservation of mechanical energy. Changes in mechanical energy in the presence of nonconservative forces. Energy diagrams and the equilibrium of a system. The 2nd cosmic speed. LINEAR MOMENTUM AND COLLISIONS: Linear momentum. Conservation of momentum. Elastic and inelastic collisions in 1D, 2D and 3D. Center of mass. Rocket propulsion. ROTATION OF A RIGID OBJECT ABOUT A FIXED AXIS: Angular velocity vector, angular acceleration vector. Rotational kinetic energy. Moment of inertia. The parallel axis theorem. Torque. Work, power, energy. ANGULAR MOMENTUM: Angular momentum of a particle and a system of particles. Conservation of angular momentum. Gyroscopes. Analogy between translational and rotation motion. KEPLER'S LAWS OF PLANETARY MOTION. STATIC EQUILIBRIUM: Conditions of equilibrium for a rigid object. ACCELERATING FRAMES: Inertia forces: the translational inertia force, the centrifugal force, the Coriolis force, the Euler force. Discussion of motion in the rotating frame of the Earth. OSCILLATORY MOTION: Simple harmonic motion, amplitude, phase constant, angular frequency. Mass attached to a spring. Energy of a simple harmonic oscillator. The simple pendulum. The physical pendulum. The torsional pendulum. Damped oscillations. Forced oscillations. Resonance. WAVES: Transverse and longitudinal waves. Travelling waves in 1D. Reflection and transmission of waves. Sinusoidal waves, wavelength, period, wave number, angular frequency. The linear wave equation in 1D and in 3D. Spherical waves, plane waves. The Doppler effect, discussion using a spacetime diagram. Shock waves. Superposition and interference of sinusoidal waves. Standing waves: strings, air columns, membranes. Beats. SPECIAL RELATIVITY, KINEMATICS: The concept of events and observers. The Galilean transformation. The isotropy of the speed of light in any inertial frame. Einstein's postulates. The synchronization of clocks. Spacetime intervals: timelike, lightlike and spacelike intervals. Minkowski diagrams and worldlines of particles and light. The relativity of simultaneity. Length contraction and proper length. Time dilation and proper time. Causality. The twins paradox, the rod-barn paradox, the two spaceships paradox. The paradox of the identically accelerated twins. The acoustic Doppler effect vs. the electromagnetic Doppler effect. Velocity transformation. SPECIAL RELATIVITY, DYNAMICS: Linear momentum. Newton's 2nd law in its correct form. Kinetic energy. Connection between mass and energy. Relativistic formulas for elastic and inelastic collisions. Relation between the energy and the momentum of a particle. Acceleration due to a constant force. TEMPERATURE: Thermal equilibrium, thermal contact. The 0th law of thermodynamics. Temperature scales. Thermal expansion of solids and liquids. The ideal gas. Extensive and intensive state variables: volume, mass, pressure, temperature. HEAT AND THE 1ST LAW OF THERMODYNAMICS: Internal energy. Heat. Heat capacity, specific heat, molar specific heat. Latent heat. Work done on an ideal gas. The 1st law of thermodynamics. Adiabatic, isobaric, isovolumetric, isothermal processes. THE KINETIC THEORY OF GASES: Relationship between microscopic and macroscopic quantities. Average molecular kinetic energy, pressure, temperature. Degrees of freedom. The equipartition of energy. Specific heat at constant volume and at constant pressure. The adiabatic process on a P-V diagram. Specific heat of solids: the Dulong-Petit law. The distribution of atmospheric density at constant temperature: the Boltzmann distribution. Distribution of molecular speeds in an ideal gas: the Maxwell-Boltzmann distribution. Collision frequency and mean free path. HEAT ENGINES, ENTROPY AND THE 2ND LAW OF THERMODYNAMICS: Heat engines. Thermal efficiency. The 2nd law (Kelvin-Planck formulation). Refrigerators and heat pumps. The coefficient of performance. The 2nd law (Clausius). Reversible and irreversible processes. The Carnot engine. Reduced heat. Entropy. The 2nd law (in terms of entropy change). Change in entropy for an ideal gas and reversible processes. Adiabatic free expansion. Irreversible heat transfer. Macrostates, microstates, thermodynamic probability. Connection between entropy and probability.

Subject code	Subject name	Requirement	ECTS credit
BMETE11MF41	Modern Solid State Physics	Exam	6

Course type	Course code	Course language	Timetable information
Lecture	T0	English	THU:08:15-11:00;
Practice	T1	English	WED:16:15-18:00;

This Physics MSc course requires a BSc diploma in Physics, since it builds on knowledge gained by studying basic solid state physics, quantum mechanics and statistical physics. It offers the description of interacting quantum many body systems (mostly electrons) by elaborating on the following topics: identical particles, second quantization, interacting electrons on Bloch and on Wannier basis, ferromagnetism of metals, linear response theory, metallic susceptibility, screening, Hartree-Fock approximation, spin density waves, Bose liquids. Requirements during the semester: 2 tests (90 minutes each) Requirements in the exam period: oral exam

Subject code	Subject name	Requirement	ECTS credit
BMETE11MF45	Superconductivity	Exam	3

Course type	Course code	Course language	Timetable information
Lecture	T0	English	WED:14:15-16:00;

Subject code	Subject name	Requirement	ECTS credit
BMETE15MF10	Random Matrix Theory and Its Physical Applications	Exam	3

Course type	Course code	Course language	Timetable information
Lecture	E0	English	TUE:08:15-10:00;

Random matrix theory provides an insight of how one can achieve information relatively simply about systems having very complex behavior. The subject based on the knowledge acquired in quantum mechanics and statistical physics together with some knowledge of probability theory provides an overview of random matrix theory. The Dyson ensembles are defined with their numerous characteristics, e.g. the spacing distribution, the two-level correlation function and other quantities derived thereof. Then the thermodynamic model of levels is obtained together with several models of transition problems using level dynamics. Among the physical applications the universality classes are identified in relation to classically integrable and chaotic systems. The problem of decoherence is studied as well. Then the universal conductance fluctuations in quasi-onedimensional disordered conductors are investigated. Other models are investigated: the disorder driven Anderson transition and the random interaction model of quantum dot conductance in the Coulomb-blockade regime. We use random matrix models to investigate chirality in two-dimensional and Dirac systems and the normal-superconductor interface. The remaining time we cover problems that do not belong to strictly physical systems: EEG signal analysis, covariance in the stock share prize fluctuations, mass transport fluctuations, etc.

Subject code	Subject name	Requirement	ECTS credit
BMETE15MF15	Foundations of Density Functional Theory	Exam	3

Course type	Course code	Course language	Timetable information
Lecture	E0	English	TUE:10:15-12:00;

The Density Functional Theory is the most widely used method perform advanced calculations for many-electron systems, such as metals, semiconductors, conductors, as well as molecules and atoms. In this course, the mathematical foundations of the theory is discussed in details: Many-body Fock space and density operator. Reduced density operators. Exact equations and the independent particle approximation for the interacting electron gas in the density operator picture. N-representability. The Fermi hole and localized orbitals. The electron density. Katorsquo;s theorem and cusp conditions. The v- and N-representability of the electron density. The Hohenberg-

Kohn theorems. Existence of the universal density functional. Levyrsquo;s constrained search. Scaling properties. The Kohn-Sham equations. Fractional occupation numbers. The chemical potential and electronnegativity. Approximate methods. The gradient expansion. Recent functionals.

Subject code	Subject name	Requirement	ECTS credit
BMETE15MF51	Electronic Structure of Solid Matter	Exam	4

Course type	Course code	Course language	Timetable information
Lecture	E0	English	

Subject code	Subject name	Requirement	ECTS credit
BMETE80MD00	Nuclear Physics	Exam	5

Course type	Course code	Course language	Timetable information
Lecture	EN0	English	THU:08:15-11:00;
Practice	EN1	English	THU:11:15-12:00;

Stability of the nucleus, mass defect. Semi-empirical binding energy formula. Types and basic theory of radioactive decays. Nuclear models: Fermi-gas, Shell-model, Basics of collective model. Nuclear forces. Nuclear reactions. Cross sections and their two additivities. Mechanism of fission and fusion. Main types and working principles of accelerators.

Subject code	Subject name	Requirement	ECTS credit
BMETE80MD01	Nuclear Measurement Techniques	Exam	3

Course type	Course code	Course language	Timetable information
Lecture	EN0	English	WED:08:15-09:00;
Practice	EN1	English	WED:09:15-10:00;

Electromagnetic and particle radiations, basic interactions between radiations and matter. General measuring properties of radiation detectors. Detectors: ionization chambers, proportional counters, GM counters, scintillation detectors, semiconductor and solid state detectors. Special detectors: detection of neutrons, detectors for dosimetry, TLD, particle detectors. Detection of gamma-, alpha-, beta and X-rays, nuclear spectrometers. Counting statistics and error prediction. Evaluation of gamma- and X-ray spectra. Electronics of nuclear spectrometers. Nuclear accelerators.

Subject code	Subject name	Requirement	ECTS credit
BMETE80MD02	Plasma Physics	Exam	4

Course type	Course code	Course language	Timetable information
Lecture	EN0	English	MON:08:15-11:00;
Practice	EN1	English	MON:11:15-12:00;

General introduction to plasma physics. Energy generation with fusion reactors, Lawson criterion, parameters of fusion plasmas. Inertial fusion. Collisionless motion of charged particles in magnetic field. Thermodynamic equilibrium, ionization and radiative processes in the plasma. Magnetic confinement: configurations. Particle collisions in plasma, transport processes. Plasma theory: kinetic description, fluid description, MHD. Equilibrium and instabilities in magnetically confined plasma, plasma waves. Laboratory plasmas: breakdown, plasma heating, plasma-wall interaction. Plasma diagnostics, measurement methods. Recent results, achievements in fusion plasma confinement.

Subject code	Subject name	Requirement	ECTS credit
BMETE80MD09	Reactor Technology and Operation	Exam	2

Course type	Course code	Course language	Timetable information
Lecture	T0	English	WED:12:15-14:00;

Structure of nuclear power plant reactors, main components. Nuclear power plant types. Possible technological schemes. Fuel and assembly types, applied materials. Pressurized water reactors (PWRs). Traditional and advanced PWRs. Boiling water reactors (BWRs). Heavy water reactors (HWRs). Other nuclear power plant types. Typical data of power reactors. Structural materials. Reactivity compensating materials. Shielding materials. Radiation damage. Reactivity coefficients, over and under moderation. Xenon and samarium poisoning. Spatial distribution of power density. Main components of reactor instrumentation and control.

Subject code	Subject name	Requirement	ECTS credit
BMETE90AX00	Mathematics A1a - Calculus	Exam	6

Course type	Course code	Course language	Timetable information
Lecture	EN0-EMK	English	
Practice	EN1-EMK	English	

Real numbers. Complex algebra. Vector algebra. Elementary operations on sets. Series of numbers. Functions of one variable. Differentiation. Rules of differentiation. Newton's method. Applications of differentiation. Integration. Definite integral, indefinite integral. Properties and evaluation of the definite integral. Techniques of integration. Applications of the definite integral.

Subject code	Subject name	Requirement	ECTS credit
BMETE90AX07	Mathematics A3 for Civil Engineers	Exam	4

Course type	Course code	Course language	Timetable information
Lecture	EN0-EA0	English	
Practice	EN0-EA1	English	

Differential geometry of curves and surfaces. Scalar and vector fields. Potential theory. Classification of differential equations. Linear differential equation of the second order. Nonlinear differential equations. Systems of linear differential equations. The concept of probability. Discrete random variables an their distributions. Random variables of continuous distribution. Two-dimensional distributions, correlation and regression. Basic notions of mathematical statistics.

Subject code	Subject name	Requirement	ECTS credit
BMETE90AX09	Mathematics A3 for Electrical Engineers	Exam	4

Course type	Course code	Course language	Timetable information
Lecture	EN0	English	MON:14:15-16:00(E402);

Differential geometry of curves and surfaces. Tangent and normal vector, curvature. Length of curves. Tangent plane, surface measure. Scalar and vector fields. Differentiation of vector fields, divergence and curl. Line and surface integrals. Potential theory. Conservative fields, potential. Independence of line integrals of the path. Theorems of Gauss and Stokes, the Green formulae. Examples and applications. Complex functions. Elementary functions, limit and continuity. Differentiation of complex functions, Cauchy-Riemann equations, harmonic functions. Complex line integrals. The fundamental theorem of function theory. Regular functions, independence of line integrals of the path. Cauchy's formulae, Liouville's theorem. Complex power series. Analytic functions, Taylor expansion. Classification of singularities, meromorphic functions, Laurent series. Residual calculation of selected integrals. Laplace transform. Definition and elementary rules. The Laplace transform of derivatives. Transforms of elementary functions. The inversion formula. Transfer function. Classification of differential equations. Existence and uniqueness of solutions. The homogeneous linear equation of first order. Problems leading to ordinary differential equations. Electrical networks, reduction of higher order equations and systems to first order systems.The linear equation of second order. Harmonic oscillators. Damped and forced oscillations. Variation of constants, the in-homogeneous equation. General solution via convolution, the method of Laplace transform. Nonlinear differential equations. Autonomous equations, separation of variables. Nonlinear vibrations, solution by expansion. Numerical solution. Linear differential equations. Solving linear systems with constant coefficients in the case of different eigenvalues. The inhomogeneous problem, Laplace transform. Stability.

Subject code	Subject name	Requirement	ECTS credit
BMETE90AX21	Calculus 1 for Informaticians	Exam	6

Course type	Course code	Course language	Timetable information
Lecture	EN0	English	TUE:10:15-12:00(T605); WED:10:15-12:00(T605);
Practice	EN1	English	THU:12:15-14:00(T601/2);

Subject code	Subject name	Requirement	ECTS credit
BMETE90AX33	Mathematics EP1	Exam	4

Course type	Course code	Course language	Timetable information
Lecture	EN0	English	
Practice	EN1	English	

This course covers the elements of single variable calculus and linear algebra. Special emphasis is put on the concepts of linear algebra which are later used by architects in structural design. These are the systems of linear equations, matrices and determinants with their properties. From the elements of calculus, the limit of sequences, the differentiation, the integration and applications belong to the course material.

Subject code	Subject name	Requirement	ECTS credit
BMETE90AX51	Mathematics A4 - Probability Theory	Exam	4

Course type	Course code	Course language	Timetable information
Lecture	EN0	English	MON:12:15-14:00(H601);
Practice	EN1	English	TUE:10:15-12:00(H601);

Notion of probability. Conditional probability. Independence of events. Discrete random variables and their distributions (discrete uniform distribution, classical problems, combinatorial methods, indicator distribution, binomial distribution, sampling with/without replacement, hypergeometrical distribution, Poisson distribution as limit of binomial distributions, geometric distribution as model of a discrete memoryless waiting time). Continuous random variables and their distributions (uniform distribution on an interval, exponential distribution as model of a continuous memoryless waiting time, standard normal distribution). Parameters of distributions (expected value, median, mode, moments, variance, standard deviation). Two-dimensional distributions. Conditional distributions, independent random variables. Covariance, correlation coefficient. Regression. Transformations of distributions. One- and two-dimensional normal distributions. Laws of large numbers, DeMoivre-Laplace limit theorem, central limit theorem. Some statistical notions. Computer simulation, applications.

Subject code	Subject name	Requirement	ECTS credit
BMETE90MX33	Mathematics MSc for Civil Engineers	Exam	3

Course type	Course code	Course language	Timetable information
Lecture	EN0-EA0	English	
Practice	EN0-EA1	English	

Subject code	Subject name	Requirement	ECTS credit
BMETE90MX38	Advanced Mathematics for Electrical Engineers B	Exam	6

Course type	Course code	Course language	Timetable information
Lecture	EN1-A0	English	
Practice	EN1-A1	English	

Combinatorial Optimization: Basic concepts of linear programming, Farkas lemma, duality. Integer programming, total unimodularity, applications to matchings in bipartite graphs and network flows.Basic notions of matroid theory, duality, minors, direct sum, sum. Algorithms for matroids. Matroids and graphs, linear representation, Tutte's theorems. Approximation algorithms (set cover, Steiner-trees, travelling salesman problem). Scheduling algorithms (list scheduling, the algorithms of Hu and Coffman and Graham). Engineering applications: design of reliable networks, design of very large scale integrated (VLSI) circuits, the classical theory of electric networks. Stochastics: Review of basic probability theory: random variables, distribution, expectation, covariance matrix, important types of distributions. Generating and characteristic functions and their applications: limit theorems and large deviations (Bernstein inequality, Chernoff bound, Kramer's theorem). Basics of mathematical statistics: samples, estimates, hypotheses, important tests, regressions. Basics of stochastic processes: Markov chains and Markov processes. Markov chains with finite state space: irreducibility, periodicity, linear algebraic tools, stationary measures, ergodicity,reversibility, MCMC. Chains with countable state space: transience, recurrence. Application to birth and death processes and random walks. Basics of continuous time Markov chains: Poisson process, semigroups. Weakly stationary processes: spectral theory, Gauss processes, interpolation, prediction and filtering.

Subject code	Subject name	Requirement	ECTS credit
BMETE90MX57	Advanced Mathematics for Informaticians - Applied Algebra and Mathematical Logic	Exam	4

Course type	Course code	Course language	Timetable information
Lecture	EN	English	TUE:08:15-10:00(T606); THU:08:15-10:00(T606);

Subject code	Subject name	Requirement	ECTS credit
BMETE90MX59	Mathematics M1 for Transportation Engineers	Mid-semester mark	4

Course type	Course code	Course language	Timetable information
Lecture	K0-EN	English	
Practice	K1-EN	English	

Subject code	Subject name	Requirement	ECTS credit
BMETETOP117	Engineering Sciences	Mid-semester mark	0

Course type	Course code	Course language	Timetable information
Lecture	EN1	English	

Subject code	Subject name	Requirement	ECTS credit
BMETETOPB22	Basic Mathematics 1	Mid-semester mark	0

Course type	Course code	Course language	Timetable information
Lecture	EN0-A0	English	