

Study plan

Name of study plan: ITS bak.prez.18/19

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Intelligent Transport Systems

Garantor of the study branch: doc. Ing. Pavel Hruběš, Ph.D.

Program of study: Technology in Transportation and Telecommunications

Type of study: Bachelor full-time

Required credits: 180

Elective courses credits: 0

Sum of credits in the plan: 180

Note on the plan:

Name of the block: Compulsory courses

Minimal number of credits of the block: 158

The role of the block: Z

Code of the group: 1.S.BP 17/18

Name of the group: 1.sem.bak.prez. od 17/18

Requirement credits in the group: In this group you have to gain 30 credits

Requirement courses in the group: In this group you have to complete 11 courses

Credits in the group: 30

Note on the group:

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.) | Completion | Credits | Scope | Semester | Role |
|--------|--|------------|---------|-----------|----------|------|
| 11CAL1 | Calculus 1 Magdalena Hykšová, Ondřej Navrátil, Bohumil Ková, Tomáš Tasák, Olga Vraštilová Ondřej Navrátil (Gar.) | Z,ZK | 7 | 2P+4C+2B | Z | Z |
| 11LA | Linear Algebra Lucie Kárná, Jan Píkrýl, Martina Beváová, Pavel Provinský Martina Beváová (Gar.) | Z,ZK | 3 | 2P+1C+10B | Z | Z |
| 12ZYDI | Introduction to Transportation Engineering Dagmar Koárková, Zuzana arská, Jan Kruntorád, Nikol Dousková, Vojtěch Novotný | Z,ZK | 2 | 1P+1C | Z | Z |
| 18MTY | Materials Science and Engineering Michaela Neuhäuserová, Jan Falta, Václav Rada, Michaela Neuhäuserová, Václav Rada, Jaroslav Valach | Z,ZK | 3 | 2P+1C+10B | Z | Z |
| 11GIE | Geometry Pavel Provinský, Oldřich Hykš, Šárka Voráová Šárka Voráová (Gar.) | KZ | 3 | 2P+2C+12B | Z | Z |
| 14ASD | Algorithm and Data Structures Kirill Smirnov, Jan Procházka, Petr Hnyk, Michal Jeábek, Marek Kalika, Zdeněk Lokaj, Jan Zelenka, Vít Fábera Michal Jeábek (Gar.) | KZ | 3 | 0P+2C+8B | Z | Z |
| 14KSP | Constructing with Computer Aid Vladimír Douda, Martin Brumovský, Lukáš Kozel, Radek Kratochvíl, Filip Müller, Lukáš Svoboda, Drahomír Schmidt Lukáš Svoboda (Gar.) | KZ | 2 | 0P+2C+8B | Z | Z |
| 18TED | Technical Documentation Jitka ezníková | KZ | 2 | 1P+1C+8B | Z | Z |
| 15DPLG | Transportation Psychology Eva Rezlerová, Jana Štikarová | Z | 2 | 2P+0C+6B | Z | Z |
| 16UDOP | Introduction into Vehicles Zuzana Radová, Josef Mík, Petr Bouchner Petr Bouchner (Gar.) | Z | 2 | 2P+0C+8B | Z | Z |
| TV-1 | Physical Education | Z | 1 | | Z | Z |

Characteristics of the courses of this group of Study Plan: Code=1.S.BP 17/18 Name=1.sem.bak.prez. od 17/18

| | | | |
|--|----------------|------|---|
| 11CAL1 | Calculus 1 | Z,ZK | 7 |
| Sequence of real numbers and its limit. Basic properties of mappings. Function of one real variable, its limit and derivative. Geometric properties of n-dimensional Euklidean space and Cartesian coordinate system. Geometric meaning of the differential of functions several real variables, differential calculus of functions of several real variables. | | | |
| 11LA | Linear Algebra | Z,ZK | 3 |
| Vector spaces (linear combinations, linear independence, dimension, basis, coordinates). Matrices and operations. Systems of linear equations and their solvability. Determinants and their applications. Scalar product. Similarity of matrices (eigenvalues and eigenvectors). Quadratic forms and their classification. | | | |

| | | | |
|---|--|------|---|
| 12ZYDI | Introduction to Transportation Engineering | Z,ZK | 2 |
| Role of transportation in land-use planning. Basic terms in transportation engineering. Traffic survey and traffic prognosis. Introduction to topic of roads, public mass transport. Negative impacts of transportation to environment and safety. | | | |
| 18MTY | Materials Science and Engineering | Z,ZK | 3 |
| Basic course of materials science and engineering explains mechanical properties of structural materials based on their bonding forces and microstructure. However the main attention is paid to metals as the most important engineering materials, also other major classes of materials are presented, namely ceramics, polymers and composites. Attention is also paid to degradation processes in materials, to defectoscopy and to main mechanical tests. | | | |
| 11GIE | Geometry | KZ | 3 |
| Orthographic and oblique projections, linear perspective. Topographic surfaces and their orthogonal projection. Differential geometry of curves - parameterization, arc of the curve, torsion and curvature, Frenet's trihedron. Kinematics - a curve as a trajectory of the motion, the velocity and acceleration of a particle moving on a curved path. | | | |
| 14ASD | Algorithm and Data Structures | KZ | 3 |
| Students will be familiarized with selected basic and derived data structures, algorithms, their properties and their design procedure. Students will analyze problems, propose theoretical solutions to the set task and the resulting algorithm write by means of flowcharts, practice in reading algorithms recorded by means of the flowchart and use the basics of Boolean algebra with forming the conditions for the algorithms. | | | |
| 14KSP | Constructing with Computer Aid | KZ | 2 |
| "CAD systems" term determination. CAD role in projecting system model. Existing CAD systems on Czech market. Project creation, basic common work rules in graphic applications and CA systems. Co-ordinated systems, CAD environment skill (basics of constructing, dimensioning, modifications, user interfaces, projecting possibilities, AutoCAD environment profiles, drawings with raster foundations). | | | |
| 18TED | Technical Documentation | KZ | 2 |
| Technical standards, international standardization, technical drawings, representation of technical objects, technical diagrams and charts, dimensional and geometrical accuracy, arrangement of drawing sheets. | | | |
| 15DPLG | Transportation Psychology | Z | 2 |
| Subject of psychology and its basic concepts. Information intake, decision-making and behaviour. Performance. Engineering psychology and vehicle construction. Psychological aspects of travel route and traffic conditions, accidents and traffic incidents. Selection and training of the staff. Work and leisure. Age as a factor in transport operation. | | | |
| 16UDOP | Introduction into Vehicles | Z | 2 |
| Vehicles and transportation systems. Functionality and setup. Movement and drive principles. Engines and their characteristics. Rail, road, air and water transport. Alternative means of transport. Lifting equipment and conveyors. Legislation. | | | |
| TV-1 | Physical Education | Z | 1 |

Code of the group: 2.S.BP 17/18

Name of the group: 2.sem.bak.prez. od 17/18

Requirement credits in the group: In this group you have to gain 30 credits

Requirement courses in the group: In this group you have to complete 9 courses

Credits in the group: 30

Note on the group:

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.) | Completion | Credits | Scope | Semester | Role |
|--------|---|------------|---------|-----------|----------|------|
| 11CAL2 | Calculus 2 Magdalena Hykšová Magdalena Hykšová Magdalena Hykšová (Gar.) | Z,ZK | 5 | 2P+3C+20B | L | Z |
| 11STAT | Statistics | Z,ZK | 4 | 2P+2C+12B | L | Z |
| 12ZTS | Railway Lines and Stations | Z,ZK | 4 | 2P+2C+10B | L | Z |
| 18SAT | Structural Analysis | Z,ZK | 4 | 2P+2C+14B | L | Z |
| 20SYSA | Systems Analysis | Z,ZK | 5 | 2P+2C+14B | L | Z |
| 14PRG | Programming | KZ | 2 | 0P+2C+8B | L | Z |
| 17TEDL | Transport Technology and Logistics | KZ | 3 | 2P+1C | L | Z |
| 21ZALD | Basics of Air Transport | KZ | 2 | 0P+2C+8B | L | Z |
| TV-2 | Physical Education | Z | 1 | | L | Z |

Characteristics of the courses of this group of Study Plan: Code=2.S.BP 17/18 Name=2.sem.bak.prez. od 17/18

| | | | |
|---|----------------------------|------|---|
| 11CAL2 | Calculus 2 | Z,ZK | 5 |
| Antiderivative, Newtonian integral, Riemannian integral of the function of one variable, improper Riemannian integral, Riemannian integral in R^n . Parametric description of regular k -dimensional surfaces in R^n , Riemannian integral over regular surfaces. Line and surface integrals of the second type, Stokes theorems, ordinary differential equations of the first order, linear differential equations with constant coefficients and its systems. | | | |
| 11STAT | Statistics | Z,ZK | 4 |
| Definition of probability, random variable and its description, known distributions, random vector, function of random variable. Methods of point estimation. Testing of statistical hypothesis. Regression and correlation, linear regression, correlation coefficient, coefficient of determination, the general linear model, statistical inference in linear regression, analysis of variance, multiple regression, the use of matrices in regression. | | | |
| 12ZTS | Railway Lines and Stations | Z,ZK | 4 |
| Rail transport. Railway track geometry parameters. Route layout of railway lines. Railway line construction - railway substructure and superstructure. Spatial layout of railway lines. Railway control systems in relation to infrastructure. Operating and carriage points. Railway lines net and category. Traction in rail transport. | | | |
| 18SAT | Structural Analysis | Z,ZK | 4 |
| General system of forces in plane and space. Calculation of reactions of bodies and structures. Assessment of internal forces on statically determinate beams and simple girders. Principle of virtual work. Kinematic method for calculation of reactions of statically determinate systems. Determination of axial forces in truss constructions. Cross-sectional characteristics of planar shapes. Fiber polygons and chains. | | | |

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|--|------------------------------------|------|---|
| 20SYSA | Systems Analysis | Z,ZK | 5 |
| Introduction to system sciences, system viewpoint, terminology, typical system analysis tasks, system identification, system interface and interface tasks, processes, system behaviour and its analysis, strong functions and processes, genetic code, system identity, system architecture. Tools for system analysis - Petri nets, decision tables, algorithms for structural tasks. Soft and hard systems, methods for soft system analysis. | | | |
| 14PRG | Programming | KZ | 2 |
| Algorithm development, methods of structured programming, high-level programming languages, basics of C programming languages (types, variables, conditions, cycles, arrays, functions), programming techniques, complexity. | | | |
| 17TEDL | Transport Technology and Logistics | KZ | 3 |
| Basic terms in transport technology and logistics, particular steps of transport planning, line planning, timetabling, planning in passenger and freight transport, organisation of traffic in each transport modus, technologic factors of the side of operator and client, organisation of city transport, logistic technologies and their application using various transport modus. | | | |
| 21ZALD | Basics of Air Transport | KZ | 2 |
| History, definitions, terminology, basic rules. VFR/IFR. Basics of aerodynamics. Propulsion of aircraft. Aircraft design. Basics of navigation, radio navigation. Weight, balance, performance. Flight planning, optimization of speed and heights, minimum fuel. Limitations of operation, maintenance, service life of aircraft. Traffic management, ground handling, security. Air crew. Airlines and economics. Space technologies. | | | |
| TV-2 | Physical Education | Z | 1 |

Code of the group: 3.S.BP 18/19

Name of the group: 3.sem.bak.prez. od 18/19

Requirement credits in the group: In this group you have to gain 30 credits

Requirement courses in the group: In this group you have to complete 8 courses

Credits in the group: 30

Note on the group:

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.) | Completion | Credits | Scope | Semester | Role |
|--------|---|------------|---------|-----------|----------|------|
| 11FYZ | Physics Tomáš Vít, Zuzana Malá, Marek Honc Zuzana Malá Zuzana Malá (Gar.) | Z,ZK | 5 | 2P+2C+18B | Z | z |
| 12MDE | Transport Models and Transport Excesses Milan Dont, Josef Kocourek | Z,ZK | 3 | 2P+1C+8B | Z | z |
| 17TGA | Graph Theory and its Applications in Transport Alena Rybíková, Denisa Mocková, Dušan Teichmann Alena Rybíková (Gar.) | Z,ZK | 4 | 2P+2C+12B | Z | z |
| 18PZP | Elasticity and Strength Petr Zlámal, Jan Vyíchl, Tomáš Doktor, Josef Jíra, Petr Koudelka, Jan Šleichert, Tomáš Doktor, Daniel Kytý, Jan Šleichert, | Z,ZK | 3 | 2P+1C+10B | Z | z |
| 20UITS | Introduction to Intelligent Transport Systems Vladimír Faltus, Jiří Růžička, Pavel Hluska, Kristýna Navrátilová, Pavel Hrubeš, Martin Langr, Patrik Horažovský, Tomáš Zelinka, Jiří Růžička | Z,ZK | 7 | 3P+2C+20B | Z | z |
| 12PPOK | Designing Roads, Highways and Motorways Petr Šatra, Jiří Arský, Jan Gallia, Tomáš Padělek, Petr Kumpošt | KZ | 3 | 1P+2C+10B | Z | z |
| 14DATS | Database Systems Martin Šrotý, Jan Král, Jana Kalíková Jana Kalíková (Gar.) | KZ | 2 | 1P+1C+10B | Z | z |
| 15JZ1A | Foreign Language - English 1 Eva Rezlerová, Dana Boušová, Jitka Heřmanová, Barbora Horáková, Marie Michlová, Lenka Monková, Markéta Olehlová, Markéta Vojanová, Peter Morpuss, | Z | 3 | 0P+4C+10B | Z | z |

Characteristics of the courses of this group of Study Plan: Code=3.S.BP 18/19 Name=3.sem.bak.prez. od 18/19

| | | | |
|---|--|------|---|
| 11FYZ | Physics | Z,ZK | 5 |
| Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics. | | | |
| 12MDE | Transport Models and Transport Excesses | Z,ZK | 3 |
| Parameters of the traffic flow and methods for their measurement. Models of the traffic flow, communications load, line and urban systems. Theory of queues, shock waves. Quality of transport and its assessment. Statistical characteristics of transport. Transport excesses, their analysis, the causes, identify and minimize the consequences. Improving of transport safety and fluency. | | | |
| 17TGA | Graph Theory and its Applications in Transport | Z,ZK | 4 |
| Basic terms of graph theory, paths in graphs, flows in networks, location problems, design problems on graphs, optimum routing, use of graphs in other scientific disciplines. | | | |
| 18PZP | Elasticity and Strength | Z,ZK | 3 |
| Tension and compression. Bending of beam. Shear stress during bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joint of structure. Analysis of deflection curve of beam. Torsion of circle cross section. Combined loading. Stability of compressed bar and buckling. Beam on elastic foundation. Strength analysis. | | | |
| 20UITS | Introduction to Intelligent Transport Systems | Z,ZK | 7 |
| Terminology and legislative framework telematics systems and their architecture. Telematics systems in practice and their operation. Fundamentals of information and telecommunication systems for ITS. Principles and technical support measurement of traffic data, localization and navigation. Practical work with traffic data. Real examples of possible applications of the principles of ITS. | | | |
| 12PPOK | Designing Roads, Highways and Motorways | KZ | 3 |
| Definition, types, ownership, maintenance, management and categorization of roads and highways. Curve and transition curve. Sinuosity and standard speed. Route in rural areas. Range of vision for stopping and overtaking. Road body - shapes and proportions, bottom and superstructure. Drainage and components of roads. Safety device. Crossings, junctions, intersections. | | | |
| 14DATS | Database Systems | KZ | 2 |
| Basic concepts of database systems, conceptual model, relational data model, the principles of normal forms, relational database design, security and integrity of data, database queries, relational algebra, SQL language, client / server, multilayer architectures, distributed database systems. Access to data via the WWW. | | | |

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|--------|------------------------------|---|---|
| 15JZ1A | Foreign Language - English 1 | Z | 3 |
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Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric.

Code of the group: 4.S.BITS 17/18

Name of the group: 4.sem.ITS bak.prez.(od)17/18

Requirement credits in the group: In this group you have to gain 22 credits

Requirement courses in the group: In this group you have to complete 4 courses

Credits in the group: 22

Note on the group:

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i> | Completion | Credits | Scope | Semester | Role |
|--------|--|------------|---------|-------|----------|------|
| 11MAMY | Mathematical Methods | Z,ZK | 7 | 3P+3C | L | Z |
| 14AM | Automation and Measurement | Z,ZK | 6 | 3P+3C | L | Z |
| 16DOTE | Transportation Technology | Z,ZK | 6 | 3P+3C | L | Z |
| 15JZ2A | Foreign Language - English 2 | Z,ZK | 3 | 3P+1C | L | Z |

Characteristics of the courses of this group of Study Plan: Code=4.S.BITS 17/18 Name=4.sem.ITS bak.prez.(od)17/18

| | | | | | | |
|--------|------------------------------|------|---|---|--|--|
| 11MAMY | Mathematical Methods | Z,ZK | 7 | Introduction to mathematical control theory, mathematical modelling. Introduction to statistical learning and system modelling from data. Mathematical optimisation, linear and dynamic programming, multi-criterial optimisation, graph problems. | | |
| 14AM | Automation and Measurement | Z,ZK | 6 | Introduction into terms agent, rational agent, their unification to elements of transportation systems, analogies in nature, regulation in open loop and control in closed loop, reactive systems. Dynamic system identification. Measurement of basic electrotechnic and physical magnitudes, measurement on AC/DC 1 and 3 phase systems. AC/DC electric motors, 1 and 3 phase distribution systems. Appliance connecting. | | |
| 16DOTE | Transportation Technology | Z,ZK | 6 | Types of vehicles, main features and principles. Construction and design elements, important legislation, testing. Drives and transmission, energy accumulation and changes. Road vehicle dynamics (lateral, transversal, vertical, driveability, suspension, wheel-road contact), mathematic solution of dynamic systems. Design features of passive, active and integrated safety. | | |
| 15JZ2A | Foreign Language - English 2 | Z,ZK | 3 | Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric. | | |

Code of the group: 4.S.BITS VÝB R 17/18

Name of the group: 4.sem bak. ITS výb r p edm tu (od)17/18

Requirement credits in the group: In this group you have to gain 4 credits

Requirement courses in the group: In this group you have to complete 1 course

Credits in the group: 4

Note on the group:

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i> | Completion | Credits | Scope | Semester | Role |
|--------|--|------------|---------|-------|----------|------|
| 11EMO | Electromagnetic Field and Optics | Z,ZK | 4 | 2P+1C | L | Z |
| 20ZEKT | Fundamentals of Electrical Engineering | Z,ZK | 4 | 2P+1C | L | Z |

Characteristics of the courses of this group of Study Plan: Code=4.S.BITS VÝB R 17/18 Name=4.sem bak. ITS výb r p edm tu (od)17/18

| | | | | | | |
|--------|--|------|---|---|--|--|
| 11EMO | Electromagnetic Field and Optics | Z,ZK | 4 | Electric field. Electric current. Magnetic field. Electromagnetic field. Optics. Basics of solid-state physics. | | |
| 20ZEKT | Fundamentals of Electrical Engineering | Z,ZK | 4 | Maxwell equations, electrotechnical quantities (electrical current, voltage, resistance, conductivity, resistivity, conductivity, power, energy), Ohm's law, Kirchhoff laws, electrical circuits (elements, methods, DC and AC circuits, accumulators, photovoltaics), electric machines, transmission lines, reflections on transmission lines, basic electrical measurements. | | |

Code of the group: 5.S.BITS 19/20

Name of the group: 5.sem.ITS bak.prez. od 19/20 (pro B3710)

Requirement credits in the group: In this group you have to gain 21 credits

Requirement courses in the group: In this group you have to complete 3 courses

Credits in the group: 21

Note on the group:

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.) | Completion | Credits | Scope | Semester | Role |
|--------|---|------------|---------|-------|----------|------|
| 14ISYD | Information Systems in Transportation Marek Kalika, Jan Král, Jana Kaliková Petr Moos (Gar.) | Z,ZK | 7 | 2P+4C | Z | z |
| 14TAMS | Telecommunications and Local Area Networks Zdeněk Lokaj, Tomáš Zelinka, Martin Šrotý Tomáš Zelinka (Gar.) | Z,ZK | 7 | 3P+3C | Z | z |
| 20RIZE | Railway Traffic Control Martin Leso, Dušan Kamenický, Adam Hlubek | Z,ZK | 7 | 3P+3C | Z | z |

Characteristics of the courses of this group of Study Plan: Code=5.S.BITS 19/20 Name=5.sem.ITS bak.prez. od 19/20 (pro B3710)

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|--------|--|------|---|---|--|--|
| 14ISYD | Information Systems in Transportation | Z,ZK | 7 | Advanced Database Technologies. Types of information systems. History of information systems. Technology of information system with relational database systems. Portal type of information system. Technology of client and server (JavaScript and PHP). XML language. | | |
| 14TAMS | Telecommunications and Local Area Networks | Z,ZK | 7 | Introduction of present stage and new trends in telecommunications systems with concentration on ITS applications. Legal conditions for telecommunications services provisioning and applications. Telecommunications key elements applied in hierarchical architecture are introduced and relations between networks elements parameters and performance of the whole telecommunications solutions are explained with concentration on the ITS applications. | | |
| 20RIZE | Railway Traffic Control | Z,ZK | 7 | Introduction to railway signaling and transport, legislation and standards, principles of security and safety equipment category, basic structural elements, power supplies and power electronics, train protection systems, ETCS. Interoperability and security technology in the world, security technology in public transport, CBTC systems. | | |

Code of the group: 6.S.BITS 16/17

Name of the group: 6.sem. ITS bak.prez. (od) 16/17

Requirement credits in the group: In this group you have to gain 21 credits

Requirement courses in the group: In this group you have to complete 3 courses

Credits in the group: 21

Note on the group:

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.) | Completion | Credits | Scope | Semester | Role |
|--------|---|------------|---------|-------|----------|------|
| 16SVIR | Vehicle Systems and Interaction with Driver | Z,ZK | 7 | 3P+3C | L | z |
| 20APLT | Applied Telematics | Z,ZK | 7 | 4P+3C | L | z |
| 20RISI | Road Traffic Control and Management | Z,ZK | 7 | 3P+3C | L | z |

Characteristics of the courses of this group of Study Plan: Code=6.S.BITS 16/17 Name=6.sem. ITS bak.prez. (od) 16/17

| | | | | | | |
|--------|---|------|---|--|--|--|
| 16SVIR | Vehicle Systems and Interaction with Driver | Z,ZK | 7 | Control and regulation theory. Electronic control systems and their relation to driving dynamics. Influential factors on vehicle dynamics, collision situation, accident, testing. Vehicle autodiagnosics, influence of construction, material, technology, data for autodiagnosics, legislative requirements. Human-machine interaction in past and present. Ergonomics. Drowsiness, its causes and consequences, aggression, monotony. | | |
| 20APLT | Applied Telematics | Z,ZK | 7 | Strategic documents in the field of ITS and related legislative and technical documents. ITS architecture, including the proposal in UML. Data models, the location table, FCD and their practical use in real systems. Specific telematics systems in practice and aspects of their operations. Binding ITS to other network industries and the concept of cooperative systems, smart cities and energy aspects of transport. | | |
| 20RISI | Road Traffic Control and Management | Z,ZK | 7 | Traffic control at junctions, their coordination and RLTS on highways. Principles of control systems used in practice. Design of traffic lights and its capacity assessment. Software tools for traffic models and simulations. Hardware of control systems. Preference of public transport and solutions for displaying traffic information and variable message signs. | | |

Name of the block: Semestrální projekt

Minimal number of credits of the block: 6

The role of the block: ZP

Code of the group: XB 4,5,6 13/14

Name of the group: Projekty bak. 4.5.6.sem. (od) 13/14 - pro B3710

Requirement credits in the group: In this group you have to gain 6 credits

Requirement courses in the group: In this group you have to complete 3 courses

Credits in the group: 6

Note on the group:

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.) | Completion | Credits | Scope | Semester | Role |
|-------|---|------------|---------|-------|----------|------|
| 11X31 | Project 1 | Z | 2 | 0P+1C | L | ZP |

| | | | | | | |
|-------|---|---|---|-------|---|----|
| 12X31 | Project 1 | Z | 2 | 0P+1C | L | ZP |
| 14X31 | Project 1 | Z | 2 | 0P+1C | L | ZP |
| 15X31 | Project 1 | Z | 2 | 0P+1C | L | ZP |
| 16X31 | Project 1 | Z | 2 | 0P+1C | L | ZP |
| 17X31 | Project 1 | Z | 2 | 0P+1C | L | ZP |
| 18X31 | Project 1 | Z | 2 | 0P+1C | L | ZP |
| 20X31 | Project 1 | Z | 2 | 0P+1C | L | ZP |
| 21X31 | Project 1 | Z | 2 | 0P+1C | L | ZP |
| 22X31 | Project 1 | Z | 2 | 0P+1C | L | ZP |
| 23X31 | Project 1 | Z | 2 | 0P+1C | L | ZP |
| 11X32 | Project 2 | Z | 2 | 0P+2C | Z | ZP |
| 12X32 | Project 2 <i>Dagmar Koárková, Zuzana arská, Vojt ch Novotný, Josef Kocourek, Roman Dostál, Karolína Moudrá, Ji í arský, Jan Gallia, Tomáš Pad lek,</i> | Z | 2 | 0P+2C | Z | ZP |
| 14X32 | Project 2 <i>Zden k Lokaj, Vít Fábera, Tomáš Zelinka, Martin Šrotý, Jan Kr ál, Jana Kalíková, Ota Hajzler</i> | Z | 2 | 0P+2C | Z | ZP |
| 15X32 | Project 2 <i>Eva Rezlerová</i> | Z | 2 | 0P+2C | Z | ZP |
| 16X32 | Project 2 <i>Josef Mík, Petr Bouchner, Milan Sliacky, Adam Orlický</i> | Z | 2 | 0P+2C | Z | ZP |
| 17X32 | Project 2 <i>Alena Rybí ková, Denisa Mocková, Dušan Teichmann, Václav Baroch, Edvard B ezina, Michal Drábek, Alexandra Dvo á ková, Veronika Fairřová, Tomáš Horák,</i> | Z | 2 | 0P+2C | Z | ZP |
| 18X32 | Project 2 | Z | 2 | 0P+2C | Z | ZP |
| 20X32 | Project 2 | Z | 2 | 0P+2C | Z | ZP |
| 21X32 | Project 2 | Z | 2 | 0P+2C | Z | ZP |
| 22X32 | Project 2 <i>Michal Frydrýn, Karel Kocián, Luboš Nouzovský, Zden k Svatý, Tomáš Mi unek</i> | Z | 2 | 0P+2C | Z | ZP |
| 23X32 | Project 2 | Z | 2 | 0P+2C | Z | ZP |
| 11X33 | Project 3 | Z | 2 | 0P+1C | L | ZP |
| 12X33 | Project 3 | Z | 2 | 0P+1C | L | ZP |
| 14X33 | Project 3 | Z | 2 | 0P+1C | L | ZP |
| 15X33 | Project 3 | Z | 2 | 0P+1C | L | ZP |
| 16X33 | Project 3 | Z | 2 | 0P+1C | L | ZP |
| 17X33 | Project 3 | Z | 2 | 0P+1C | L | ZP |
| 18X33 | Project 3 | Z | 2 | 0P+1C | L | ZP |
| 20X33 | Project 3 | Z | 2 | 0P+1C | L | ZP |
| 21X33 | Project 3 | Z | 2 | 0P+1C | L | ZP |
| 22X33 | Project 3 | Z | 2 | 0P+1C | L | ZP |
| 23X33 | Project 3 | Z | 2 | 0P+1C | L | ZP |

Characteristics of the courses of this group of Study Plan: Code=XB 4,5,6 13/14 Name=Projekty bak. 4.5.6.sem. (od) 13/14 - pro B3710

| | | | |
|-------|-----------|---|---|
| 11X31 | Project 1 | Z | 2 |
| 12X31 | Project 1 | Z | 2 |
| 14X31 | Project 1 | Z | 2 |
| 15X31 | Project 1 | Z | 2 |
| 16X31 | Project 1 | Z | 2 |
| 17X31 | Project 1 | Z | 2 |
| 18X31 | Project 1 | Z | 2 |
| 20X31 | Project 1 | Z | 2 |
| 21X31 | Project 1 | Z | 2 |
| 22X31 | Project 1 | Z | 2 |
| 23X31 | Project 1 | Z | 2 |
| 11X32 | Project 2 | Z | 2 |
| 12X32 | Project 2 | Z | 2 |
| 14X32 | Project 2 | Z | 2 |
| 15X32 | Project 2 | Z | 2 |
| 16X32 | Project 2 | Z | 2 |
| 17X32 | Project 2 | Z | 2 |
| 18X32 | Project 2 | Z | 2 |

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|-------|-----------|---|---|
| 20X32 | Project 2 | Z | 2 |
| 21X32 | Project 2 | Z | 2 |
| 22X32 | Project 2 | Z | 2 |
| 23X32 | Project 2 | Z | 2 |
| 11X33 | Project 3 | Z | 2 |
| 12X33 | Project 3 | Z | 2 |
| 14X33 | Project 3 | Z | 2 |
| 15X33 | Project 3 | Z | 2 |
| 16X33 | Project 3 | Z | 2 |
| 17X33 | Project 3 | Z | 2 |
| 18X33 | Project 3 | Z | 2 |
| 20X33 | Project 3 | Z | 2 |
| 21X33 | Project 3 | Z | 2 |
| 22X33 | Project 3 | Z | 2 |
| 23X33 | Project 3 | Z | 2 |

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 10

The role of the block: PV

Code of the group: Y1-BITS 18/19

Name of the group: PVP bak.prez. ITS 18/19

Requirement credits in the group: In this group you have to gain 10 credits

Requirement courses in the group: In this group you have to complete 5 courses

Credits in the group: 10

Note on the group:

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i> | Completion | Credits | Scope | Semester | Role |
|--------|--|------------|---------|-------|----------|------|
| 20Y1AF | Alternative Forms of Transportation Project Financing <i>Mária Jánešová</i> | KZ | 2 | 2P+0C | Z | PV |
| 18Y1AM | Anatomy, Mobility and Safety of Man <i>Jitka Jírová</i> | KZ | 2 | 2P+0C | Z | PV |
| 14Y1AV | Animation and Visualization | KZ | 2 | 2P+0C | L | PV |
| 20Y1AE | Applied Electronics <i>Tomáš Musil</i> | KZ | 2 | 2P+0C | Z | PV |
| 14Y1BE | Barrierless Transport <i>Jan Král</i> | KZ | 2 | 2P+0C | L | PV |
| 21Y1BC | Aviation safety and security | KZ | 2 | 2P+0C | L | PV |
| 15Y1BO | Work Safety and Health Protection in Transportation | KZ | 2 | 2P+0C | L | PV |
| 21Y1BS | Unmanned aircraft systems 1 | KZ | 2 | 2P+0C | L | PV |
| 14Y1BM | Biometric Methods | KZ | 2 | 2P+0C | Z | PV |
| 23Y1DZ | Data and Their Processing for Engineering Fields Needs | KZ | 2 | 2P+0C | Z | PV |
| 12Y1DS | Project Documentation in Practice | KZ | 2 | 2P+0C | Z | PV |
| 15Y1DZ | History of Railway | KZ | 2 | 2P+0C | L | PV |
| 20Y1EK | Qualification in Electrical Engineering | KZ | 2 | 2P+0C | L | PV |
| 16Y1EN | Energy Requirements of Vehicles | KZ | 2 | 2P+0C | L | PV |
| 20Y1EA | Environmental Aspects of Transport | KZ | 2 | 2P+0C | Z | PV |
| 15Y1EH | European Integration within Historical Context <i>Eva Rezlerová, Jan Feit</i> | KZ | 2 | 2P+0C | Z | PV |
| 18Y1EM | Experimental Methods in Mechanics <i>Daniel Kytý</i> | KZ | 2 | 2P+0C | Z | PV |
| 21Y1FN | Factors Affecting the Rate of Accidents in Aviation | KZ | 2 | 2+0 | Z | PV |
| 15Y1FD | French Area Studies and Transportation | KZ | 2 | 2P+0C | L | PV |
| 14Y1HW | Computer Hardware <i>Vít Fáběra</i> | KZ | 2 | 2P+0C | L | PV |
| 15Y1HL | (History of Civil Aviation) | KZ | 2 | 2P+0C | L | PV |
| 15Y1HD | History of City Mass Transport <i>Eva Rezlerová, Milan Dont</i> | KZ | 2 | 2P+0C | Z | PV |
| 12Y1HD | Traffic Noise | KZ | 2 | 2P+0C | L | PV |

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|--------|---|----|---|-------|---|----|
| 15Y1HE | Work Hygiene and Ergonomics in Traffic <i>Eva Rezlárová, Petr Musil</i> | KZ | 2 | 2P+0C | Z | PV |
| 16Y1IS | Interactive Systems and Simulations | KZ | 2 | 2P+0C | L | PV |
| 12Y1KN | Combined Transportation | KZ | 2 | 2P+0C | Z | PV |
| 23Y1KO | Quantum Physics and Optoelectronics | KZ | 2 | 2P+0C | L | PV |
| 21Y1LA | Aerobatics | KZ | 2 | 2+0 | L | PV |
| 21Y1LR | Radio Technology in Aviation | KZ | 2 | 2+0 | L | PV |
| 17Y1LL | Logistics of Passenger and Freight Air Transport | KZ | 2 | 2P+0C | L | PV |
| 20Y1LN | Location and Navigation | KZ | 2 | 2P+0C | L | PV |
| 21Y1MZ | Managerial Ethics | KZ | 2 | 2+0 | Z | PV |
| 17Y1MD | Marketing in Transportation <i>Petra Skolilová</i> | KZ | 2 | 2P+0C | Z | PV |
| 11Y1MM | Mathematical Models in Economy | KZ | 2 | 2P+0C | Z | PV |
| 18Y1MT | Engineering Materials | KZ | 2 | 2P+0C | L | PV |
| 21Y1MP | Matlab for project-oriented study <i>Vladimír Socha, Lenka Hanáková</i> | KZ | 2 | 2P+0C | Z | PV |
| 14Y1MP | Modeling Complex Assemblies and Models in Parametric Modeller | KZ | 2 | 2P+0C | Z | PV |
| 15Y1MK | Modern History in Context: Every Day Life and Transport | KZ | 2 | 2P+0C | L | PV |
| 15Y1NE | German in the Economy and Society | KZ | 2 | 2P+0C | Z | PV |
| 23Y1OK | Protection of Critical Objects and Infrastructures | KZ | 2 | 2P+0C | L | PV |
| 20Y1OI | Fare Collection and Information Systems | KZ | 2 | 2P+0C | L | PV |
| 14Y1OP | Operating System | KZ | 2 | 2P+0C | Z | PV |
| 17Y1OF | Personal Finance | KZ | 2 | 2P+0C | Z | PV |
| 11Y1PV | Parametrical and Multicriterial Programming <i>Olga Vraštilová</i> | KZ | 2 | 2P+0C | Z | PV |
| 17Y1PM | Personnel Management | KZ | 2 | 2P+0C | L | PV |
| 14Y1PI | Corporate Information System | KZ | 2 | 2P+0C | Z | PV |
| 14Y1PZ | Advanced Data Processing in Spreadsheets | KZ | 2 | 2P+0C | Z | PV |
| 12Y1PD | Assessment of Transport Structures <i>Kristýna Neubergová</i> | KZ | 2 | 2P+0C | Z | PV |
| 14Y1PG | Computer Graphics | KZ | 2 | 2P+0C | L | PV |
| 14Y1P2 | Computer Aid of Transportation Projecting 2 | KZ | 2 | 2P+0C | Z | PV |
| 18Y1PS | Computer Simulations in Mechanics | KZ | 2 | 2P+0C | L | PV |
| 20Y1PK | Product Quality Management Processes <i>Martin Leso</i> | KZ | 2 | 2P+0C | Z | PV |
| 14Y1PJ | C Programming Language <i>Vít Fábbera</i> | KZ | 2 | 2P+0C | Z | PV |
| 12Y1C1 | Designing Roads in Civil 3D I | KZ | 2 | 2P+0C | L | PV |
| 12Y1C2 | Designing Roads in Civil 3D II <i>Tomáš Honc</i> | KZ | 2 | 2P+0C | Z | PV |
| 14Y1PA | 3D Modeling in AutoCAD | KZ | 2 | 2P+0C | Z | PV |
| 16Y1PV | Operation, Construction and Maintenance of Vehicles | KZ | 2 | 2P+0C | L | PV |
| 12Y1PU | Organization Disposition of Railway Stations | KZ | 2 | 2P+0C | L | PV |
| 12Y1PC | Pedestrian and Cycling Transport | KZ | 2 | 2P+0C | L | PV |
| 17Y1ST | Titan Simulation | KZ | 2 | 2P+0C | L | PV |
| 20Y1SC | Sensors and Actuators | KZ | 2 | 2P+0C | L | PV |
| 17Y1SL | Sociology of Human Resources | KZ | 2 | 2P+0C | Z | PV |
| 11Y1SI | Transportation Software Engineering | KZ | 2 | 2P+0C | Z | PV |
| 22Y1SZ | Forensic Expertise | KZ | 2 | 2P+0C | L | PV |
| 16Y1KS | Quality and Reliability of Vehicles <i>Jaroslav Machan</i> | KZ | 2 | 2P+0C | Z | PV |
| 12Y1SU | Road Management and Maintenance | KZ | 2 | 2P+0C | L | PV |
| 21Y1TH | Aircraft Technical Handling <i>Anna Polánecká, Jakub Kraus</i> | KZ | 2 | 2P+0C | Z | PV |
| 11Y1TG | Graph Theory | KZ | 2 | 2P+0C | L | PV |
| 14Y1TI | Creating Interactive Internet Applications | KZ | 2 | 2P+0C | L | PV |
| 12Y1VC | Waterways and Shipping | KZ | 2 | 2P+0C | Z | PV |
| 23Y1VS | Negotiation and Cooperation | KZ | 2 | 2P+0C | Z | PV |

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|--------|---|----|---|-------|---|----|
| 14Y1VM | Development of Applications for Mobile Devices | KZ | 2 | 2P+0C | Z | PV |
| 16Y1VT | Development in Railroad Vehicles | KZ | 2 | 2P+0C | L | PV |
| 14Y1W1 | Webdesign 1 | KZ | 2 | 2P+0C | Z | PV |
| 14Y1W2 | Webdesign 2 | KZ | 2 | 2P+0C | L | PV |
| 16Y1ZL | Vehicle Testing, Legislation and Construction <i>Josef Mík</i> | KZ | 2 | 2P+0C | Z | PV |
| 16Y1ZG | Introduction into Applied Computer Graphics | KZ | 2 | 2P+0C | L | PV |
| 14Y1ZM | Fundamentals of Parametric and Adaptive Programming | KZ | 2 | 2P+0C | L | PV |
| 11Y1ZM | Foundation of MATLAB Programming | KZ | 2 | 2P+0C | L | PV |
| 12Y1ZU | Principles of Urbanism <i>Karel Hájek</i> | KZ | 2 | 2P+0C | Z | PV |
| 15Y1ZV | East-West dichotomy: Prelude to the Cold War <i>Eva Rezlerová, Marie Michlová</i> | KZ | 2 | 2P+0C | Z | PV |
| 21Y1UT | Airports Maintenance | KZ | 2 | 2+0 | L | PV |
| 14Y1UP | Editing of Theses in MS Word | KZ | 2 | 2P+0C | L | PV |
| 18Y1UK | Introduction of Rail Vehicles | KZ | 2 | 2P+0C | L | PV |
| 16Y1RE | Control and Electronic Vehicle Systems <i>Josef Mík, Jiří First</i> | KZ | 2 | 2P+0C | Z | PV |
| 21Y1RZ | Human Resources Management | KZ | 2 | 2P+0C | L | PV |

Characteristics of the courses of this group of Study Plan: Code=Y1-BITS 18/19 Name=PVP bak.prez. ITS 18/19

| | | | |
|--------|---|----|---|
| 20Y1AF | Alternative Forms of Transportation Project Financing It will be specified such forms of financing in transportation and telecommunications, where the public sector body perform the final debtor, i. e. debt payments come from its budget but the final debtor is not a direct participant of the transaction and it is not the counterparty of the financial institute which provides the funding. Issue of securities as an alternative source of transportation and telecommunication projects. | KZ | 2 |
| 18Y1AM | Anatomy, Mobility and Safety of Man Survey of tissues. Anatomical structure and growth of bones. Articular joint. Remodelling of bone tissue. Anatomical structure of muscles. Blood circulation and nervous system. Structure and biomechanics of muscular-skeletal system. Injury of human organs and musculo-skeletal system during traffic accidents. Mobility of ill and injured man and his treatment. Human joint prostheses. Protective means and traffic safety regulations. | KZ | 2 |
| 14Y1AV | Animation and Visualization Introducing and basic 3D primitives and their basic modifications and transformations. Creating 3D scenes. Transformations of 3D primitives, connection / interaction / combination of 3D primitives, creating 3D bodies as non-primitives. Using of surfaces. Working with materials and material editors. Lightnings. Setting of light and material parameters. Scene capturing. Camera settings, moving in the scene. Rendering and making animation. | KZ | 2 |
| 20Y1AE | Applied Electronics Basic electronic semiconductor components, their principles, characteristics and typical connection diagrams. Semiconductor PN junction diodes, transistors, thyristor, operational amplifiers, basic logic gates. Functions of basic electronic circuits and methods for their designs (rectifiers, voltage regulator with Zener diode, transistor as an amplifier, operational amplifier as an inverting and noninverting amplifier). | KZ | 2 |
| 14Y1BE | Barrierless Transport The issue of barrierless accessible public transportation in terms of architectural barriers and also for transportation-technological point of view. Students will gain theoretical knowledge of barrierless environment roads, railway stations, public transport stops, terminal buildings, vehicles, public transport, information and orientation systems and transportation technology. Theoretical knowledge will be supplemented by practical examples. | KZ | 2 |
| 21Y1BC | Aviation safety and security History of safety and security development in aviation. Modern tools for safety and security management. Research and development of safe and secure systems. | KZ | 2 |
| 15Y1BO | Work Safety and Health Protection in Transportation Fundamental legislative, definition of terms, risks and possible health damage, working conditions and health protection with focus on transportation. Health protection programmes, health insurance of home and foreign business trips, statistics, working practice. | KZ | 2 |
| 21Y1BS | Unmanned aircraft systems 1 Unmanned Aviation Development. Aircraft design. Legislation in force in the Czech Republic. Planning and execution of the flight. Airspace division. Operational risks and operational procedures. Practical flights. | KZ | 2 |
| 14Y1BM | Biometric Methods Basic biometric terms, authentication methods, principles and performance measurement of biometric systems, overview of biometric technologies, hand geometry, iris recognition, retina recognition method, 2D and 3D face recognition, vein patterns on the wrist, ear biometrics, fingerprint recognition, skin spectroscopy, behavioral methods, the use of biometrics in transport applications, safety and risks of biometric technologies. | KZ | 2 |
| 23Y1DZ | Data and Their Processing for Engineering Fields Needs Courses of risk, basic terms, data collection, data sets, data random uncertainty and data epistemic uncertainty, data processing, hazard, risk, value scales, analytical, empirical and heuristic methods, hazard determination and risk determination, methods for variants' creation, decision support systems. | KZ | 2 |
| 12Y1DS | Project Documentation in Practice Project documentation creating. Project documentation types. Support materials for project documentation creating. Building permit obtaining process. Budget and pricing. Practical creation of some project documentation parts. | KZ | 2 |
| 15Y1DZ | History of Railway Horse-drawn railways, steam railways, railway network development in the 2nd half of 19th century, regional railways epoch, railways of the "First Republic", electric traction, World War II railways, railway development in the 2nd half of 20th century, high-speed railway origins, railway lines closing, important long-distance train connections, railway lines construction, railway accidents, railway junctions. Excursions and projections. | KZ | 2 |
| 20Y1EK | Qualification in Electrical Engineering Practical experience with measurements in laboratories, electrical equipment, power supply, electrical installation of low voltage, electric shock hazard, symbols and labeling, nominal voltage, maximum allowed currents, electrical equipment protection against short circuit and overload protection, control and revision, first aid, legislation, standards and regulations in relation to health and safety and electrical engineering. | KZ | 2 |

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| 16Y1EN | Energy Requirements of Vehicles | KZ | 2 |
| Dynamics and the driving inertial of the vehicles. Types of energy - kinetic, static, heat, chemical and others. Ways of energy change into kinetic energy. Combustion engine, electric drive, steam engine, air engine. Energy accumulation means, accumulator, flywheel, fuel cell. Energy recuperation. WTW analysis. | | | |
| 20Y1EA | Environmental Aspects of Transport | KZ | 2 |
| State of the atmosphere, weather observation network, weather in transportation, road meteorology. Weather forecasting, data assimilation, probabilistic forecasts, forecast evaluation. Air quality, main pollutants and their effects, atmospheric chemistry, traffic emissions. Greenhouse gasses, carbon cycle, a role of energy and transportation in climate change. | | | |
| 15Y1EH | European Integration within Historical Context | KZ | 2 |
| Versailles system, formation of new states. Europe and the powers, League of Nations. European policy in the 1920s. Fascism, nazism, communism. Little Entente, its principles and goals. Europe after Hitler's getting to power, system of bilateral agreements. Decline of the LN. Rearrangement of powers during WWII. Cold war and its consequences for Europe. New quality of French-German relationship - a driving power of starting European integration. | | | |
| 18Y1EM | Experimental Methods in Mechanics | KZ | 2 |
| The purpose and role of experimental mechanics. Sensors for mechanical testing. Overview of experimental methods. Destructive and non-destructive testing of materials. Design of experimental procedures and sample preparation. Tensile and bending tests. Electrical resistance strain gages. Optical based strain measurement. Fatigue and lifetime prediction. Instrumented hardness testing. Introduction to electron microscopy. Errors in measurement. | | | |
| 21Y1FN | Factors Affecting the Rate of Accidents in Aviation | KZ | 2 |
| Introduction. The scope of international and national organizations in civil aviation. The scope of the investigation organisations within the state and international committees. Analysis and interpretation of ICAO Annexes 13 and 19. Analysis and interpretation of the Regulation (EC), Regulation (EU). Human factor. Utilization of information from the investigation reports. | | | |
| 15Y1FD | French Area Studies and Transportation | KZ | 2 |
| France - geography and regions, transport infrastructure. Paris and its sights, city public transport. Road traffic, motorways, railway traffic, TGV, air traffic, specialised terminology. French society and culture. Current political system. System of education, studying in France. Selected authors of French literature. French gastronomy. | | | |
| 14Y1HW | Computer Hardware | KZ | 2 |
| Design combinational and sequential logical circuits and their implementation on FPGA, VHDL language. Computer architecture, structures of computer components - controller, ALU, memories, I/O subsystem, typical interfaces and buses (PCI Express, I2C, SPI, USB). | | | |
| 15Y1HL | (History of Civil Aviation) | KZ | 2 |
| Aeronautics. Beginnings of aircrafts heavier than air. Czechoslovak aviation pioneers. Development of airports in the Czech Republic. World airports. Airlines of the world. Helicopters. CSA airplanes. Famous aviators. Classic era of aviation. Golden era of civil aviation. Supersonic flying. Modern era of civil aviation. Flying in the world. | | | |
| 15Y1HD | History of City Mass Transport | KZ | 2 |
| History of city mass transport in the world, development of tram, bus and trolley-bus systems. History of transport networks in the world, current trends and developments of tariff and clearance systems. History of city transport in Prague and Brno. History of tram, bus and trolley-bus operation systems in the Czech Republic and Slovakia. | | | |
| 12Y1HD | Traffic Noise | KZ | 2 |
| Acoustic introduction, basic terms, quantities. Basics of physiological acoustic, noise impacts on human body. Acoustic legislation, standarts, regulations. Creation acoustic climate in area, principles of urban acoustic, noise transmission, soundproofing. Types of noise sources in area. Determination of acoustic situation in the area of interest. Methodology of computing and measurement of transport noise. Acoustic studies, measuring protocol. | | | |
| 15Y1HE | Work Hygiene and Ergonomics in Traffic | KZ | 2 |
| Basic knowledge of occupational hygiene and ergonomics, and their application in transport. Working environment factors, and the influence of these factors on health of workers. Creation and protection of working conditions that do not damage public health. Mutual links: man-machine-environment. Adaptation of technology to possibilities and skills of a man. Practical examples from the field of transportation; relevant legislature. | | | |
| 16Y1IS | Interactive Systems and Simulations | KZ | 2 |
| Principles of vehicle movement. Forces in moving vehicle, origin, classification, assesment. Adhesion. Traction output. Drives, source systems, classification, structure, operational and energetic singularity. Sources of energy. Calculations to assess output quantities and energetic intensity. Auxiliary systems energy consumption. | | | |
| 12Y1KN | Combined Transportation | KZ | 2 |
| Combined transport strategy and legislation. Load units. Means of transport in combined transport. Combined transport systems. Transshipping areas. Multimodal logistic centres. | | | |
| 23Y1KO | Quantum Physics and Optoelectronics | KZ | 2 |
| Ground of quantum physics. Application of quantum physics in practice. Optoelectronics. Production of optoelectronics components. | | | |
| 21Y1LA | Aerobatics | KZ | 2 |
| Methodology of flying aerobatic figures. Aerodynamics and flight mechanics of aerobatic figures. Aerobatic training syllabi and aerobatic competitions. Creating an aerobatic sequence. Safety in aerobatics, accidents related to aerobatics. Physiological aspects of flying aerobatics. Aircraft structure loads and construction fatigue strength of aerobatic aircraft. Upset recovery training (UPRT) for commercial pilots and related accidents. | | | |
| 21Y1LR | Radio Technology in Aviation | KZ | 2 |
| Electric signals and the wave spectrum. Analog and digital modulations. Noises. Filters. Resonance circuits. Electromagnetic field. Electromagnetic wave propagation. Wave ranges in aviation, radiation and reception of electromagnetic field. Antennas in aviation, receivers and transmitters. | | | |
| 17Y1LL | Logistics of Passenger and Freight Air Transport | KZ | 2 |
| Logistics airline passenger and cargo. Aircraft and airport terminals for passenger and cargo transport. Airlines in terms of logistics systems. Aerial transport process passengers and air cargo. Information systems in air transport. Global distribution systems. | | | |
| 20Y1LN | Location and Navigation | KZ | 2 |
| Description and examples of road networks, localization on the network. Routing algorithms, their properties and implementation. Description and examples of datasets for finding transport connections, routing algorithms, their properties and implementation. | | | |
| 21Y1MZ | Managerial Ethics | KZ | 2 |
| The basic terminology of managerial ethics. Basics of etiquette and rules of social contact. Social events. Etiquette of working contacts. The art of presentation and negotiation. Personal image. Diplomatic protocol. Managerial ethics. Business ethics. | | | |
| 17Y1MD | Marketing in Transportation | KZ | 2 |
| General principles of marketing applied to transport issues, marketing tools suitable for transport as a service, specifics of public passenger transport and the resulting differences in the application of marketing. | | | |
| 11Y1MM | Mathematical Models in Economy | KZ | 2 |
| The goal of the course is to teach selected methods of linear programming, with theoretical procedures applicable for individual tasks and their program implementation. The outcom of the course is the ability to implement and solve basic tasks from the queue theory, graph theory and both free and constrained optimization. | | | |
| 18Y1MT | Engineering Materials | KZ | 2 |
| Systematic overview of main classes of materials used in technical design. In addition to main classes of materials, i. e. metals, ceramics, polymers and composites, attention is paid to biological materials and to biomimetics. Integral approach to material selection process is also demonstrated based on so called Ashby's selection charts. | | | |

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| 21Y1MP | Matlab for project-oriented study | KZ | 2 |
| The subject's syllabus is focused on the problem-solving during bachelor's thesis preparation and it is based on students' requests. Individual exercises will be prepared according to particular examples, based on actual students' needs and suggestions. The subject will have a flexible form, which is expected to bring an improvement of students' Matlab skills. | | | |
| 14Y1MP | Modeling Complex Assemblies and Models in Parametric Modeller | KZ | 2 |
| Assemblies programming - tools and methodology of working subassemblies and assemblies, sheet metal parts modelling, welded assemblies, pipelines, and distribution lines. Photorealistic output rendering - physical and material properties, lighting sources. MKP - visual example. | | | |
| 15Y1MK | Modern History in Context: Every Day Life and Transport | KZ | 2 |
| Historical overview of modern history of every day life, science, technology and transport in a wider context. | | | |
| 15Y1NE | German in the Economy and Society | KZ | 2 |
| Recent economic and social issues of German speaking countries and of the EU. Reading and listening of texts. Lexical, grammatical and semantic analysis of texts. Discussion on selected topics. | | | |
| 23Y1OK | Protection of Critical Objects and Infrastructures | KZ | 2 |
| Types of technological systems, critical item, risks and their courses, criticality, vulnerability, connectivity, dependability, resilience, failure, protection, safety of critical objects and critical infrastructures. | | | |
| 20Y1OI | Fare Collection and Information Systems | KZ | 2 |
| Fare collection systems in public transport and their components (on-board units, validators, turnstiles, ...). Information systems and their components for users (timetables, maps, panels ...) and operators (cycles, location or current delay of vehicles, ...). The issue of tariff systems. Other examples of clearance systems (parking). | | | |
| 14Y1OP | Operating System | KZ | 2 |
| Distributions. Installation GNU/Linux OS. X-window system. Rights management - users and groups, ACL rights. Filesystems and attributes. Programs and processes. OS boot, runlevels. Basic console programs / commands. Config files. SW management, package systems. Programs in graphic shell - text, spreadsheet, graphic editors, sound, video and communication. Services management. Safe and secure configuration of OS. Remote administration. | | | |
| 17Y1OF | Personal Finance | KZ | 2 |
| Personal finance (budget, financing of basic living needs), debt (loans and credits, payment instruments, interest and fees, debt trap), financing of housing (rent, mortgage, savings, consumer loans, refinancing), savings and investments (investment horizon, return, risk, investment strategy), insurance (insurance types, suitability and adequacy), securing the future (retirement savings and insurance). | | | |
| 11Y1PV | Parametrical and Multicriterial Programming | KZ | 2 |
| Solution to the problem of linear programming with a parameter in objective function, on right sides and in the matrix of coefficients of linear constraints. Computation of efficient solution. | | | |
| 17Y1PM | Personnel Management | KZ | 2 |
| Human sources, work group, man as personality, planning, choice, evaluation and education of human sources, work adaptation, teamwork, intercultural communication. | | | |
| 14Y1PI | Corporate Information System | KZ | 2 |
| Data-information-knowledge, components of information system, syntactic and semantic sense of data, structure of corporate information system, particular information system (personalistic, production, storage, etc.), corporate information politic and information control, risks of information system operation, legal environment of information system operation, state information system, information system security, data protection, safety politics. | | | |
| 14Y1PZ | Advanced Data Processing in Spreadsheets | KZ | 2 |
| Students will be familiar with principles of working in a spreadsheet. Graphic layout of the table appearance, formatting of numbers, insertion of formulas and functions, including addressing, error detection. Working with large spreadsheets, filters, advanced filters, database functions. Pivot tables and charts, conditional formatting, solution finding, solver, macros, data analysis. Examples and questions from various companies and training. | | | |
| 12Y1PD | Assessment of Transport Structures | KZ | 2 |
| Assessment of transport structures, the EIA process. Multicriteria assessment methods, risk analysis, SWOT analysis. Landscape character, possibilities of its protection and assessment transport structures on the landscape. Rating fragmentation and landscape connectivity in the preparation of linear structures. Practical examples of assessment of traffic buildings on the environment. | | | |
| 14Y1PG | Computer Graphics | KZ | 2 |
| Basic formats of graphic and possibilities of their editing and mutual conversion. Use of individual types according to character of work. Work with editing programs (within the user level scope) using layers, DPI, colors. Basics of digital photography, scanning and computer technology like monitors and graphics cards. | | | |
| 14Y1P2 | Computer Aid of Transportation Projecting 2 | KZ | 2 |
| Overview of CAx application for transportation projecting aid. AutoCAD environment possibilities of basic tasks automatizing (programming, scripting, data exchange). Advanced blocks modification (attributes, relation to databases). Work in projecting group, external references. Basic tasks for cummunication projecting (clotoidic transition curve, cross-and longitudinal section). Basics of 3D modelling. | | | |
| 18Y1PS | Computer Simulations in Mechanics | KZ | 2 |
| Principles and overview of programs for stress analysis of structures. Numerical methods in mechanics, finite element method. Geometric model development and adaptation of geometry from other CAE systems. Assignment of material properties. The types of elements and their use. Discretization of solid model. Boundary conditions and application of the load. Basic tasks of structural and modal analysis. Introduction to complex nonlinear problems. | | | |
| 20Y1PK | Product Quality Management Processes | KZ | 2 |
| General principles of organization management. Management systems and international standards; quality management systems. Quality products, processes, systems. A framework of standards for systems management, management principles. Principles of process management, monitoring and measurement systems management. Uniform framework of standards for systems management. Process management principles. Metrology and testing. Product certification. | | | |
| 14Y1PJ | C Programming Language | KZ | 2 |
| C programming language. Preprocessor, basics of the C language (data types, syntax, commands), functions, pointers, dynamical memory allocation, string, files, structures and unions. Implementations of abstract data types (FIFO, LIFO, list), programming techniques (sorting, searching, recursion), using bitwise operators. | | | |
| 12Y1C1 | Designing Roads in Civil 3D I | KZ | 2 |
| The course is devoted to the traffic buildings design field, specifically the design of roads as such, by the means of a 3D software. Students go through the complete design of this particular linear building, from the initial situation, over the longitudinal section, to the model and work sections and the cubic capacity calculation. The course also includes a basic explanation of the traffic building design in the real-life profession. | | | |
| 12Y1C2 | Designing Roads in Civil 3D II | KZ | 2 |
| The course is devoted to the traffic buildings design field, specifically the design of roads as such, by the means of a 3D software. Students go through the complete design of this particular linear building, from the initial situation, over the longitudinal section, to the model and work sections and the cubic capacity calculation. The previously acquired skills are improved and developed. Students learn to design intersections. | | | |
| 14Y1PA | 3D Modeling in AutoCAD | KZ | 2 |
| Work in 3D non-parametric modeller (AutoCAD) environment, scenes rendering, creation of planar and volumetric objects, user setup creation, object data creation, work with data connected with external database. Basic definition of work with lights, materials and reflexes. Models presentation. | | | |

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| 16Y1PV | Operation, Construction and Maintenance of Vehicles | KZ | 2 |
| Methods of vehicle production. Vehicle maintenance. Vehicle diagnostics. Maintenance and repair plans. Engine maintenance and emission measurement. Transmission mechanism. General principles of engine diagnostics. | | | |
| 12Y1PU | Organization Disposition of Railway Stations | KZ | 2 |
| Connecting station. Passenger transport equipment. Freight transport equipment. Branch lines and railway traffic inside industrial company areas. Zone stations. Formation yards. Reserve stations. Technology of work in railway station with regard to its disposition. Railway station documentations in the Czech Republic railway network. | | | |
| 12Y1PC | Pedestrian and Cycling Transport | KZ | 2 |
| Routes for pedestrians. Pedestrian crossings. Modifications for blind, dim-sighted and disabled people. Design of cycle routes network. Ways of cycle route layout and design parameters for cyclists. Separation of cyclists from other transport modes. Cycle tracks and its design - one way streets, reserved traffic lanes, bus stops, crossings with other transport modes, crossroads. Traffic signs and road marking for cyclists. | | | |
| 17Y1ST | Titan Simulation | KZ | 2 |
| Titan is a management game simulating the business decisions. Lets 2-8 student groups to produce and compete in the market with the same product. Students set a price and determine the quantity and capacity of production, plan budgets for marketing, research and development. They become familiar with the consequences of their decisions by the form of financial corporate reports and they use this information for other business decisions. | | | |
| 20Y1SC | Sensors and Actuators | KZ | 2 |
| Principles of sensors and actuators. Basics of measuring theory and actuating influence. The respective technologies and construction principles. Sensors of mechanical, electro-magnetic, state (temperature, humidity), chemical and particle flow values. Electrical, pneumatic and hydraulic actuators and solid phase elements. | | | |
| 17Y1SL | Sociology of Human Resources | KZ | 2 |
| Human resources and their importance, work group as a special kind of social group, communication, personal management, modern management, human resources planning, culture of the organization. | | | |
| 11Y1SI | Transportation Software Engineering | KZ | 2 |
| Basic concepts of software engineering, ranging from domain analysis, requirement analysis and software architectures to analyses, design and implementation using formal techniques and practical usage. | | | |
| 22Y1SZ | Forensic Expertise | KZ | 2 |
| Historical evolution of forensic engineering, forensic activity, current legislature in the Czech Republic, different disciplines, notion of forensic, forensic legislation, basic forensic acts, expert role in the obtaining proofs, forensic methodology. Notion of the evidence, general principles of evidence obtaining, metrology, protocol, evidences collection, site inspection, forensic report, elements. Finding, expert testimony / report. | | | |
| 16Y1KS | Quality and Reliability of Vehicles | KZ | 2 |
| Quality and reliability theory in design, development, production and operation of vehicles. Definition and possible approach to quality and reliability. Key legislation. FMEA (Failure Mode and Effects Analysis), QFD (Quality Function Deployment), DFx (Design for Assamly, Manufacturing, Quality, Services ...) and other methods used in industrial applications. Knowledge-based systems of quality and reliability, data collection. | | | |
| 12Y1SU | Road Management and Maintenance | KZ | 2 |
| Getting familiar with ownership of roads in the Czech Republic and the administration of the road at the state and county level. It is presented development of road network, short, medium and long-term strategy of the Ministry of Transport. Maintenance of roads winter and summer, its requirements, specifics, possibilities and repair methods are discussed in the classroom as well as investment activity in highway engineering. | | | |
| 21Y1TH | Aircraft Technical Handling | KZ | 2 |
| Aircraft towing and pushing tractors. GPU. Air conditioning and heating units. Aircraft fuel equipment. De-icing and anti-icing units. Loading and unloading units. Equipment for passangers onboarding and offboarding. Operational processes of aircraft technical handling and regulations. Modernization and technical progress. | | | |
| 11Y1TG | Graph Theory | KZ | 2 |
| Directed and undirected graphs, weighted graphs, matrices describing graphs, minimal spanning tree, minimal path, Eulerian paths, graph traversing, matching in bipartite graphs, flow networks. Algorithms for problems of existence and optimization. Solving of NP-hard problems, heuristic approach. | | | |
| 14Y1TI | Creating Interactive Internet Applications | KZ | 2 |
| Possibilities of scripting language PHP. Overview of PHP language syntax, and functions. Analysis of finished scripts and demonstration of solutions. Your own application programmed in PHP language. | | | |
| 12Y1VC | Waterways and Shipping | KZ | 2 |
| Basic modes of transport. The position of water transport in the transport system of the Czech Republic and the EU. Advantages and disadvantages of water transport. Basic systems of waterways in Europe, a network of waterways in the Czech Republic. Construction of the waterway and its equipment. Management of waterways and its operation. The legal regime in inland navigation, navigation rules of operation, navigation maps. | | | |
| 23Y1VS | Negotiation and Cooperation | KZ | 2 |
| Code of conduct for negotiation. The influence of personality traits on the negotiations. Negotiation and commanding. Teamwork. Variants teams. Informal and formal role in the team. Principles of negotiation, the essence of negotiation, the differences in negotiation in business and in crisis situations, the principle of "win both", specifications and bidding, the role of trust. | | | |
| 14Y1VM | Development of Applications for Mobile Devices | KZ | 2 |
| Object oriented programming, Java programming language, development environment, operating system Android, development application - widgets, containers, threads, menu, permissions, services, GUI. | | | |
| 16Y1VT | Development in Railroad Vehicles | KZ | 2 |
| Railroad vehicles traction. Railroad vehicle parametres regulation. Control and driving of railroad vehicles. Importance in heavy duty and personal transportation. Critical situation assesment. New materials in design. International standardization. | | | |
| 14Y1W1 | Webdesign 1 | KZ | 2 |
| Students will learn the basics of communication HTTP, URL and addressing, markup languages HTML and XHTML, HTML tags, rules of web accessibility and usability, CSS properties and selectors, the issue of web browsers, creating one to three column layout pages, sites validation, conditional comments. Topics will be practiced on practical examples. | | | |
| 14Y1W2 | Webdesign 2 | KZ | 2 |
| Students will learn advanced techniques CSS, responsive webdesign, CSS frontends, content management systems, JavaScript, jQuery, SEO, web server installation + configuration directives. Topics will be practiced on practical examples. | | | |
| 16Y1ZL | Vehicle Testing, Legislation and Construction | KZ | 2 |
| Vehicle, bus and motorbike costruction, aggregate computing, driving resistance, build and parameters of traction, constructional arrangement of personal cars, trucks, buses, motorbikes, legislation in the EU and in the world, technical legislation creation, testing methods, vehicle tests, accelerated tests, mathematical modelling in testing. | | | |
| 16Y1ZG | Introduction into Applied Computer Graphics | KZ | 2 |
| Computer graphics, division and applications with emphasis on transport, including development and research. Colours, colour perception, colour schemes, models, principles of 2D and 3D generation, elementary algorithms for graphic data workout. Visualisation principles and tasks, technics, graphics and visualisation HW basics. Introduction to 2D and 3D graphics software. | | | |

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| 14Y1ZM | Fundamentals of Parametric and Adaptive Programming | KZ | 2 |
| Basics of work at products and parts creation. Sketch drawing by help of geometric relations, parametric dimensions, creation of adaptive models from 2D sketches. Import and export from and to another systems. Fundamentals of assemblies creation. | | | |
| 11Y1ZM | Foundation of MATLAB Programming | KZ | 2 |
| To explain the principle of algorithmization, flow charts, description of MATLAB environment and its settings, MATLAB help, mathematical operators, matrices and elements operations, control flow, inputs and outputs, graphics, optimization and program code debugging. | | | |
| 12Y1ZU | Principles of Urbanism | KZ | 2 |
| Survey on history of city and settlement building. Functional components and their mutual relations (working, living, recreation, transportation). Spatial arrangement of settlements. Types of towns or cities with a certain prevailing function, forms of their development. Brief overview of land-use planning. | | | |
| 15Y1ZV | East-West dichotomy: Prelude to the Cold War | KZ | 2 |
| Historical prologue, evolution of the "West" and "East" from the 1500s. Focus on the history in the period between 1850 nad 1950. Milestones and continuity of the international relations in the end of 19th century and the beginning of the 20th century. Revolutions, the causes and consequences. Scientific and technological progress, the causes and consequences. Economic and financial history. Social changes. Discussions on texts, sources. | | | |
| 21Y1UT | Airports Maintenance | KZ | 2 |
| Summer airport maintenance. Summer maintenance equipment. Winter airport maintenance. Winter maintenance equipment. De-icing / anti-icing of aircraft. De-icing / anti-icing liquid. Operating procedures, limitations, practices. | | | |
| 14Y1UP | Editing of Theses in MS Word | KZ | 2 |
| Students will be introduced to the principles of creating and editing large documents and basic typographic rules. They will properly apply styles, create tables of contents, lists of figures, tables, graphs, etc. Footnotes, captions, index. They practice corrections of finished documents. The goal is to prepare students for seamless editing dissertations and theses, so that they are able to concentrate mainly on writing a thesis. | | | |
| 18Y1UK | Introduction of Rail Vehicles | KZ | 2 |
| Basic characteristics and parameters rail transport systems - railway and urban transport. Basis driving mechanics rail vehicles - equation of motion train and unit trains. Rolling and track resistance. Total running resistance. Acceleration force. Analyzing driving cycle rail vehicle. Speed-power diagrams and characteristics rail vehicle - hydromechanic, hydrodynamic and electric drive. Design concept rail vehicles and drive of wheel set. | | | |
| 16Y1RE | Control and Electronic Vehicle Systems | KZ | 2 |
| Elementary concepts of regulation. Tools for analytical solution, linear system description. Basic types of a regulator (PID), properties, advantages, disadvantages, function. Conventional and hybrid drive control. Electric drive. Vehicle communication bus (CAN, LIN, FlexRay, ISObus, KWP2000 protocole etc.). Vehicle electronic control, safety, communication and comfort systems. | | | |
| 21Y1RZ | Human Resources Management | KZ | 2 |
| The position of human resources in the organization and related disciplines file. Substance, importance and challenges of human resources management. Internal and external environment of human resource management. Human resource planning. Search, recruitment and selection of employees. Motivation, evaluation and remuneration of staff. Positioning, dismissal and redundancies of employees. Education of employees. Planning career management. | | | |

Name of the block: Jazyky

Minimal number of credits of the block: 6

The role of the block: J

Code of the group: JZ-B-3,4 16/17

Name of the group: Jazyk bak. 5., 6.sem. od 16/17 (pro B3710)

Requirement credits in the group: In this group you have to gain 6 credits

Requirement courses in the group: In this group you have to complete 2 courses

Credits in the group: 6

Note on the group:

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i> | Completion | Credits | Scope | Semester | Role |
|--------|--|------------|---------|-----------|----------|------|
| 15JZ3F | Foreign Language - French 3 <i>Eva Rezlerová, Irena Veselková</i> | Z | 3 | 0P+4C | Z | J |
| 15JZ3I | Foreign Language - Italian 3 | Z | 3 | 0P+4C | Z | J |
| 15JZ3N | Foreign Language - German 3 <i>Eva Rezlerová, Jana Štikarová</i> | Z | 3 | 0P+4C | Z | J |
| 15JZ3R | Foreign Language - Russian 3 <i>Eva Rezlerová, Marie Michlová</i> | Z | 3 | 0P+4C | Z | J |
| 15JZ3S | Foreign Language - Spanish 3 <i>Eva Rezlerová, Nina Hricsina Puškinová</i> | Z | 3 | 0P+4C | Z | J |
| 15JZ4F | Foreign Language - French 4 | Z,ZK | 3 | 0P+4C+10B | L | J |
| 15JZ4I | Foreign Language - Italian 4 | Z,ZK | 3 | 0P+4C+10B | L | J |
| 15JZ4N | Foreign Language - German 4 | Z,ZK | 3 | 0P+4C+10B | L | J |
| 15JZ4R | Foreign Language - Russian 4 | Z,ZK | 3 | 0P+4C+10B | L | J |
| 15JZ4S | Foreign Language - Spanish 4 | Z,ZK | 3 | 0P+4C+10B | L | J |

Characteristics of the courses of this group of Study Plan: Code=JZ-B-3,4 16/17 Name=Jazyk bak. 5., 6.sem. od 16/17 (pro B3710)

| | | | |
|--|-----------------------------|---|---|
| 15JZ3F | Foreign Language - French 3 | Z | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |

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|--|------------------------------|------|---|
| 15JZ3I | Foreign Language - Italian 3 | Z | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ3N | Foreign Language - German 3 | Z | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ3R | Foreign Language - Russian 3 | Z | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ3S | Foreign Language - Spanish 3 | Z | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ4F | Foreign Language - French 4 | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ4I | Foreign Language - Italian 4 | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ4N | Foreign Language - German 4 | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ4R | Foreign Language - Russian 4 | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ4S | Foreign Language - Spanish 4 | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |

List of courses of this pass:

| Code | Name of the course | Completion | Credits |
|--|----------------------------------|------------|---------|
| 11CAL1 | Calculus 1 | Z,ZK | 7 |
| Sequence of real numbers and its limit. Basic properties of mappings. Function of one real variable, its limit and derivative. Geometric properties of n-dimensional Eukclidean space and Cartesian coordinate system. Geometric meaning of the differential of functions several real variables, differential calculus of functions of several real variables. | | | |
| 11CAL2 | Calculus 2 | Z,ZK | 5 |
| Antiderivative, Newtonian integral, Riemannian integral of the function of one variable, improper Riemannian integral, Riemannian integral in R_n . Parametric description of regular k-dimensional surfaces in R_n , Riemannian integral over regular surfaces. Line and surface integrals of the second type, Stokes theorems, ordinary differential equations of the first order, linear differential equations with constant coefficients and its systems. | | | |
| 11EMO | Electromagnetic Field and Optics | Z,ZK | 4 |
| Electric field. Electric current. Magnetic field. Electromagnetic field. Optics. Basics of solid-state physics. | | | |
| 11FYZ | Physics | Z,ZK | 5 |
| Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics. | | | |
| 11GIE | Geometry | KZ | 3 |
| Orthographic and oblique projections, linear perspective. Topographic surfaces and their orthogonal projection. Differential geometry of curves - parameterization, arc of the curve, torsion and curvature, Frenet's trihedron. Kinematics - a curve as a trajectory of the motion, the velocity and acceleration of a particle moving on a curved path. | | | |
| 11LA | Linear Algebra | Z,ZK | 3 |
| Vector spaces (linear combinations, linear independence, dimension, basis, coordinates). Matrices and operations. Systems of linear equations and their solvability. Determinants and their applications. Scalar product. Similarity of matrices (eigenvalues and eigenvectors). Quadratic forms and their classification. | | | |
| 11MAMY | Mathematical Methods | Z,ZK | 7 |
| Introduction to mathematical control theory, mathematical modelling. Introduction to statistical learning and system modelling from data. Mathematical optimisation, linear and dynamic programming, multi-criterial optimisation, graph problems. | | | |
| 11STAT | Statistics | Z,ZK | 4 |
| Definition of probability, random variable and its description, known distributions, random vector, function of random variable. Methods of point estimation. Testing of statistical hypothesis. Regression and correlation, linear regression, correlation coefficient, coefficient of determination, the general linear model, statistical inference in linear regression, analysis of variance, multiple regression, the use of matrices in regression. | | | |
| 11X31 | Project 1 | Z | 2 |
| 11X32 | Project 2 | Z | 2 |

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|--|--|------|---|
| 11X33 | Project 3 | Z | 2 |
| 11Y1MM | Mathematical Models in Economy | KZ | 2 |
| The goal of the course is to teach selected methods of linear programming, with theoretical procedures applicable for individual tasks and their program implementation. The outcome of the course is the ability to implement and solve basic tasks from the queue theory, graph theory and both free and constrained optimization. | | | |
| 11Y1PV | Parametrical and Multicriterial Programming | KZ | 2 |
| Solution to the problem of linear programming with a parameter in objective function, on right sides and in the matrix of coefficients of linear constraints. Computation of efficient solution. | | | |
| 11Y1SI | Transportation Software Engineering | KZ | 2 |
| Basic concepts of software engineering, ranging from domain analysis, requirement analysis and software architectures to analyses, design and implementation using formal techniques and practical usage. | | | |
| 11Y1TG | Graph Theory | KZ | 2 |
| Directed and undirected graphs, weighted graphs, matrices describing graphs, minimal spanning tree, minimal path, Eulerian paths, graph traversing, matching in bipartite graphs, flow networks. Algorithms for problems of existence and optimization. Solving of NP-hard problems, heuristic approach. | | | |
| 11Y1ZM | Foundation of MATLAB Programming | KZ | 2 |
| To explain the principle of algorithmization, flow charts, description of MATLAB environment and its settings, MATLAB help, mathematical operators, matrices and elements operations, control flow, inputs and outputs, graphics, optimization and program code debugging. | | | |
| 12MDE | Transport Models and Transport Excesses | Z,ZK | 3 |
| Parameters of the traffic flow and methods for their measurement. Models of the traffic flow, communications load, line and urban systems. Theory of queues, shock waves. Quality of transport and its assessment. Statistical characteristics of transport. Transport excesses, their analysis, the causes, identify and minimize the consequences. Improving of transport safety and fluency. | | | |
| 12PPOK | Designing Roads, Highways and Motorways | KZ | 3 |
| Definition, types, ownership, maintenance, management and categorization of roads and highways. Curve and transition curve. Sinuosity and standard speed. Route in rural areas. Range of vision for stopping and overtaking. Road body - shapes and proportions, bottom and superstructure. Drainage and components of roads. Safety device. Crossings, junctions, intersections. | | | |
| 12X31 | Project 1 | Z | 2 |
| 12X32 | Project 2 | Z | 2 |
| 12X33 | Project 3 | Z | 2 |
| 12Y1C1 | Designing Roads in Civil 3D I | KZ | 2 |
| The course is devoted to the traffic buildings design field, specifically the design of roads as such, by the means of a 3D software. Students go through the complete design of this particular linear building, from the initial situation, over the longitudinal section, to the model and work sections and the cubic capacity calculation. The course also includes a basic explanation of the traffic building design in the real-life profession. | | | |
| 12Y1C2 | Designing Roads in Civil 3D II | KZ | 2 |
| The course is devoted to the traffic buildings design field, specifically the design of roads as such, by the means of a 3D software. Students go through the complete design of this particular linear building, from the initial situation, over the longitudinal section, to the model and work sections and the cubic capacity calculation. The previously acquired skills are improved and developed. Students learn to design intersections. | | | |
| 12Y1DS | Project Documentation in Practice | KZ | 2 |
| Project documentation creating. Project documentation types. Support materials for project documentation creating. Building permit obtaining process. Budget and pricing. Practical creation of some project documentation parts. | | | |
| 12Y1HD | Traffic Noise | KZ | 2 |
| Acoustic introduction, basic terms, quantities. Basics of physiological acoustic, noise impacts on human body. Acoustic legislation, standards, regulations. Creation acoustic climate in area, principles of urban acoustic, noise transmission, soundproofing. Types of noise sources in area. Determination of acoustic situation in the area of interest. Methodology of computing and measurement of transport noise. Acoustic studies, measuring protocol. | | | |
| 12Y1KN | Combined Transportation | KZ | 2 |
| Combined transport strategy and legislation. Load units. Means of transport in combined transport. Combined transport systems. Transshipping areas. Multimodal logistic centres. | | | |
| 12Y1PC | Pedestrian and Cycling Transport | KZ | 2 |
| Routes for pedestrians. Pedestrian crossings. Modifications for blind, dim-sighted and disabled people. Design of cycle routes network. Ways of cycle route layout and design parameters for cyclists. Separation of cyclists from other transport modes. Cycle tracks and its design - one way streets, reserved traffic lanes, bus stops, crossings with other transport modes, crossroads. Traffic signs and road marking for cyclists. | | | |
| 12Y1PD | Assessment of Transport Structures | KZ | 2 |
| Assessment of transport structures, the EIA process. Multicriteria assessment methods, risk analysis, SWOT analysis. Landscape character, possibilities of its protection and assessment transport structures on the landscape. Rating fragmentation and landscape connectivity in the preparation of linear structures. Practical examples of assessment of traffic buildings on the environment. | | | |
| 12Y1PU | Organization Disposition of Railway Stations | KZ | 2 |
| Connecting station. Passenger transport equipment. Freight transport equipment. Branch lines and railway traffic inside industrial company areas. Zone stations. Formation yards. Reserve stations. Technology of work in railway station with regard to its disposition. Railway station documentations in the Czech Republic railway network. | | | |
| 12Y1SU | Road Management and Maintenance | KZ | 2 |
| Getting familiar with ownership of roads in the Czech Republic and the administration of the road at the state and county level. It is presented development of road network, short, medium and long-term strategy of the Ministry of Transport. Maintenance of roads winter and summer, its requirements, specifics, possibilities and repair methods are discussed in the classroom as well as investment activity in highway engineering. | | | |
| 12Y1VC | Waterways and Shipping | KZ | 2 |
| Basic modes of transport. The position of water transport in the transport system of the Czech Republic and the EU. Advantages and disadvantages of water transport. Basic systems of waterways in Europe, a network of waterways in the Czech Republic. Construction of the waterway and its equipment. Management of waterways and its operation. The legal regime in inland navigation, navigation rules of operation, navigation maps. | | | |
| 12Y1ZU | Principles of Urbanism | KZ | 2 |
| Survey on history of city and settlement building. Functional components and their mutual relations (working, living, recreation, transportation). Spatial arrangement of settlements. Types of towns or cities with a certain prevailing function, forms of their development. Brief overview of land-use planning. | | | |
| 12ZTS | Railway Lines and Stations | Z,ZK | 4 |
| Rail transport. Railway track geometry parameters. Route layout of railway lines. Railway line construction - railway substructure and superstructure. Spatial layout of railway lines. Railway control systems in relation to infrastructure. Operating and carriage points. Railway lines net and category. Traction in rail transport. | | | |
| 12ZYDI | Introduction to Transportation Engineering | Z,ZK | 2 |
| Role of transportation in land-use planning. Basic terms in transportation engineering. Traffic survey and traffic prognosis. Introduction to topic of roads, public mass transport. Negative impacts of transportation to environment and safety. | | | |

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|---|---|------|---|
| 14AM | Automation and Measurement | Z,ZK | 6 |
| Introduction into terms agent, rational agent, their unification to elements of transportation systems, analogies in nature, regulation in open loop and control in closed loop, reactive systems. Dynamic system identification. Measurement of basic electrotechnic and physical magnitudes, measurement on AC/DC 1 and 3 phase systems. AC/DC electric motors, 1 and 3 phase distribution systems. Appliance connecting. | | | |
| 14ASD | Algorithm and Data Structures | KZ | 3 |
| Students will be familiarized with selected basic and derived data structures, algorithms, their properties and their design procedure. Students will analyze problems, propose theoretical solutions to the set task and the resulting algorithm write by means of flowcharts, practice in reading algorithms recorded by means of the flowchart and use the basics of Boolean algebra with forming the conditions for the algorithms. | | | |
| 14DATS | Database Systems | KZ | 2 |
| Basic concepts of database systems, conceptual model, relational data model, the principles of normal forms, relational database design, security and integrity of data, database queries, relational algebra, SQL language, client / server, multilayer architectures, distributed database systems. Access to data via the WWW. | | | |
| 14ISYD | Information Systems in Transportation | Z,ZK | 7 |
| Advanced Database Technologies. Types of information systems. History of information systems. Technology of information system with relational database systems. Portal type of information system. Technology of client and server (JavaScript and PHP). XML language. | | | |
| 14KSP | Constructing with Computer Aid | KZ | 2 |
| "CAD systems" term determination. CAD role in projecting system model. Existing CAD systems on Czech market. Project creation, basic common work rules in graphic applications and CA systems. Co-ordinated systems, CAD environment skill (basics of constructing, dimensioning, modifications, user interfaces, projecting possibilities, AutoCAD environment profiles, drawings with raster foundations). | | | |
| 14PRG | Programming | KZ | 2 |
| Algorithm development, methods of structured programming, high-level programming languages, basics of C programming languages (types, variables, conditions, cycles, arrays, functions), programming techniques, complexity. | | | |
| 14TAMS | Telecommunications and Local Area Networks | Z,ZK | 7 |
| Introduction of present stage and new trends in telecommunications systems with concentration on ITS applications. Legal conditions for telecommunications services provisioning and applications. Telecommunications key elements applied in hierarchical architecture are introduced and relations between networks elements parameters and performance of the whole telecommunications solutions are explained with concentration on the ITS applications. | | | |
| 14X31 | Project 1 | Z | 2 |
| 14X32 | Project 2 | Z | 2 |
| 14X33 | Project 3 | Z | 2 |
| 14Y1AV | Animation and Visualization | KZ | 2 |
| Introducing and basic 3D primitives and their basic modifications and transformations. Creating 3D scenes. Transformations of 3D primitives, connection / interaction / combination of 3D primitives, creating 3D bodies as non-primitives. Using of surfaces. Working with materials and material editors. Lightnings. Setting of light and material parameters. Scene capturing. Camera settings, moving in the scene. Rendering and making animation. | | | |
| 14Y1BE | Barrierless Transport | KZ | 2 |
| The issue of barrierless accessible public transportation in terms of architectural barriers and also for transportation-technological point of view. Students will gain theoretical knowledge of barrierless environment roads, railway stations, public transport stops, terminal buildings, vehicles, public transport, information and orientation systems and transportation technology. Theoretical knowledge will be supplemented by practical examples. | | | |
| 14Y1BM | Biometric Methods | KZ | 2 |
| Basic biometric terms, authentication methods, principles and performance measurement of biometric systems, overview of biometric technologies, hand geometry, iris recognition, retina recognition method, 2D and 3D face recognition, vein patterns on the wrist, ear biometrics, fingerprint recognition, skin spectroscopy, behavioral methods, the use of biometrics in transport applications, safety and risks of biometric technologies. | | | |
| 14Y1HW | Computer Hardware | KZ | 2 |
| Design combinational and sequential logical circuits and their implementation on FPGA, VHDL language. Computer architecture, structures of computer components - controller, ALU, memories, I/O subsystem, typical interfaces and buses (PCI Express, I2C, SPI, USB). | | | |
| 14Y1MP | Modeling Complex Assemblies and Models in Parametric Modeller | KZ | 2 |
| Assemblies programming - tools and methodology of working subassemblies and assemblies, sheet metal parts modelling, welded assemblies, pipelines, and distribution lines. Photorealistic output rendering - physical and material properties, lighting sources. MKP - visual example. | | | |
| 14Y1OP | Operating System | KZ | 2 |
| Distributions. Installation GNU/Linux OS. X-window system. Rights management - users and groups, ACL rights. Filesystems and attributes. Programs and processes. OS boot, runlevels. Basic console programs / commands. Config files. SW management, package systems. Programs in graphic shell - text, spreadsheet, graphic editors, sound, video and communication. Services management. Safe and secure configuration of OS. Remote administration. | | | |
| 14Y1P2 | Computer Aid of Transportation Projecting 2 | KZ | 2 |
| Overview of CAx application for transportation projecting aid. AutoCAD environment possibilities of basic tasks automatizing (programming, scripting, data exchange). Advanced blocks modification (attributes, relation to databases). Work in projecting group, external references. Basic tasks for communication projecting (clothoid transition curve, cross-and longitudinal section). Basics of 3D modelling. | | | |
| 14Y1PA | 3D Modeling in AutoCAD | KZ | 2 |
| Work in 3D non-parametric modeller (AutoCAD) environment, scenes rendering, creation of planar and volumetric objects, user setup creation, object data creation, work with data connected with external database. Basic definition of work with lights, materials and reflexes. Models presentation. | | | |
| 14Y1PG | Computer Graphics | KZ | 2 |
| Basic formats of graphic and possibilities of their editing and mutual conversion. Use of individual types according to character of work. Work with editing programs (within the user level scope) using layers, DPI, colors. Basics of digital photography, scanning and computer technology like monitors and graphics cards. | | | |
| 14Y1PI | Corporate Information System | KZ | 2 |
| Data-information-knowledge, components of information system, syntactic and semantic sense of data, structure of corporate information system, particular information system (personalistic, production, storage, etc.), corporate information politics and information control, risks of information system operation, legal environment of information system operation, state information system, information system security, data protection, safety politics. | | | |
| 14Y1PJ | C Programming Language | KZ | 2 |
| C programming language. Preprocessor, basics of the C language (data types, syntax, commands), functions, pointers, dynamical memory allocation, string, files, structures and unions. Implementations of abstract data types (FIFO, LIFO, list), programming techniques (sorting, searching, recursion), using bitwise operators. | | | |
| 14Y1PZ | Advanced Data Processing in Spreadsheets | KZ | 2 |
| Students will be familiar with principles of working in a spreadsheet. Graphic layout of the table appearance, formatting of numbers, insertion of formulas and functions, including addressing, error detection. Working with large spreadsheets, filters, advanced filters, database functions. Pivot tables and charts, conditional formatting, solution finding, solver, macros, data analysis. Examples and questions from various companies and training. | | | |

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| 14Y1TI | Creating Interactive Internet Applications | KZ | 2 |
| Possibilities of scripting language PHP. Overview of PHP language syntax, and functions. Analysis of finished scripts and demonstration of solutions. Your own application programmed in PHP language. | | | |
| 14Y1UP | Editing of Theses in MS Word | KZ | 2 |
| Students will be introduced to the principles of creating and editing large documents and basic typographic rules. They will properly apply styles, create tables of contents, lists of figures, tables, graphs, etc. Footnotes, captions, index. They practice corrections of finished documents. The goal is to prepare students for seamless editing dissertations and theses, so that they are able to concentrate mainly on writing a thesis. | | | |
| 14Y1VM | Development of Applications for Mobile Devices | KZ | 2 |
| Object oriented programming, Java programming language, development environment, operating system Android, development application - widgets, containers, threads, menu, permissions, services, GUI. | | | |
| 14Y1W1 | Webdesign 1 | KZ | 2 |
| Students will learn the basics of communication HTTP, URL and addressing, markup languages HTML and XHTML, HTML tags, rules of web accessibility and usability, CSS properties and selectors, the issue of web browsers, creating one to three column layout pages, sites validation, conditional comments. Topics will be practiced on practical examples. | | | |
| 14Y1W2 | Webdesign 2 | KZ | 2 |
| Students will learn advanced techniques CSS, responsive webdesign, CSS frontends, content management systems, JavaScript, jQuery, SEO, web server installation + configuration directives. Topics will be practiced on practical examples. | | | |
| 14Y1ZM | Fundamentals of Parametric and Adaptive Programming | KZ | 2 |
| Basics of work at products and parts creation. Sketch drawing by help of geometric relations, parametric dimensions, creation of adaptive models from 2D sketches. Import and export from and to another systems. Fundamentals of assemblies creation. | | | |
| 15DPLG | Transportation Psychology | Z | 2 |
| Subject of psychology and its basic concepts. Information intake, decision-making and behaviour. Performance. Engineering psychology and vehicle construction. Psychological aspects of travel route and traffic conditions, accidents and traffic incidents. Selection and training of the staff. Work and leisure. Age as a factor in transport operation. | | | |
| 15JZ1A | Foreign Language - English 1 | Z | 3 |
| Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric. | | | |
| 15JZ2A | Foreign Language - English 2 | Z,ZK | 3 |
| Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric. | | | |
| 15JZ3F | Foreign Language - French 3 | Z | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ3I | Foreign Language - Italian 3 | Z | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ3N | Foreign Language - German 3 | Z | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ3R | Foreign Language - Russian 3 | Z | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ3S | Foreign Language - Spanish 3 | Z | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ4F | Foreign Language - French 4 | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ4I | Foreign Language - Italian 4 | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ4N | Foreign Language - German 4 | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ4R | Foreign Language - Russian 4 | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ4S | Foreign Language - Spanish 4 | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15X31 | Project 1 | Z | 2 |
| 15X32 | Project 2 | Z | 2 |
| 15X33 | Project 3 | Z | 2 |

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| 15Y1BO | Work Safety and Health Protection in Transportation | KZ | 2 |
| Fundamental legislative, definition of terms, risks and possible health damage, working conditions and health protection with focus on transportation. Health protection programmes, health insurance of home and foreign business trips, statistics, working practice. | | | |
| 15Y1DZ | History of Railway | KZ | 2 |
| Horse-drawn railways, steam railways, railway network development in the 2nd half of 19th century, regional railways epoch, railways of the "First Republic", electric traction, World War II railways, railway development in the 2nd half of 20th century, high-speed railway origins, railway lines closing, important long-distance train connections, railway lines construction, railway accidents, railway junctions. Excursions and projections. | | | |
| 15Y1EH | European Integration within Historical Context | KZ | 2 |
| Versailles system, formation of new states. Europe and the powers, League of Nations. European policy in the 1920s. Fascism, nazism, communism. Little Entente, its principles and goals. Europe after Hitler's getting to power, system of bilateral agreements. Decline of the LN. Rearrangement of powers during WWII. Cold war and its consequences for Europe. New quality of French-German relationship - a driving power of starting European integration. | | | |
| 15Y1FD | French Area Studies and Transportation | KZ | 2 |
| France - geography and regions, transport infrastructure. Paris and its sights, city public transport. Road traffic, motorways, railway traffic, TGV, air traffic, specialised terminology. French society and culture. Current political system. System of education, studying in France. Selected authors of French literature. French gastronomy. | | | |
| 15Y1HD | History of City Mass Transport | KZ | 2 |
| History of city mass transport in the world, development of tram, bus and trolley-bus systems. History of transport networks in the world, current trends and developments of tariff and clearance systems. History of city transport in Prague and Brno. History of tram, bus and trolley-bus operation systems in the Czech Republic and Slovakia. | | | |
| 15Y1HE | Work Hygiene and Ergonomics in Traffic | KZ | 2 |
| Basic knowledge of occupational hygiene and ergonomics, and their application in transport. Working environment factors, and the influence of these factors on health of workers. Creation and protection of working conditions that do not damage public health. Mutual links: man-machine-environment. Adaptation of technology to possibilities and skills of a man. Practical examples from the field of transportation; relevant legislature. | | | |
| 15Y1HL | (History of Civil Aviation) | KZ | 2 |
| Aeronautics. Beginnings of aircrafts heavier than air. Czechoslovak aviation pioneers. Development of airports in the Czech Republic. World airports. Airlines of the world. Helicopters. CSA airplanes. Famous aviators. Classic era of aviation. Golden era of civil aviation. Supersonic flying. Modern era of civil aviation. Flying in the world. | | | |
| 15Y1MK | Modern History in Context: Every Day Life and Transport | KZ | 2 |
| Historical overview of modern history of every day life, science, technology and transport in a wider context. | | | |
| 15Y1NE | German in the Economy and Society | KZ | 2 |
| Recent economic and social issues of German speaking countries and of the EU. Reading and listening of texts. Lexical, grammatical and semantic analysis of texts. Discussion on selected topics. | | | |
| 15Y1ZV | East-West dichotomy: Prelude to the Cold War | KZ | 2 |
| Historical prologue, evolution of the "West" and "East" from the 1500s. Focus on the history in the period between 1850 nad 1950. Milestones and continuity of the international relations in the end of 19th century and the beginning of the 20th century. Revolutions, the causes and consequences. Scientific and technological progress, the causes and consequences. Economic and financial history. Social changes. Discussions on texts, sources. | | | |
| 16DOTE | Transportation Technology | Z,ZK | 6 |
| Types of vehicles, main features and principles. Construction and design elements, important legislation, testing. Drives and transmission, energy accumulation and changes. Road vehicle dynamics (lateral, transversal, vertical, driveability, suspension, wheel-road contact), mathematic solution of dynamic systems. Design features of passive, active and integrated safety. | | | |
| 16SVIR | Vehicle Systems and Interaction with Driver | Z,ZK | 7 |
| Control and regulation theory. Electronic control systems and their relation to driving dynamics. Influential factors on vehicle dynamics, collision situation, accident, testing. Vehicle autodiagnosics, influence of construction, material, technology, data for autodiagnosics, legislative requirements. Human-machine interaction in past and present. Ergonomy. Drowsiness, its causes and consequences, aggression, monotony. | | | |
| 16UDOP | Introduction into Vehicles | Z | 2 |
| Vehicles and transportation systems. Functionality and setup. Movement and drive principles. Engines and their characteristics. Rail, road, air and water transport. Alternative means of transport. Lifting equipment and conveyors. Legislation. | | | |
| 16X31 | Project 1 | Z | 2 |
| 16X32 | Project 2 | Z | 2 |
| 16X33 | Project 3 | Z | 2 |
| 16Y1EN | Energy Requirements of Vehicles | KZ | 2 |
| Dynamics and the driving inertial of the vehicles. Types of energy - kinetic, static, heat, chemical and others. Ways of energy change into kinetic energy. Combustion engine, electric drive, steam engine, air engine. Energy accumulation means, accumulator, flywheel, fuel cell. Energy recuperation. WTW analysis. | | | |
| 16Y1IS | Interactive Systems and Simulations | KZ | 2 |
| Principles of vehicle movement. Forces in moving vehicle, origin, classification, assesment. Adhesion. Traction output. Drives, source systems, classification, structure, operational and energetic singularity. Sources of energy. Calculations to assess output quantities and energetic intensity. Auxiliary systems energy consumption. | | | |
| 16Y1KS | Quality and Reliability of Vehicles | KZ | 2 |
| Quality and reliability theory in design, development, production and operation of vehicles. Definition and possible approach to quality and reliability. Key legislation. FMEA (Failure Mode and Effects Analysis), QFD (Quality Function Deployment), DfX (Design for Assamly, Manufacturing, Quality, Services ...) and other methods used in industrial applications. Knowledge-based systems of quality and reliability, data collection. | | | |
| 16Y1PV | Operation, Construction and Maintenance of Vehicles | KZ | 2 |
| Methods of vehicle production. Vehicle maintenance. Vehicle diagnostics. Maintenance and repair plans. Engine maintenance and emission measurement. Transmission mechanism. General principles of engine diagnostics. | | | |
| 16Y1RE | Control and Electronic Vehicle Systems | KZ | 2 |
| Elementary concepts of regulation. Tools for analytical solution, linear system description. Basic types of a regulator (PID), properties, advantages, disadvantages, function. Conventional and hybrid drive control. Electric drive. Vehicle communication bus (CAN, LIN, FlexRay, ISOBus, KWP2000 protocole etc.). Vehicle electronic control, safety, communication and comfort systems. | | | |
| 16Y1VT | Development in Railroad Vehicles | KZ | 2 |
| Railroad vehicles traction. Railroad vehicle parametres regulation. Control and driving of railroad vehicles. Importance in heavy duty and personal transportation. Critical situation assesment. New materials in design. International standardization. | | | |
| 16Y1ZG | Introduction into Applied Computer Graphics | KZ | 2 |
| Computer graphics, division and applications with emphasis on transport, including development and research. Colours, colour perception, colour schemes, models, principles of 2D and 3D generation, elementary algorithms for graphic data workout. Visualisation principles and tasks, technics, graphics and visualisation HW basics. Introduction to 2D and 3D graphics software. | | | |

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| 16Y1ZL | Vehicle Testing, Legislation and Construction | KZ | 2 |
| Vehicle, bus and motorbike construction, aggregate computing, driving resistance, build and parameters of traction, constructional arrangement of personal cars, trucks, buses, motorbikes, legislation in the EU and in the world, technical legislation creation, testing methods, vehicle tests, accelerated tests, mathematical modelling in testing. | | | |
| 17TEDL | Transport Technology and Logistics | KZ | 3 |
| Basic terms in transport technology and logistics, particular steps of transport planning, line planning, timetabling, planning in passenger and freight transport, organisation of traffic in each transport modus, technologic factors of the side of operator and client, organisation of city transport, logistic technologies and their application using various transport modus. | | | |
| 17TGA | Graph Theory and its Applications in Transport | Z,ZK | 4 |
| Basic terms of graph theory, paths in graphs, flows in networks, location problems, design problems on graphs, optimum routing, use of graphs in other scientific disciplines. | | | |
| 17X31 | Project 1 | Z | 2 |
| 17X32 | Project 2 | Z | 2 |
| 17X33 | Project 3 | Z | 2 |
| 17Y1LL | Logistics of Passenger and Freight Air Transport | KZ | 2 |
| Logistics airline passenger and cargo. Aircraft and airport terminals for passenger and cargo transport. Airlines in terms of logistics systems. Aerial transport process passengers and air cargo. Information systems in air transport. Global distribution systems. | | | |
| 17Y1MD | Marketing in Transportation | KZ | 2 |
| General principles of marketing applied to transport issues, marketing tools suitable for transport as a service, specifics of public passenger transport and the resulting differences in the application of marketing. | | | |
| 17Y1OF | Personal Finance | KZ | 2 |
| Personal finance (budget, financing of basic living needs), debt (loans and credits, payment instruments, interest and fees, debt trap), financing of housing (rent, mortgage, savings, consumer loans, refinancing), savings and investments (investment horizon, return, risk, investment strategy), insurance (insurance types, suitability and adequacy), securing the future (retirement savings and insurance). | | | |
| 17Y1PM | Personnel Management | KZ | 2 |
| Human sources, work group, man as personality, planning, choice, evaluation and education of human sources, work adaptation, teamwork, intercultural communication. | | | |
| 17Y1SL | Sociology of Human Resources | KZ | 2 |
| Human resources and their importance, work group as a special kind of social group, communication, personal management, modern management, human resources planning, culture of the organization. | | | |
| 17Y1ST | Titan Simulation | KZ | 2 |
| Titan is a management game simulating the business decisions. Lets 2-8 student groups to produce and compete in the market with the same product. Students set a price and determine the quantity and capacity of production, plan budgets for marketing, research and development. They become familiar with the consequences of their decisions by the form of financial corporate reports and they use this information for other business decisions. | | | |
| 18MTY | Materials Science and Engineering | Z,ZK | 3 |
| Basic course of materials science and engineering explains mechanical properties of structural materials based on their bonding forces and microstructure. However the main attention is paid to metals as the most important engineering materials, also other major classes of materials are presented, namely ceramics, polymers and composites. Attention is also paid to degradation processes in materials, to defectoscopy and to main mechanical tests. | | | |
| 18PZP | Elasticity and Strength | Z,ZK | 3 |
| Tension and compression. Bending of beam. Shear stress during bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joint of structure. Analysis of deflection curve of beam. Torsion of circle cross section. Combined loading. Stability of compressed bar and buckling. Beam on elastic foundation. Strength analysis. | | | |
| 18SAT | Structural Analysis | Z,ZK | 4 |
| General system of forces in plane and space. Calculation of reactions of bodies and structures. Assessment of internal forces on statically determinate beams and simple girders. Principle of virtual work. Kinematic method for calculation of reactions of statically determinate systems. Determination of axial forces in truss constructions. Cross-sectional characteristics of planar shapes. Fiber polygons and chains. | | | |
| 18TED | Technical Documentation | KZ | 2 |
| Technical standards, international standardization, technical drawings, representation of technical objects, technical diagrams and charts, dimensional and geometrical accuracy, arrangement of drawing sheets. | | | |
| 18X31 | Project 1 | Z | 2 |
| 18X32 | Project 2 | Z | 2 |
| 18X33 | Project 3 | Z | 2 |
| 18Y1AM | Anatomy, Mobility and Safety of Man | KZ | 2 |
| Survey of tissues. Anatomical structure and growth of bones. Articular joint. Remodelling of bone tissue. Anatomical structure of muscles. Blood circulation and nervous system. Structure and biomechanics of muscular-skeletal system. Injury of human organs and musculo-skeletal system during traffic accidents. Mobility of ill and injured man and his treatment. Human joint prostheses. Protective means and traffic safety regulations. | | | |
| 18Y1EM | Experimental Methods in Mechanics | KZ | 2 |
| The purpose and role of experimental mechanics. Sensors for mechanical testing. Overview of experimental methods. Destructive and non-destructive testing of materials. Design of experimental procedures and sample preparation. Tensile and bending tests. Electrical resistance strain gages. Optical based strain measurement. Fatigue and lifetime prediction. Instrumented hardness testing. Introduction to electron microscopy. Errors in measurement. | | | |
| 18Y1MT | Engineering Materials | KZ | 2 |
| Systematic overview of main classes of materials used in technical design. In addition to main classes of materials, i. e. metals, ceramics, polymers and composites, attention is paid to biological materials and to biomimetics. Integral approach to material selection process is also demonstrated based on so called Ashby's selection charts. | | | |
| 18Y1PS | Computer Simulations in Mechanics | KZ | 2 |
| Principles and overview of programs for stress analysis of structures. Numerical methods in mechanics, finite element method. Geometric model development and adaptation of geometry from other CAE systems. Assignment of material properties. The types of elements and their use. Discretization of solid model. Boundary conditions and application of the load. Basic tasks of structural and modal analysis. Introduction to complex nonlinear problems. | | | |
| 18Y1UK | Introduction of Rail Vehicles | KZ | 2 |
| Basic characteristics and parameters rail transport systems - railway and urban transport. Basis driving mechanics rail vehicles - equation of motion train and unit trains. Rolling and track resistance. Total running resistance. Acceleration force. Analyzing driving cycle rail vehicle. Speed-power diagrams and characteristics rail vehicle - hydromechanic, hydrodynamic and electric drive. Design concept rail vehicles and drive of wheel set. | | | |
| 20APLT | Applied Telematics | Z,ZK | 7 |
| Strategic documents in the field of ITS and related legislative and technical documents. ITS architecture, including the proposal in UML. Data models, the location table, FCD and their practical use in real systems. Specific telematics systems in practice and aspects of their operations. Binding ITS to other network industries and the concept of cooperative systems, smart cities and energy aspects of transport. | | | |

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| 20RISI | Road Traffic Control and Management | Z,ZK | 7 |
| Traffic control at junctions, their coordination and RLTS on highways. Principles of control systems used in practice. Design of traffic lights and its capacity assessment. Software tools for traffic models and simulations. Hardware of control systems. Preference of public transport and solutions for displaying traffic information and variable message signs. | | | |
| 20RIZE | Railway Traffic Control | Z,ZK | 7 |
| Introduction to railway signaling and transport, legislation and standards, principles of security and safety equipment category, basic structural elements, power supplies and power electronics, train protection systems, ETCS. Interoperability and security technology in the world, security technology in public transport, CBTC systems. | | | |
| 20SYSA | Systems Analysis | Z,ZK | 5 |
| Introduction to system sciences, system viewpoint, terminology, typical system analysis tasks, system identification, system interface and interface tasks, processes, system behaviour and its analysis, strong functions and processes, genetic code, system identity, system architecture. Tools for system analysis - Petri nets, decision tables, algorithms for structural tasks. Soft and hard systems, methods for soft system analysis. | | | |
| 20UITS | Introduction to Intelligent Transport Systems | Z,ZK | 7 |
| Terminology and legislative framework telematics systems and their architecture. Telematics systems in practice and their operation. Fundamentals of information and telecommunication systems for ITS. Principles and technical support measurement of traffic data, localization and navigation. Practical work with traffic data. Real examples of possible applications of the principles of ITS. | | | |
| 20X31 | Project 1 | Z | 2 |
| 20X32 | Project 2 | Z | 2 |
| 20X33 | Project 3 | Z | 2 |
| 20Y1AE | Applied Electronics | KZ | 2 |
| Basic electronic semiconductor components, their principles, characteristics and typical connection diagrams. Semiconductor PN junction diodes, transistors, thyristor, operational amplifiers, basic logic gates. Functions of basic electronic circuits and methods for their designs (rectifiers, voltage regulator with Zener diode, transistor as an amplifier, operational amplifier as an inverting and noninverting amplifier). | | | |
| 20Y1AF | Alternative Forms of Transportation Project Financing | KZ | 2 |
| In will be specified such forms of financing in transportation and telecommunications, where the public sector body perform the final debtor, i. e. debt payments come from its budget but the final debtor is not a direct participant of the transaction and it is not the counterparty of the financial institute which provides the funding. Issue of securities as an alternative source of transportation and telecommunication projects. | | | |
| 20Y1EA | Environmental Aspects of Transport | KZ | 2 |
| State of the atmosphere, weather observation network, weather in transportation, road meteorology. Weather forecasting, data assimilation, probabilistic forecasts, forecast evaluation. Air quality, main pollutants and their effects, atmospheric chemistry, traffic emissions. Greenhouse gasses, carbon cycle, a role of energy and transportation in climate change. | | | |
| 20Y1EK | Qualification in Electrical Engineering | KZ | 2 |
| Practical experience with measurements in laboratories, electrical equipment, power supply, electrical installation of low voltage, electric shock hazard, symbols and labeling, nominal voltage, maximum allowed currents, electrical equipment protection against short circuit and overload protection, control and revision, first aid, legislation, standards and regulations in relation to health and safety and electrical engineering. | | | |
| 20Y1LN | Location and Navigation | KZ | 2 |
| Description and examples of road networks, localization on the network. Routing algorithms, their properties and implementation. Description and examples of datasets for finding transport connections, routing algorithms, their properties and implementation. | | | |
| 20Y1OI | Fare Collection and Information Systems | KZ | 2 |
| Fare collection systems in public transport and their components (on-board units, validators, turnstiles, ...). Information systems and their components for users (timetables, maps, panels ...) and operators (cycles, location or current delay of vehicles, ...). The issue of tariff systems. Other examples of clearance systems (parking). | | | |
| 20Y1PK | Product Quality Management Processes | KZ | 2 |
| General principles of organization management. Management systems and international standards; quality management systems. Quality products, processes, systems. A framework of standards for systems management, management principles. Principles of process management, monitoring and measurement systems management. Uniform framework of standards for systems management. Process management principles. Metrology and testing. Product certification. | | | |
| 20Y1SC | Sensors and Actuators | KZ | 2 |
| Principles of sensors and actuators. Basics of measuring theory and actuating influence. The respective technologies and construction principles. Sensors of mechanical, electro-magnetic, state (temperature, humidity), chemical and particle flow values. Electrical, pneumatic and hydraulic actuators and solid phase elements. | | | |
| 20ZEKT | Fundamentals of Electrical Engineering | Z,ZK | 4 |
| Maxwell equations, electrotechnical quantities (electrical current, voltage, resistance, conductivity, resistivity, conductivity, power, energy), Ohm's law, Kirchhoff laws, electrical circuits (elements, methods, DC and AC circuits, accumulators, photovoltaics), electric machines, transmission lines, reflections on transmission lines, basic electrical measurements. | | | |
| 21X31 | Project 1 | Z | 2 |
| 21X32 | Project 2 | Z | 2 |
| 21X33 | Project 3 | Z | 2 |
| 21Y1BC | Aviation safety and security | KZ | 2 |
| History of safety and security development in aviation. Modern tools for safety and security management. Research and development of safe and secure systems. | | | |
| 21Y1BS | Unmanned aircraft systems 1 | KZ | 2 |
| Unmanned Aviation Development. Aircraft design. Legislation in force in the Czech Republic. Planning and execution of the flight. Airspace division. Operational risks and operational procedures. Practical flights. | | | |
| 21Y1FN | Factors Affecting the Rate of Accidents in Aviation | KZ | 2 |
| Introduction. The scope of international and national organizations in civil aviation. The scope of the investigation organisations within the state and international committees. Analysis and interpretation of ICAO Annexes 13 and 19. Analysis and interpretation of the Regulation (EC), Regulation (EU). Human factor. Utilization of information from the investigation reports. | | | |
| 21Y1LA | Aerobatics | KZ | 2 |
| Methodology of flying aerobatic figures. Aerodynamics and flight mechanics of aerobatic figures. Aerobatic training syllabi and aerobatic competitions. Creating an aerobatic sequence. Safety in aerobatics, accidents related to aerobatics. Physiological aspects of flying aerobatics. Aircraft structure loads and construction fatigue strength of aerobatic aircraft. Upset recovery training (UPRT) for commercial pilots and related accidents. | | | |
| 21Y1LR | Radio Technology in Aviation | KZ | 2 |
| Electric signals and the wave spectrum. Analog and digital modulations. Noises. Filters. Resonance circuits. Electromagnetic field. Electromagnetic wave propagation. Wave ranges in aviation, radiation and reception of electromagnetic field. Antennas in aviation, receivers and transmitters. | | | |
| 21Y1MP | Matlab for project-oriented study | KZ | 2 |
| The subject's syllabus is focused on the problem-solving during bachelor's thesis preparation and it is based on students' requests. Individual exercises will be prepared according to particular examples, based on actual students' needs and suggestions. The subject will have a flexible form, which is expected to bring an improvement of students' Matlab skills. | | | |

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| 21Y1MZ | Managerial Ethics | KZ | 2 |
| The basic terminology of managerial ethics. Basics of etiquette and rules of social contact. Social events. Etiquette of working contacts. The art of presentation and negotiation. Personal image. Diplomatic protocol. Managerial ethics. Business ethics. | | | |
| 21Y1RZ | Human Resources Management | KZ | 2 |
| The position of human resources in the organization and related disciplines field. Substance, importance and challenges of human resources management. Internal and external environment of human resource management. Human resource planning. Search, recruitment and selection of employees. Motivation, evaluation and remuneration of staff. Positioning, dismissal and redundancies of employees. Education of employees. Planning career management. | | | |
| 21Y1TH | Aircraft Technical Handling | KZ | 2 |
| Aircraft towing and pushing tractors. GPU. Air conditioning and heating units. Aircraft fuel equipment. De-icing and anti-icing units. Loading and unloading units. Equipment for passengers onboarding and offboarding. Operational processes of aircraft technical handling and regulations. Modernization and technical progress. | | | |
| 21Y1UT | Airports Maintenance | KZ | 2 |
| Summer airport maintenance. Summer maintenance equipment. Winter airport maintenance. Winter maintenance equipment. De-icing / anti-icing of aircraft. De-icing / anti-icing liquid. Operating procedures, limitations, practices. | | | |
| 21ZALD | Basics of Air Transport | KZ | 2 |
| History, definitions, terminology, basic rules. VFR/IFR. Basics of aerodynamics. Propulsion of aircraft. Aircraft design. Basics of navigation, radio navigation. Weight, balance, performance. Flight planning, optimization of speed and heights, minimum fuel. Limitations of operation, maintenance, service life of aircraft. Traffic management, ground handling, security. Air crew. Airlines and economics. Space technologies. | | | |
| 22X31 | Project 1 | Z | 2 |
| 22X32 | Project 2 | Z | 2 |
| 22X33 | Project 3 | Z | 2 |
| 22Y1SZ | Forensic Expertise | KZ | 2 |
| Historical evolution of forensic engineering, forensic activity, current legislature in the Czech Republic, different disciplines, notion of forensic, forensic legislation, basic forensic acts, expert role in the obtaining proofs, forensic methodology. Notion of the evidence, general principles of evidence obtaining, metrology, protocol, evidences collection, site inspection, forensic report, elements. Finding, expert testimony / report. | | | |
| 23X31 | Project 1 | Z | 2 |
| 23X32 | Project 2 | Z | 2 |
| 23X33 | Project 3 | Z | 2 |
| 23Y1DZ | Data and Their Processing for Engineering Fields Needs | KZ | 2 |
| Courses of risk, basic terms, data collection, data sets, data random uncertainty and data epistemic uncertainty, data processing, hazard, risk, value scales, analytical, empirical and heuristic methods, hazard determination and risk determination, methods for variants' creation, decision support systems. | | | |
| 23Y1KO | Quantum Physics and Optoelectronics | KZ | 2 |
| Ground of quantum physics. Application of quantum physics in practice. Optoelectronics. Production of optoelectronics components. | | | |
| 23Y1OK | Protection of Critical Objects and Infrastructures | KZ | 2 |
| Types of technological systems, critical item, risks and their courses, criticality, vulnerability, connectivity, dependability, resilience, failure, protection, safety of critical objects and critical infrastructures. | | | |
| 23Y1VS | Negotiation and Cooperation | KZ | 2 |
| Code of conduct for negotiation. The influence of personality traits on the negotiations. Negotiation and commanding. Teamwork. Variants teams. Informal and formal role in the team. Principles of negotiation, the essence of negotiation, the differences in negotiation in business and in crisis situations, the principle of "win both", specifications and bidding, the role of trust. | | | |
| TV-1 | Physical Education | Z | 1 |
| TV-2 | Physical Education | Z | 1 |

For updated information see <http://bilakniha.cvut.cz/en/FF.html>

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