# Study plan

# Name of study plan: Bachelor TET-ITS Full-Time from 2024/25

Faculty/Institute/Others:
Department:
Branch of study guaranteed by the department: Welcome page
Garantor of the study branch:
Program of study: Technology in Transportation and Telecommunications
Type of study: Bachelor full-time
Required credits: 174
Elective courses credits: 6
Sum of credits in the plan: 180
Note on the plan:

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Name of the block: Compulsory courses
Minimal number of credits of the block: 162
The role of the block: Z

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Code of the group: 1S-BP-TET-20/21
Name of the group: 1st Sem. Bachelor Full-Time TET from 2020/21
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** *Olga Vraštilová, Tomáš T asák, Magdalena Hykšová, Bohumil Ková , Ond ej Navrátil* **Bohumil Ková** *Ond ej Navrátil (Gar.)* | Z,ZK | 7 | 2P+4C+22B | Z | z |
| 11LA | **Linear Algebra** *Lucie Kárná, Pavel Provinský, Martina Be vá ová* **Martina Be vá ová** *Martina Be vá ová (Gar.)* | Z,ZK | 3 | 2P+1C+10B | Z | z |
| 12ZYDI | **Introduction to Transportation Engineering** *Zuzana arská, Dagmar Ko árková, Jan Kruntorád* | Z,ZK | 2 | 1P+1C | Z | z |
| 18MTY | **Materials Science and Engineering** *Jaromír Kylar, Veronika Drechslerová, Jaromír Kylar, Nela Kr má ová, Jitka ezní ková, Jaroslav Valach, Vít Malinovský, Veronika Drechslerová, Jaromír Kylar* **Jaroslav Valach** *Jaroslav Valach (Gar.)* | Z,ZK | 3 | 2P+1C+10B | Z | z |
| 11GIE | **Geometry** *Pavel Provinský, Old ich Hykš, Šárka Vorá ová* **Old ich Hykš** *Old ich Hykš (Gar.)* | KZ | 3 | 2P+2C+12B | Z | z |
| 14ASD | **Algorithm and Data Structures** *Tomáš Brandejský, Michal Je ábek, Alena Kubá ová, Jan Procházka, Vít Fábera, Martin Fiala* **Vít Fábera** *Vít Fábera (Gar.)* | KZ | 3 | 0P+2C+8B | Z | z |
| 14KSP | **Constructing with Computer Aid** *Vít Fábera, Radek Kratochvíl* **Lukáš Svoboda** | KZ | 2 | 0P+2C+8B | Z | z |
| 18TED | **Technical Documentation** *Jitka ezní ková, Vít Malinovský* **Jitka ezní ková** *Jitka ezní ková (Gar.)* | 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, Petr Bouchner* | 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=1S-BP-TET-20/21 Name=1st Sem. Bachelor Full-Time TET from 2020/21**

| 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. Indefinite integral, Newton integral, Riemann integral, improper Riemann integral. First-order differential equations, linear differential equations. | | | | |
| 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. | | | | |

| Code | Name | | Completion | Credits |
|---|---|---|---|---|
| 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 |
|---|---|---|---|---|

Differential geometry of curves - parameterization, the 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 analyze problems, design a theoretical solution to a given problem and write the resulting algorithm using flowcharts, practice reading algorithms written using flowcharts, and use basic Boolean algebra to construct constraints in algorithms. Students will be introduced to the basics of the Python programming language - variable, branching, loops, they will learn to work with variables of basic data types (integer, floating point and string) and the list data structure in their programs.

| 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 possibilites, AutoCAD environment profiles, drawings with raster foundaments).

| 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 |
|---|---|---|---|---|

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Code of the group: 2S-BP-TET-20/21
Name of the group: 2nd Sem. Bachelor Full-Time TET from 2020/21
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** *Olga Vraštilová, Tomáš T asák, Magdalena Hykšová, Ond ej Navrátil, Old ich Hykš* **Magdalena Hykšová** *Ond ej Navrátil (Gar.)* | Z,ZK | 5 | 2P+3C+20B | L | z |
| 11STAT | **Statistics** *Pavel Provinský, Evženie Uglickich, Pavla Pecherková, Michal Matowicki, Natálie Blahitka, Ivan Nagy, Jana Kuklová* **Pavla Pecherková** *Evženie Uglickich (Gar.)* | Z,ZK | 4 | 2P+2C+12B | L | z |
| 12ZTS | **Railway Lines and Stations** *Lukáš Týfa, Martin Jacura, Petr Šatra, Tomáš Javo ík, Ond ej Trešl Lukáš Týfa (Gar.)* | Z,ZK | 4 | 2P+2C+10B | L | z |
| 18SAT | **Structural Analysis** *Jaromír Kylar, Veronika Drechslerová, Nela Kr má ová, Jitka ezní ková, Daniel Kytý , Jan Vy ichl, Tomáš Doktor, Jan Falta, Jan Šleichrt Daniel Kytý (Gar.)* | Z,ZK | 4 | 2P+2C+14B | L | z |
| 20SYSA | **Systems Analysis** *Zuzana B linová, Ji í R ži ka, Patrik Horaž ovský, Petr Bureš Zuzana B linová (Gar.)* | Z,ZK | 5 | 2P+2C+14B | L | z |
| 14PRG | **Programming** *Alena Kubá ová, Jan Procházka, Martin Fiala, Jana Kaliková, Jan Kr ál, Lukáš Svoboda* **Jana Kaliková** *Jana Kaliková (Gar.)* | KZ | 2 | 0P+2C+8B | L | z |
| 17TEDL | **Transport Technology and Logistics** *Vít Janoš, Michal Drábek, Zden k Michl, Rudolf Vávra, Stanislav Metelka* **Zden k Michl** *Vít Janoš (Gar.)* | KZ | 3 | 2P+1C | L | z |
| 21ZALD | **Basics of Air Transport** *Jakub Hospodka, Tomáš Tlu ho , Ji í Volt, Peter Olexa, Jan Slezá ek, Jakub Trýb, Sébastien Lán, Bo Stloukal* | 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=2S-BP-TET-20/21 Name=2nd Sem. Bachelor Full-Time TET from 2020/21**

| 11CAL2 | Calculus 2 | | Z,ZK | 5 |
|---|---|---|---|---|

Linear differential equations and their systems, differential calculus of functions of several real variables. Riemann integral in Rn. Line and surface integrals.

| 11STAT | Statistics | | Z,ZK | 4 |
|---|---|---|---|---|
| Basics of probability Descriptive statistics Population and sample, limit theorem Point estimate, construction and properties Interval estimates Parametric tests Nonparametric tests Regression and correlation analysis | | | | |
| 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. | | | | |
| 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 |
| The Course Programming builds on and fully extends the course 14ASD (Algorithmization and Data Structures). The knowledge of the Python programming language is expanded here so that the participant gains skills and can apply them to solve various follow-up tasks. Main topics: lists, multidimensional arrays, sorting and searching, tuples, sets, dictionaries, working with date and time, regular expressions, functions and procedures, working with files (CSV, JSON, XML). | | | | |
| 17TEDL | Transport Technology and Logistics | | KZ | 3 |
| Basic terms in transport technology and logistics, particular steps of transport planning, line planning, timetabling, planning in pasanger 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 aplication 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 |

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Code of the group: 3S-BP-TET-24/25

Name of the group: 3rd Sem. Bachelor Full-Time TET from 2024/25

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** *Old ich Hykš, Jana Kuklová, Pavel Demo, Zuzana Malá, Tomáš Vít* **Jana Kuklová** *Pavel Demo (Gar.)* | Z,ZK | 5 | 2P+2C+18B | Z | z |
| 12MDE | **Transport Models and Transport Excesses** *Josef Kocourek, Tomáš Pad lek* | Z,ZK | 3 | 2P+1C+8B | Z | z |
| 11TGA | **Graph Theory and its Applications in Transport** *Denisa Mocková, Dušan Teichmann* **Denisa Mocková** *Denisa Mocková (Gar.)* | Z,ZK | 4 | 2P+2C+12B | Z | z |
| 18PZP | **Elasticity and Strength** *Jitka ezní ková, Daniel Kytý, Jan Vy ichl, Tomáš Doktor, Jan Šleichrt, Josef Jíra, Ond ej Jiroušek* **Ond ej Jiroušek** *Ond ej Jiroušek (Gar.)* | Z,ZK | 3 | 2P+1C+10B | Z | z |
| 20UITS | **Introduction to Intelligent Transport Systems** *Ji í R ži ka, Patrik Horaž ovský, Kristýna Navrátilová, Viktor Beneš, Eva Haj iarová, Martin Langr, Vladimír Faltus, Pavel Hrubeš* **Martin Langr** | Z,ZK | 7 | 3P+2C+20B | Z | z |
| 12PPOK | **Designing Roads, Highways and Motorways** *Josef Kocourek, Tomáš Pad lek, Polina Zayats, Petr Kumpošt* **Josef Kocourek** *(Gar.)* | KZ | 3 | 1P+2C+10B | Z | z |
| 14DATS | **Database Systems** *Jana Kaliková, Jan Kr ál* **Jana Kaliková** *Jana Kaliková (Gar.)* | KZ | 2 | 1P+1C+10B | Z | z |
| 15JZ1A | **Foreign Language - English 1** *Eva Rezlerová, Markéta Vojanová, Dana Boušová, Marie Michlová, Marek Tome ek, Jan Feit, Markéta Musilová, Peter Morpuss, Lenka Monková, .....* | Z | 3 | 0P+4C+10B | Z | z |

**Characteristics of the courses of this group of Study Plan: Code=3S-BP-TET-24/25 Name=3rd Sem. Bachelor Full-Time TET from 2024/25**

| 11FYZ | Physics | | Z,ZK | 5 |
|---|---|---|---|---|
| Kinematics, dynamics, Newton's laws, force fields, mechanics of continuum, thermodynamics, introduction to electrostatics and electric current. | | | | |
| 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. | | | | |
| 11TGA | 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 in bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joints of structures. Analysis of deflection curve of beams. Torsion of circular cross sections. Combined loading. Stability. | | | | |

| 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. | | | |
| 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. | | | |

Code of the group: 4S-BP-ITS-22/23

Name of the group: 4th Sem. Bachelor Full-Time TET-ITS from 2022/23

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)* *Tutors,* **authors** *and guarantors (gar.)* | Completion | Credits | Scope | Semester | Role |
|---|---|---|---|---|---|---|
| 11MAMY | **Mathematical Methods** *Michal Matowicki, Jan P ikryl* **Jan P ikryl** *Jan P ikryl (Gar.)* | Z,ZK | 7 | 3P+3C | L | z |
| 14AM | **Automation and Measurement** *Tomáš Brandejský, Vít Fábera* **Vít Fábera** *Tomáš Brandejský (Gar.)* | Z,ZK | 6 | 3P+3C | L | z |
| 16DOTE | **Transport Technology** *Josef Mík, Michal Cenkner, P emysl Toman, Josef Svoboda* **Josef Mík** | Z,ZK | 6 | 3P+3C | L | z |
| 15JZ2A | **Foreign Language - English 2** *Eva Rezlerová, Markéta Vojanová, Marie Michlová, Marek Tome ek, Jan Feit, Markéta Musilová, Peter Morpuss, Lenka Monková, Jitka He manová, .....* | Z,ZK | 3 | 0P+4C+10B | L | z |

**Characteristics of the courses of this group of Study Plan: Code=4S-BP-ITS-22/23 Name=4th Sem. Bachelor Full-Time TET-ITS from 2022/23**

| 11MAMY | Mathematical Methods | Z,ZK | 7 |
|---|---|---|---|
| Mathematical modeling. The system and its mathematical description. Types of signals. Basic system responses. Convolution. State models. Principle of general / stationary / linear state description. Data measurement. Uncertainty in measured data. Data normalization. Preparation of data for further processing. Linear state model over noisy data. Kalman filter condition estimation. Statistical learning methods. Regression, classification. | | | |
| 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 openen loop and control in closed loop, reactive systems, control using finite state machines. Dynamic system identification. Measurement of basic electric and other physical quantities, principles of measurement instruments, DC and AC measurement, actuators, measurement automation, measurement laboratories. | | | |
| 16DOTE | Transport 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: 4S-BP-ITS-V1-22/23

Name of the group: 4th Sem. Bachelor Full-Time TET-ITS alternative subject from 2022/23

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)* *Tutors,* **authors** *and guarantors (gar.)* | Completion | Credits | Scope | Semester | Role |
|---|---|---|---|---|---|---|
| 11EMO | **Electromagnetic Field and Optics** *Old ich Hykš, Jana Kuklová, Zuzana Malá, Tomáš Vít* **Zuzana Malá** *Pavel Demo (Gar.)* | Z,ZK | 4 | 2P+1C | L | z |
| 20ZEKT | **Fundamentals of Electrical Engineering** *Jind ich Sadil, Daniel Beránek* **Jind ich Sadil** *(Gar.)* | Z,ZK | 4 | 2P+1C | L | z |

**Characteristics of the courses of this group of Study Plan: Code=4S-BP-ITS-V1-22/23 Name=4th Sem. Bachelor Full-Time TET-ITS alternative subject from 2022/23**

| 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: 5S-BP-ITS-25/26
Name of the group: 5th Sem. Bachelor Full-Time TET-ITS from 2025/26
Requirement credits in the group: In this group you have to gain 23 credits
Requirement courses in the group: In this group you have to complete 4 courses
Credits in the group: 23
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** *Jana Kaliková, Jan Kr ál, Marek Kalika **Marek Kalika** Marek Kalika (Gar.)* | Z,ZK | 7 | 2P+4C | Z | z |
| 20TAMS | **Telecommunications and Local Area Networks** | Z,ZK | 7 | 3P+3C | Z | z |
| 20RIZE | **Railway Traffic Management** *Jind ich Sadil, Martin Leso, Dušan Kamenický, Petr Koutecký **Dušan Kamenický*** | Z,ZK | 7 | 3P+3C | Z | z |
| 20ELKA | **Qualification in Electrical Engineering** *Jind ich Sadil, Daniel Beránek **Daniel Beránek*** | KZ | 2 | 2P+0C | Z | z |

**Characteristics of the courses of this group of Study Plan: Code=5S-BP-ITS-25/26 Name=5th Sem. Bachelor Full-Time TET-ITS from 2025/26**

| 14ISYD | Information Systems in Transportation | Z,ZK | 7 |
|---|---|---|---|
| Architecture and cloud services concept, eGovernment-structure. Electronic communication and signature. IS life cycle and IT projects. Types of information systems and specific implementation in transport. Roles, processes, management, optimization in IS. Oracle data types. SQL Developer, SQL queries. Comprehensive example and web application programming. | | | |
| 20TAMS | Telecommunications and Local Area Networks | Z,ZK | 7 |
| Summary of the current state and introduction of the new trends in the development of telecommunication systems. The legal environment for the provision and use of telecommunication services is explained, basic telecommunication solutions in the hierarchical architecture of telecommunication networks are presented, and the links between the parameters of the parts and the performance of telecommunication systems. | | | |
| 20RIZE | Railway Traffic Management | Z,ZK | 7 |
| Historical development of security technology, external elements (switches, signals, detection means), station, track and crossing security equipment, existing train security equipment and ETCS, traffic control structure, traffic control technology, automation and traffic control optimization, power supply systems, energy calculations and train running dynamics. | | | |
| 20ELKA | 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. | | | |

Code of the group: 6S-BP-ITS-23/24
Name of the group: 6th Sem. Bachelor Full-Time TET-ITS from 2023/24
Requirement credits in the group: In this group you have to gain 23 credits
Requirement courses in the group: In this group you have to complete 4 courses
Credits in the group: 23
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** *Petr Bouchner, Stanislav Novotný **Stanislav Novotný** (Gar.)* | Z,ZK | 7 | 3P+3C | L | z |
| 20ATEL | **Applied Telematics** *Ji í R ži ka, Petr Bureš, Martin Langr, Pavel Hrubeš **Pavel Hrubeš** (Gar.)* | Z,ZK | 7 | 3P+3C | L | z |
| 20RISI | **Road Traffic Control** *Ji í R ži ka, Martin Langr, Vladimír Faltus, Tomáš Tichý **Tomáš Tichý** (Gar.)* | Z,ZK | 7 | 3P+3C | L | z |
| 20APEL | **Applied Electronics** *Vít Fábera, Tomáš Musil* | KZ | 2 | 0P+2C | L | z |

**Characteristics of the courses of this group of Study Plan: Code=6S-BP-ITS-23/24 Name=6th Sem. Bachelor Full-Time TET-ITS from 2023/24**

| 16SVIR | Vehicle Systems and Interaction with Driver | Z,ZK | 7 |
|---|---|---|---|

| Code | | | Z,ZK | 7 |
|---|---|---|---|---|

| 20ATEL | Applied Telematics | | Z,ZK | 7 |
|---|---|---|---|---|
| Transport telematics - definition, benefits, ITS legislation, ITS organizations, ITS architecture and its practical use, data structures and data, geographic information systems, toll systems, e-call, fleet management, check-in and information systems, ITS connection to Smart City, ITS applications on specific examples. | | | | |
| 20RISI | Road Traffic Control | | Z,ZK | 7 |
| Traffic node management - basic concepts, SSZ design criteria, SSZ production project, dynamic SSZ management, public transport preferences, traffic area management, microscopic traffic models, macroscopic traffic models, traffic management on motorways, tunnel systems. | | | | |
| 20APEL | 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). | | | | |

Name of the block: Semestrální projekt
Minimal number of credits of the block: 6
The role of the block: ZP

Code of the group: X1-BP-ITS-22/23
Name of the group: Research Groups Bachelor Full-Time TET-ITS from 2022/23
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 |
|---|---|---|---|---|---|---|
| 16X31S | **Project 1 ITS** <br> *Petr Bouchner, Milan Sliacky, Michal Cenkner* | Z | 2 | 0P+1C | L | ZP |
| 15X31S | **Project 1 ITS** | Z | 2 | 0P+1C | L | ZP |
| 14X31S | **Project 1 ITS** <br> *Tomáš Brandejský, Vít Fábera, Jana Kaliková, Jan Kr ál, Mária Jánešová* | Z | 2 | 0P+1C | L | ZP |
| 12X31S | **Project 1 ITS** | Z | 2 | 0P+1C | L | ZP |
| 11X31S | **Project 1 ITS** <br> *Jan P ikryl* **Jan P ikryl** *Jan P ikryl (Gar.)* | Z | 2 | 0P+1C | L | ZP |
| 23X31S | **Project 1 ITS** | Z | 2 | 0P+1C | L | ZP |
| 18X31S | **Project 1 ITS** | Z | 2 | 0P+1C | L | ZP |
| 20X31S | **Project 1 ITS** <br> *Ji í R ži ka, Patrik Horaž ovský, Milan Sliacky, Vladimír Faltus, Martin Leso, Ji í Brož* | Z | 2 | 0P+1C | L | ZP |
| 21X31S | **Project 1 ITS** | Z | 2 | 0P+1C | L | ZP |
| 22X31S | **Project 1 ITS** <br> *Michal Frydrýn, Tomáš Mi unek, Luboš Nouzovský, Tomáš Kohout, Zden k Svatý* **Luboš Nouzovský** | Z | 2 | 0P+1C | L | ZP |
| 17X31S | **Project 1 ITS** | Z | 2 | 0P+1C | L | ZP |
| 16X32S | **Project 2 ITS** <br> *Milan Sliacky, Josef Mík, Michal Cenkner, Tereza Kunclová* | Z | 2 | 0P+1C | Z | ZP |
| 15X32S | **Project 2 ITS** | Z | 2 | 0P+1C | Z | ZP |
| 14X32S | **Project 2 ITS** <br> *Jana Kaliková, Jan Kr ál, Zden k Lokaj, Martin Šrotý , Tomáš Zelinka* | Z | 2 | 0P+1C | Z | ZP |
| 12X32S | **Project 2 ITS** | Z | 2 | 0P+1C | Z | ZP |
| 11X32S | **Project 2 ITS** <br> *Evženie Uglickich, Pavla Pecherková, Michal Matowicki, Ivan Nagy, Jana Kuklová, Jan P ikryl, Ond ej P ibyl* **Jana Kuklová** *Jana Kuklová (Gar.)* | Z | 2 | 0P+1C | Z | ZP |
| 17X32S | **Project 2 ITS** | Z | 2 | 0P+1C | Z | ZP |
| 23X32S | **Project 2 ITS** | Z | 2 | 0P+1C | Z | ZP |
| 22X32S | **Project 2 ITS** | Z | 2 | 0P+1C | Z | ZP |
| 21X32S | **Project 2 ITS** | Z | 2 | 0P+1C | Z | ZP |
| 20X32S | **Project 2 ITS** <br> *Ji í R ži ka, Patrik Horaž ovský, Milan Sliacky, Martin Leso* | Z | 2 | 0P+1C | Z | ZP |
| 18X32S | **Project 2 ITS** | Z | 2 | 0P+1C | Z | ZP |
| 11X33S | **Project 3 ITS** <br> *Jan P ikryl* **Jan P ikryl** *Jan P ikryl (Gar.)* | Z | 2 | 0P+2C | L | ZP |
| 12X33S | **Project 3 ITS** | Z | 2 | 0P+2C | L | ZP |
| 14X33S | **Project 3 ITS** <br> *Jana Kaliková, Jan Kr ál, Zden k Lokaj, Martin Šrotý , Tomáš Zelinka* | Z | 2 | 0P+2C | L | ZP |
| 15X33S | **Project 3 ITS** | Z | 2 | 0P+2C | L | ZP |

| 16X33S | **Project 3 ITS**<br>*Milan Sliacky, Josef Mík, Michal Cenkner, Tereza Kunclová* | Z | 2 | 0P+2C | L | ZP |
|--------|----------------------------------------------------------------------------------|---|---|-------|---|----|
| 23X33S | **Project 3 ITS** | Z | 2 | 0P+2C | L | ZP |
| 21X33S | **Project 3 ITS** | KZ | 2 | 0P+2C | L | ZP |
| 20X33S | **Project 3 ITS** | Z | 2 | 0P+2C | L | ZP |
| 18X33S | **Project 3 ITS** | Z | 2 | 0P+2C | L | ZP |
| 17X33S | **Project 3 ITS** | Z | 2 | 0P+2C | L | ZP |
| 22X33S | **Project 3 ITS** | Z | 2 | 0P+2C | L | ZP |

**Characteristics of the courses of this group of Study Plan: Code=X1-BP-ITS-22/23 Name=Research Groups Bachelor Full-Time TET-ITS from 2022/23**

| 16X31S | Project 1 ITS | Z | 2 |
|--------|---------------|---|---|
| 15X31S | Project 1 ITS | Z | 2 |
| 14X31S | Project 1 ITS | Z | 2 |
| 12X31S | Project 1 ITS | Z | 2 |
| 11X31S | Project 1 ITS | Z | 2 |
| 23X31S | Project 1 ITS | Z | 2 |
| 18X31S | Project 1 ITS | Z | 2 |
| 20X31S | Project 1 ITS | Z | 2 |
| 21X31S | Project 1 ITS | Z | 2 |
| 22X31S | Project 1 ITS | Z | 2 |
| 17X31S | Project 1 ITS | Z | 2 |
| 16X32S | Project 2 ITS | Z | 2 |
| 15X32S | Project 2 ITS | Z | 2 |
| 14X32S | Project 2 ITS | Z | 2 |
| 12X32S | Project 2 ITS | Z | 2 |
| 11X32S | Project 2 ITS | Z | 2 |
| 17X32S | Project 2 ITS | Z | 2 |
| 23X32S | Project 2 ITS | Z | 2 |
| 22X32S | Project 2 ITS | Z | 2 |
| 21X32S | Project 2 ITS | Z | 2 |
| 20X32S | Project 2 ITS | Z | 2 |
| 18X32S | Project 2 ITS | Z | 2 |
| 11X33S | Project 3 ITS | Z | 2 |
| 12X33S | Project 3 ITS | Z | 2 |
| 14X33S | Project 3 ITS | Z | 2 |
| 15X33S | Project 3 ITS | Z | 2 |
| 16X33S | Project 3 ITS | Z | 2 |
| 23X33S | Project 3 ITS | Z | 2 |
| 21X33S | Project 3 ITS | Z | 2 |
| 20X33S | Project 3 ITS | Z | 2 |
| 18X33S | Project 3 ITS | Z | 2 |
| 17X33S | Project 3 ITS | Z | 2 |
| 22X33S | Project 3 ITS | Z | 2 |

Name of the block: Compulsory elective courses
Minimal number of credits of the block: 6
The role of the block: PV

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Code of the group: Y1-BP-ITS-24/25
Name of the group: Comp. Sel. Courses Bachelor Full-Time TET-ITS from 2024/25
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**<br>*(in case of groups of courses the list of codes of their members)*<br>*Tutors,* **authors** *and guarantors (gar.)* | Completion | Credits | Scope | Semester | Role |
|------|-----|-----|-----|-----|-----|-----|
| 21Y1AM | **Aeronautical Information Management (AIM)** | KZ | 2 | 2P+0C | Z | PV |
| 00Y1XB | **Active participation in a scientific project, workshop, short-term trip abroad** | KZ | 2 | 2P+0C | | PV |

| | | | | | | |
|---|---|---|---|---|---|---|
| | *Patrik Horaž ovský* **Patrik Horaž ovský** *Patrik Horaž ovský (Gar.)* | | | | | |
| 20Y1AF | **Alternative Forms of Transportation Project Financing**<br>*Mária Jánešová* **Mária Jánešová** | KZ | 2 | 2P+0C | Z | PV |
| 18Y1AM | **Anatomy, Mobility and Safety of Man** | KZ | 2 | 2P+0C | Z | PV |
| 14Y1AV | **Animation and Visualization** | KZ | 2 | 2P+0C | L | PV |
| 12Y1AE | **Applied Ecology**<br>*Martin Jacura, Kristýna Neubergová* | KZ | 2 | 2P+0C | Z | PV |
| 20Y1AE | **Applied Electronics** | KZ | 2 | 2P+0C | Z | PV |
| 14Y1BE | **Barrierless Transport**<br>*Jan Kr ál* | KZ | 2 | 2P+0C | L | PV |
| 15Y1BO | **Work Safety and Health Protection in Transportation**<br>*Petr Musil* | KZ | 2 | 2P+0C | L | PV |
| 11Y1BK | **Error Detection Codes for Interlocking Systems**<br>*Lucie Kárná* **Lucie Kárná** *Lucie Kárná (Gar.)* | KZ | 2 | 2P+0C | Z | PV |
| 21Y1BS | **Unmanned aircraft systems 1**<br>*Tomáš Tlu ho , Jakub Kraus, Michal erný* | KZ | 2 | 2P+0C | L | PV |
| 14Y1BM | **Biometric Methods** | KZ | 2 | 2P+0C | Z | PV |
| 15Y1DZ | **History of Railway**<br>*Eva Rezlerová, Martin Jacura* | KZ | 2 | 2P+0C | L | PV |
| 12Y1DS | **Project Documentation in Practice** | KZ | 2 | 2P+0C | Z | PV |
| 17Y1EV | **Public Sector Economy** | KZ | 2 | 2P+0C | Z | PV |
| 23Y1EH | **Electronics and hardware in security of transportation** | 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**<br>*Jan Feit* | KZ | 2 | 2P+0C | Z | PV |
| 18Y1EM | **Experimental Methods in Mechanics**<br>*Daniel Kytý* **Daniel Kytý** *Daniel Kytý (Gar.)* | KZ | 2 | 2P+0C | Z | PV |
| 15Y1FD | **French Area Studies and Transportation** | KZ | 2 | 2P+0C | L | PV |
| 14Y1HW | **Computer Hardware** | KZ | 2 | 2P+0C | L | PV |
| 15Y1HL | **History of Civil Aviation**<br>*Vladimír Plos* | KZ | 2 | 2P+0C | L | PV |
| 15Y1HD | **History of City Mass Transport**<br>*Milan Dont* | KZ | 2 | 2P+0C | Z | PV |
| 12Y1HD | **Traffic Noise**<br>*Dagmar Ko árková, Libor Ládyš* | KZ | 2 | 2P+0C | L | PV |
| 15Y1HE | **Work Hygiene and Ergonomics in Traffic**<br>*Petr Musil* | KZ | 2 | 2P+0C | Z | PV |
| 16Y1IS | **Interactive simulators and simulations** | KZ | 2 | 2P+0C | L | PV |
| 12Y1KN | **Combined Transportation**<br>*Petr Nejedlý* | KZ | 2 | 2P+0C | Z | PV |
| 12Y1KP | **Communication and Promotion of Transport Projects**<br>*Dagmar Ko árková, Ond ej Kubala* | KZ | 2 | 2P+0C | L | PV |
| 20Y1KP | **Communication and presentation skills**<br>*Ji í R ži ka, Patrik Horaž ovský, Kristýna Navrátilová, Eva Haj iarová* **Ji í R ži ka** | KZ | 2 | 2P+0C | Z | PV |
| 23Y1KM | **Crisis Management** | KZ | 2 | 2P+0C | Z | PV |
| 23Y1KO | **Quantum Physics and Optoelectronics** | KZ | 2 | 2P+0C | L | PV |
| 23Y1KY | **Cybernality** | KZ | 2 | 2P+0C | L | PV |
| 23Y1KB | **Cyber security in transportation** | KZ | 2 | 2P+0C | L | PV |
| 21Y1LJ | **Aeronautical Radio and Flight Instruments** | KZ | 2 | 2P+0C | L | PV |
| 21Y1LS | **Air Traffic Services** | KZ | 2 | 2P+0C | L | PV |
| 17Y1LL | **Logistics of Passenger and Freight Air Transport**<br>*Petra Skolilová Petra Skolilová (Gar.)* | KZ | 2 | 2P+0C | L | PV |
| 20Y1LN | **Location and Navigation**<br>*Petr Bureš* | KZ | 2 | 2P+0C | L | PV |
| 23Y1MK | **Crisis Situation Management in Critical Infrastructure** | KZ | 2 | 2P+0C | L | PV |
| 23Y1MU | **Emergency Events Management Solution in Transport Infrastructure** | KZ | 2 | 2P+0C | Z | PV |
| 17Y1MD | **Marketing in Transportation** | KZ | 2 | 2P+0C | Z | PV |
| 18Y1MT | **Engineering Materials**<br>*Jaroslav Valach* **Jaroslav Valach** *Jaroslav Valach (Gar.)* | KZ | 2 | 2P+0C | L | PV |
| 21Y1MP | **Matlab for project-oriented study**<br>*Lenka Hanáková, Vladimír Socha* **Vladimír Socha** | 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**<br>*Marie Michlová* | KZ | 2 | 2P+0C | L | PV |
|---|---|---|---|---|---|---|
| 15Y1NE | **German in the Economy and Society**<br>*Eva Rezlerová* | KZ | 2 | 2P+0C | Z | PV |
| 21Y1OH | **Airline Business and Operations**<br>*Peter Olexa, Eva Endrizalová* **Peter Olexa** | 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**<br>*Patrik Horaž ovský, Milan Sliacky Milan Sliacky (Gar.)* | KZ | 2 | 2P+0C | L | PV |
| 14Y1OJ | **Object - oriented programming in JAVA** | KZ | 2 | 2P+0C | L | PV |
| 14Y1OP | **Operating System** | KZ | 2 | 2P+0C | Z | PV |
| 17Y1OF | **Personal Finance** | KZ | 2 | 2P+0C | Z | PV |
| 20Y1OK | **Road Lighting**<br>*František Kekula* | KZ | 2 | 2P+0C | L | PV |
| 11Y1PV | **Parametrical and Multicriterial Programming**<br>*Olga Vraštilová* **Olga Vraštilová** *Olga Vraštilová (Gar.)* | KZ | 2 | 2P+0C | Z | PV |
| 17Y1PM | **Personnel Management** | KZ | 2 | 2P+0C | L | PV |
| 12Y1PC | **Pedestrian and Cycling Transport**<br>*Denis Liutov* | KZ | 2 | 2P+0C | L | 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**<br>*Petr Zlámal* **Petr Zlámal** *Petr Zlámal (Gar.)* | 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 |
| 21Y1PC | **ATC Procedures and Activities**<br>*Terézia Pilmannová* **Terézia Pilmannová** | KZ | 2 | 2P+0C | Z | PV |
| 12Y1PD | **Assessment of Transport Structures** | KZ | 2 | 2P+0C | Z | PV |
| 20Y1PK | **Product Quality Management Processes**<br>*Martin Leso* **Martin Leso** | KZ | 2 | 2P+0C | Z | PV |
| 14Y1PJ | **C Programming Language** | KZ | 2 | 2P+0C | Z | PV |
| 12Y1C1 | **Designing Roads in Civil 3D I**<br>*Tomáš Honc* | KZ | 2 | 2P+0C | L | PV |
| 12Y1C2 | **Designing Roads in Civil 3D II**<br>*Tomáš Honc* | 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 |
| 12Y1RU | **Railway Lines Reconstruction** | KZ | 2 | 2P+0C | Z | PV |
| 16Y1RE | **Control and Electronic Vehicle Systems**<br>*Josef Mík, P emysl Toman* | KZ | 2 | 2P+0C | Z | PV |
| 21Y1RZ | **Human Resources Management** | KZ | 2 | 2P+0C | L | PV |
| 17Y1ST | **Titan Simulation** | KZ | 2 | 2P+0C | L | PV |
| 21Y1SI | **ATC Simulator**<br>*Terézia Pilmannová* | 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 |
| 16Y1KS | **Quality and Reliability of Vehicles**<br>*Jan Leistner, Filip Kotas, Jaroslav Machan, David Lehet* | KZ | 2 | 2P+0C | Z | PV |
| 12Y1SU | **Road Management and Maintenance**<br>*Dagmar Ko árková, Otakar Vacín* | KZ | 2 | 2P+0C | L | PV |
| 16Y1SO | **Strategy and innovation in mobility** | KZ | 2 | 2P+0C | Z | PV |
| 17Y1SK | **Urban and Regional Rail Transport Systems**<br>*Ji í Pospíšil Ji í Pospíšil (Gar.)* | KZ | 2 | 2P+0C | L | PV |
| 11Y1TG | **Graph Theory**<br>*Lucie Kárná* **Lucie Kárná** *Lucie Kárná (Gar.)* | KZ | 2 | 2P+0C | L | PV |
| 23Y1TP | **Criminal Law in IT and Transportation** | KZ | 2 | 2P+0C | Z | PV |
| 14Y1TI | **Creating Interactive Internet Applications** | KZ | 2 | 2P+0C | L | PV |
| 21Y1UL | **Aircraft Maintenance**<br>*Tomáš T ma* | KZ | 2 | 2P+0C | L | PV |
| 14Y1UP | **Editing of Theses in MS Word** | KZ | 2 | 2P+0C | L | PV |
| 18Y1UK | **Introduction of Rail Vehicles**<br>*Jitka ezní ková, Josef Kolá , Josef Kolá* **Josef Kolá** *Josef Kolá (Gar.)* | KZ | 2 | 2P+0C | L | PV |

| Code | Course | | | | | |
|------|--------|----|----|-------|---|----|
| 12Y1VR | **Public Transport in Cities and Regions**<br>*Vladimír Pušman* | KZ | 2 | 2P+0C | Z | PV |
| 23Y1VS | **Negotiation and Cooperation** | KZ | 2 | 2P+0C | Z | PV |
| 14Y1VM | **Development of Applications for Mobile Devices** | KZ | 2 | 2P+0C | Z | PV |
| 16Y1VT | **Development in Railroad Vehicles** | KZ | 2 | 2P+0C | L | PV |
| 14Y1WG | **Webdesign** | KZ | 2 | 2P+0C | Z | PV |
| 14Y1W1 | **Webdesign 1** | KZ | 2 | 2P+0C | Z | PV |
| 14Y1W2 | **Webdesign 2** | KZ | 2 | 2P+0C | L | PV |
| 16Y1ZG | **Introduction into Applied Computer Graphics** | KZ | 2 | 2P+0C | L | PV |
| 14Y1ZM | **Fundamentals of parametric and adaptive modeling** | KZ | 2 | 2P+0C | L | PV |
| 11Y1ZM | **Foundation of MATLAB Programming**<br>*Šárka Vorá ová* **Šárka Vorá ová** *Šárka Vorá ová (Gar.)* | KZ | 2 | 2P+0C | L | PV |
| 14Y1ZJ | **Fundamentals of programming in JAVA** | KZ | 2 | 2P+0C | Z | PV |
| 12Y1ZU | **Principles of Urbanism**<br>*Karel Hájek* | KZ | 2 | 2P+0C | Z | PV |
| 15Y1ZV | **East-West dichotomy: Prelude to the Cold War**<br>*Marie Michlová* | KZ | 2 | 2P+0C | Z | PV |
| 16Y1ZL | **Vehicle Testing, Legislation and Construction**<br>*Zuzana Radová, Josef Mík* | KZ | 2 | 2P+0C | Z | PV |

**Characteristics of the courses of this group of Study Plan: Code=Y1-BP-ITS-24/25 Name=Comp. Sel. Courses Bachelor Full-Time TET-ITS from 2024/25**

| Code | Course | | |
|------|--------|----|----|
| 21Y1AM | Aeronautical Information Management (AIM) | KZ | 2 |
| | Definition and basic overview of AIS and AIM. Transition from AIS to AIM. Regulatory base. Provision of AIS/AIM in the Czech Rep. AIP (Aeronautical Inf. Publication). VFR Manual of the Czech Rep. AIRAC System. NOTAM messages.PIB (Pre-flight Informtion Bulletin). AIC (Aeronautical Inf. Circulars). Aeronautical Charts. EAD (Europena AIS Database). QMS (Quality Mng. System). ADQ (Aeronautical Data Quality). AIXM (Aeronautical Inf. Exchnage Format). | | |
| 00Y1XB | Active participation in a scientific project, workshop, short-term trip abroad | KZ | 2 |
| 20Y1AF | Alternative Forms of Transportation Project Financing | KZ | 2 |
| | In will be specifed such forms of financing in transportation and telecomunications, 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 telecomunication projects. | | |
| 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. | | |
| 14Y1AV | Animation and Visualization | KZ | 2 |
| | Advanced modifications and modeling of NURBS, Patch objects, selection of objects (according to filter and properties). 3D Studio MAX systems and Space Warp objects. Atmospheric and other effects, rendering filters, Motion blur, advanced animations, Motion panel. Modeling for morphing and animation, bone formation, animation using Inverse Kinematics. | | |
| 12Y1AE | Applied Ecology | KZ | 2 |
| | General ecology - ecological concepts and principles, ecosystem, ecological factors, energy flow through the ecosystem. Application of knowledge within EIA documentation. Special ecology. Landscape ecology - origin and historical development. Landscape definition and classification. Success. Traffic constructions in the countryside. Landscape and nature protection. Applied ecology. | | |
| 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). | | |
| 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. | | |
| 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. | | |
| 11Y1BK | Error Detection Codes for Interlocking Systems | KZ | 2 |
| | Safe communication and methods for its assuring. Safety codes linear codes, cyclic codes, BCH codes, Reed-Solomon codes. Transmission channels, detection of transmission errors, probability of undetected error. Design and assessment of detection codes; requirements of the European standard EN 50159. | | |
| 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. | | |
| 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. | | |
| 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. | | |
| 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. | | |

| 17Y1EV | Public Sector Economy | KZ | 2 |
|---|---|---|---|
| Economic and financial theory of public sector, public choice theory, externalites, decisions about public finance allocation, economic assesment of public projects (CBA, MCA, CEA), tax system of the CR, state budget, management of public projects a their economic efficiency assessment, way of elaboration of PPP projects, funding from EU funds, program HDM-4. ||||
| 23Y1EH | Electronics and hardware in security of transportation | KZ | 2 |
| Types and parameters of signals. Passive circuits, properties, basic measurements. Passive filters, semiconductors. Operational amplifiers, basic circuits, parameters. Active filters. Power supplies. Logic circuits. AD converters. Connection of analog and digital parts. Basic blocks of digital signal processing. Measurement processing. Design and fabrication methods in electronics. ||||
| 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. ||||
| 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, nacism, 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. ||||
| 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 |
| Computer architecture, basics of logical circuits design and their realization using FPGA. In detail, description of computer architecture and separate parts designing - controllers, arithmetic and logical units, I/O subsystem. ||||
| 15Y1HL | History of Civil Aviation | KZ | 2 |
| Beginnings of flying, development of aircrafts lighter than air. Beginnings of aircrafts heavier than air. Czechoslovak aviation pioneers. Development of airports in the Czech Republic. World airports. Famous aviators. Helicopters. CSA airplanes. Development of aircrafts in Czechoslovakia between the years 1945-1989. Classic era of aviation. Golden era of civil aviation. Modern era of civil aviation. Airline companies. Supersonic flying. ||||
| 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 simulators and simulations | KZ | 2 |
| Simulation theory and application of computing equipment. Creating computing models. Mechanical and dynamic systems and their mathematical models. Computing methods. Simulation of vehicle dynamics, on-land carriage in particular. Virtual reality systems. Practical exercise with simulation software and interactive simulators. ||||
| 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. ||||
| 12Y1KP | Communication and Promotion of Transport Projects | KZ | 2 |
| Fundamentals of Public Relations and the power of public opinion. Work and tasks of PR department and press spokesperson. Communication with the media, the public on social networks and beyond. Communication strategy of transport projects. Systematic goodwill building. Crisis situations in communication and preparation for crisis communication. The influence of political marketing and political PR on transport projects. Lobbing. ||||
| 20Y1KP | Communication and presentation skills | KZ | 2 |
| Motivation, priorities and their fulfillment, current communication networks, work with various sources, formal requirements of emails and final theses, basic typology of personalities, teamwork, emotional intelligence, manipulation and way of working with it, coping with stressful situations, formal requirements of presentations, ways of communication during presentation, presentation skills, presentation skills in online environment. ||||
| 23Y1KM | Crisis Management | KZ | 2 |
| Theory and legal frame of crisis management with direction to Rescue system (IZS). After introduction to safety domain, there are terms and knowledge on: theory and position of crisis management and its targets; IZS-crisis management-crisis planning; and basic legislation. Practical part is concentrated to responsibility matrix compilation. ||||
| 23Y1KO | Quantum Physics and Optoelectronics | KZ | 2 |
| Ground of quantum physics. Application of quantum physics in practice. Optoelectronics. Production of optoelectronics components. ||||
| 23Y1KY | Cybernality | KZ | 2 |
| Juridical aspects of behavior on the computer network and computer systems. Cybernetic crime technology. Theory basis and models. Cyberterrorism. Infoware and connected aspects. ||||
| 23Y1KB | Cyber security in transportation | KZ | 2 |
| Basic concepts of security and cyber security, legal status in the field of cyber security, virtual cyberspace and communities, taxonomy of crimes in cyberspace, social impacts, social engineering, cyber attack technology, information security, cyber attacks on telematics systems, security of systems with artificial intelligence, norms and standards. ||||
| 21Y1LJ | Aeronautical Radio and Flight Instruments | KZ | 2 |
| Basic definitions, history of aircraft instrumentation, aerometric instrumentation, Earth magnetism, aircraft electric equipment, gyroscopic instrumentation, airframe instrumentation and other aircraft equipment, engine instrumentation, warning and recording systems, instrumentation operational requirements, radiocommunication and radionavigation. ||||

| 21Y1LS | Air Traffic Services | | KZ | 2 |
|---|---|---|---|---|
| Airspace structure in Czech Republic and other countries. Introduction and description of ATS units in Czech Republic. Practical examples of TWR, APP a ACC control. History of ATS at USA and Czechoslovakia. ATS - Model of financing. Training System of Air Traffic Controllers. Future development of ATS. | | | | |
| 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. | | | | |
| 23Y1MK | Crisis Situation Management in Critical Infrastructure | | KZ | 2 |
| Determination of critical infrastructte elements on all levels, their protection systems, responsibilities of particular agencies of the state administration and the self-government, and their responsibilities to anounce particular safety provisions. Physical and cyber protection of critical infrastructure with special attention to the soft targets. | | | | |
| 23Y1MU | Emergency Events Management Solution in Transport Infrastructure | | KZ | 2 |
| Basic solutions of emergency events with emphasis of the transport infrastructure events and their solution management. Knowledge in the emergency planning and special procedures in liquidation work within the transport infrastructure. | | | | |
| 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. | | | | |
| 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. | | | | |
| 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. | | | | |
| 21Y1OH | Airline Business and Operations | | KZ | 2 |
| The course provides a comprehensive view of the commercial, operational and transportation activities of air transport companies. It focuses on the organizational structure of companies, various aspects of their strategy, economic and operational indicators. It introduces students in detail to operational processes and the essentials of transportation processes. It provides a basic view of the economic aspects of air transport. | | | | |
| 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). | | | | |
| 14Y1OJ | Object - oriented programming in JAVA | | KZ | 2 |
| Objective thinking. Encapsulation. Classes. Attributes. Access modifiers. Methods and overloading. Special methods (constructors, getters / setters ...). Basic object methods. Reference data types. Inheritance. Polymorphism. Statics, constants, interfaces, abstract classes, enum, packages, exceptions, collections, generics, lambda expressions, anonymous functions. | | | | |
| 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 processess. 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). | | | | |
| 20Y1OK | Road Lighting | | KZ | 2 |
| Basic lighting quantities and terms, street lighting components (luminaires, control cabinets for street lighting, street lighting cables), characteristics of luminaires (lifetime of light sources, light distribution), standards, measurement of illuminance and luminance in road lighting, tunnels, conceptual approach to street lighting design, lighting calculations in DIALux and Relux, street lighting control systems. | | | | |
| 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 coeficients 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. | | | | |
| 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. | | | | |
| 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 tools 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. |
| 14Y1PI | Corporate Information System | KZ | 2 |
| Data-information-knowledge, components of information system, syntatic 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. |
| 21Y1PC | ATC Procedures and Activities | KZ | 2 |
| Air traffic control procedures, basics of communication and phraseology, aircraft identification, spacing and traffic coordination. In addition, the course discusses air traffic control at the airports and low visibility operational procedures. Students will during the course learn basic safety management applications applied across the infrastructure. |
| 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. |
| 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, pointes, dynamical memory allocation, string, files, structures and unions. Implementations of abstract data types (FIFO, LIFO, list), programming techniques (sorting, searching, recursion), using bitwise oprerators. |
| 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. |
| 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. |
| 12Y1RU | Railway Lines Reconstruction | KZ | 2 |
| Keeping railway line operational, maintaining lines and stations, geometrical alignment of railway line, vehicles for railway superstructure and substructure maintenance, scheduling and organising possesions, preparation of railway lines reconstruction and maintenance, process of ralway line reconstruction. |
| 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. |
| 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. |
| 21Y1SI | ATC Simulator | KZ | 2 |
| Familiarization with the simulation environment, acquiring basic habits, aircraft identification procedures, vectoring, level changes, ATC clearance, use of RNAV points. Practical exercises focusing on basic vectoring, early application of vertical separation, EST and REV message passing. Practical exercises in the APPROACH area, practicing arrival and departure management procedures, conflict resolution. |
| 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 usuage. |

| 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, Manufacturying, 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. | | | |
| 16Y1SO | Strategy and innovation in mobility | KZ | 2 |
| Introduction to innovation, definition. Innovation strategy. Innovation life cycle and ecosystem, main sources and funding opportunities. Successful innovation project, KPIs, budget; co-financing, evaluation. Sprint method and its use. Innovative business model - main patterns and examples, design, strategy, processes and outlook (business plan and possibilities of use). Creating an innovation strategy. Customer and value map, design and testing. | | | |
| 17Y1SK | Urban and Regional Rail Transport Systems | KZ | 2 |
| Factors affecting transport demand, modal-split, distribution of passenger flows on public regional transport lines. Optimization of line management, line networking. Creating and evaluation of the timetable. Vehicle circulation creation. Optimizing driver shifts and arranging them in turnus. Effects of barrier-free and public transport preferences. The role of marketing. | | | |
| 11Y1TG | Graph Theory | KZ | 2 |
| Basic concepts and terminology of graph theory, graph representation. Problems of graph theory, problem instance. Graph search algorithms, trees, minimum spanning tree, shortest path problem, Eulerian path, bipartite graph matching, flow networks, circulations, critical path method, traveling salesman problem. Problem of existence and optimization and algorithms for their solving. Computational complexity, dealing with NP-complete problems, heuristic approach. | | | |
| 23Y1TP | Criminal Law in IT and Transportation | KZ | 2 |
| Introduction of criminal law into legal order, conception of culpability and criminal delict, consequency of other legal standards. international treaty and criminal law, investigation of crime, specific indicia of criminal court cases, practical examples. | | | |
| 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. | | | |
| 21Y1UL | Aircraft Maintenance | KZ | 2 |
| Aircraft operations and technical operations. Maintenance and work processes. Defects search methods, status check diagnostic tools. Selection and qualification of aviation personnel. Basic documentation for maintenance. Optimization of time maintenance intervals. Regulation no. 1321/2014 Part 145. Human factors of aircraft maintenance. Regulation of director EASA for aircraft maintenance. Seminars will be focused on practical application. | | | |
| 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. | | | |
| 12Y1VR | Public Transport in Cities and Regions | KZ | 2 |
| Professional and political pillars of public transport. Accessibility of public transport. Transport demand management and directional coordination of lines. Principles of line tracing. Basic operating parameters and transport variations. Types of lines according to their routing and basic operating parameters. Time coordination of lines. Operational traffic control. Organization of tram operation in Prague. Tram safety. | | | |
| 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. | | | |
| 14Y1WG | Webdesign | KZ | 2 |
| Students will learn the basics of HTTP communication, URL and addressing, HTML5 markup language, advanced CSS3 techniques, accessible and usable web rules, responsive webdesign, content management systems, web server installation + configuration directives. The subject matter will be trained on examples. | | | |
| 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. | | | |
| 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. | | | |
| 14Y1ZM | Fundamentals of parametric and adaptive modeling | 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. | | | |

| 14Y1ZJ | Fundamentals of programming in JAVA | KZ | 2 |
|---|---|---|---|

Introduction to the Java SE Platform. IDE Installation and First Project. Comments. Variables and Type System. Operators. User Input and Parsing. Chain and Chain Conversion. Text Chain and Mathematical Methods. Terms. Relational Operators and Switches. Cycles for, while, foreach. Field - declaration, initialization, methods for field work. ASCII. Functions, parameters, return value, recursion. Program creation.

| 12Y1ZU | Principles of Urbanism | KZ | 2 |
|---|---|---|---|

Survey on history of city and settlement building. Functional components and their mutual relations (working, living, recreation, transportation). Spacial 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.

| 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.

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Name of the block: Elective courses
Minimal number of credits of the block: 0
The role of the block: V

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Code of the group: VP-BP-TET-20/21
Name of the group: Bachelor Full-Time TET voluntary
Requirement credits in the group:
Requirement courses in the group:
Credits in the group: 0
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 |
|---|---|---|---|---|---|---|
| 14DPK | **Digital Support for Designing of Roads and Highways** *Libor Žídek, Drahomír Schmidt **Drahomír Schmidt** Drahomír Schmidt (Gar.)* | Z | 0 | 0P+2C | Z | V |
| 14DZT | **Digital Support for Railway Lines** *Martin Brumovský **Martin Brumovský** Martin Brumovský (Gar.)* | Z | 0 | 0P+2C | L | V |
| 11SCFZ | **Seminar of Physics** *Old ich Hykš, Jana Kuklová, Zuzana Malá, Tomáš Vít **Zuzana Malá** Zuzana Malá (Gar.)* | Z | 0 | 0P+2C | Z | V |
| 21SLD | **Seminar of Air Transport** *Jakub Kraus, Vladimír Plos, Natalia Guskova **Vladimír Plos*** | Z | 0 | 0P+2C | L | V |
| 18SPP | **Seminary from Elasticity and Strength** *Jan Vy ichl, Tomáš Doktor **Jan Vy ichl** Jan Vy ichl (Gar.)* | Z | 0 | 0P+2C | Z | V |
| 18STD | **Seminary from Technical Documentation** | Z | 0 | 0P+2C | Z | V |
| 18SS | **Seminary from Structural Analysis** *Jan Vy ichl* | Z | 0 | 0P+2C | L | V |
| 11SSF | **Secondary School Physics Course** *Zuzana Malá **Zuzana Malá** Zuzana Malá (Gar.)* | Z | 0 | 0P+2C | L | V |
| TVKLV | **Physical Education Course** | Z | 0 | 7dní | L | V |
| TVKZV | **Physical Education Course** | Z | 0 | 7dní | Z | V |

**Characteristics of the courses of this group of Study Plan: Code=VP-BP-TET-20/21 Name=Bachelor Full-Time TET voluntary**

| 14DPK | Digital Support for Designing of Roads and Highways | Z | 0 |
|---|---|---|---|

Seminars possibilities of technical processing problems focused on designing of roads and highways.

| 14DZT | Digital Support for Railway Lines | Z | 0 |
|---|---|---|---|

Seminars possibilities of technical processing problems solved in the field of railway lines.

| 11SCFZ | Seminar of Physics | Z | 0 |
|---|---|---|---|

Solving problems on kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics.

| 21SLD | Seminar of Air Transport | Z | 0 |
|---|---|---|---|

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.

| 18SPP | Seminary from Elasticity and Strength | Z | 0 |
|---|---|---|---|

Excersise for practice. Tension and compression. Bending of beam. Shear stress during bending of beam. Design and analysis of cross section of beam. Analysis of deflection curve of beam. Torsion of circle cross section. Combined loading. Stability of compressed bar and buckling.

| 18STD | Seminary from Technical Documentation | Z | 0 |
|---|---|---|---|

Technical standards, international standardization, technical drawings, representation of technical objects, technical diagrams and charts, dimensional and geometrical accuracy, arrangement of drawing sheets.

| 18SS | Seminary from Structural Analysis | Z | 0 |
|---|---|---|---|

Examples for practise. General system of forces. Reactions of mass objects and compound systems. Internal forces on statically determinate beam and simple framework. Application of principle of virtual works for calculation of reactions of staticaly determinate systems. Determination of axial forces in truss construction - method of joints and method of sections. Geometry of cross sections. Plane fiber polygons.

| 11SSF | Secondary School Physics Course | Z | 0 |
|---|---|---|---|
| Basics of kinematics, dynamics, thermodynamics, electric field and magnetic field. | | | |
| TVKLV | Physical Education Course | Z | 0 |
| TVKZV | Physical Education Course | Z | 0 |

Code of the group: VP-BP-TET-ITS

Name of the group: Bachelor Full-Time TET-ITS voluntary

Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0

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 |
|---|---|---|---|---|---|---|
| 11SEMO | **Seminar of Electromagnetic Field and Optics** *Old ich Hykš, Zuzana Malá, Tomáš Vít* **Zuzana Malá** *Zuzana Malá (Gar.)* | Z | 0 | 0P+2C | L | v |

**Characteristics of the courses of this group of Study Plan: Code=VP-BP-TET-ITS Name=Bachelor Full-Time TET-ITS voluntary**

| 11SEMO | Seminar of Electromagnetic Field and Optics | Z | 0 |
|---|---|---|---|
| Solving problems on electric and magnetic field, electromagnetic field, optics and basics of solid-state physics. | | | |

# List of courses of this pass:

| Code | Name of the course | Completion | Credits |
|---|---|---|---|
| 00Y1XB | Active participation in a scientific project, workshop, short-term trip abroad | KZ | 2 |
| 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. Indefinite integral, Newton integral, Riemann integral, improper Riemann integral. First-order differential equations, linear differential equations. | | | |
| 11CAL2 | Calculus 2 | Z,ZK | 5 |
| Linear differential equations and their systems, differential calculus of functions of several real variables. Riemann integral in Rn. Line and surface integrals. | | | |
| 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, dynamics, Newton's laws, force fields, mechanics of continuum, thermodynamics, introduction to electrostatics and electric current. | | | |
| 11GIE | Geometry | KZ | 3 |
| Differential geometry of curves - parameterization, the 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 |
| Mathematical modeling. The system and its mathematical description. Types of signals. Basic system responses. Convolution. State models. Principle of general / stationary / linear state description. Data measurement. Uncertainty in measured data. Data normalization. Preparation of data for further processing. Linear state model over noisy data. Kalman filter condition estimation. Statistical learning methods. Regression, classification. | | | |
| 11SCFZ | Seminar of Physics | Z | 0 |
| Solving problems on kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics. | | | |
| 11SEMO | Seminar of Electromagnetic Field and Optics | Z | 0 |
| Solving problems on electric and magnetic field, electromagnetic field, optics and basics of solid-state physics. | | | |
| 11SSF | Secondary School Physics Course | Z | 0 |
| Basics of kinematics, dynamics, thermodynamics, electric field and magnetic field. | | | |
| 11STAT | Statistics | Z,ZK | 4 |
| Basics of probability Descriptive statistics Population and sample, limit theorem Point estimate, construction and properties Interval estimates Parametric tests Nonparametric tests Regression and correlation analysis | | | |
| 11TGA | 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. | | | |
| 11X31S | Project 1 ITS | Z | 2 |
| 11X32S | Project 2 ITS | Z | 2 |
| 11X33S | Project 3 ITS | Z | 2 |
| 11Y1BK | Error Detection Codes for Interlocking Systems | KZ | 2 |
| Safe communication and methods for its assuring. Safety codes linear codes, cyclic codes, BCH codes, Reed-Solomon codes. Transmission channels, detection of transmission errors, probability of undetected error. Design and assessment of detection codes; requirements of the European standard EN 50159. | | | |

| Code | Course | Exam | Credits |
|---|---|---|---|
| 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 coeficients 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 usuage. | | | |
| 11Y1TG | Graph Theory | KZ | 2 |
| Basic concepts and terminology of graph theory, graph representation. Problems of graph theory, problem instance. Graph search algorithms, trees, minimum spanning tree, shortest path problem, Eulerian path, bipartite graph matching, flow networks, circulations, critical path method, traveling salesman problem. Problem of existence and optimization and algorithms for their solving. Computational complexity, dealing with NP-complete 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. | | | |
| 12X31S | Project 1 ITS | Z | 2 |
| 12X32S | Project 2 ITS | Z | 2 |
| 12X33S | Project 3 ITS | Z | 2 |
| 12Y1AE | Applied Ecology | KZ | 2 |
| General ecology - ecological concepts and principles, ecosystem, ecological factors, energy flow through the ecosystem. Application of knowledge within EIA documentation. Special ecology. Landscape ecology - origin and historical development. Landscape definition and classification. Success. Traffic constructions in the countryside. Landscape and nature protection. Applied ecology. | | | |
| 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, 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. | | | |
| 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. | | | |
| 12Y1KP | Communication and Promotion of Transport Projects | KZ | 2 |
| Fundamentals of Public Relations and the power of public opinion. Work and tasks of PR department and press spokesperson. Communication with the media, the public on social networks and beyond. Communication strategy of transport projects. Systematic goodwill building. Crisis situations in communication and preparation for crisis communication. The influence of political marketing and political PR on transport projects. Lobbing. | | | |
| 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. | | | |
| 12Y1RU | Railway Lines Reconstruction | KZ | 2 |
| Keeping railway line operational, maintaining lines and stations, geometrical alignment of railway line, vehicles for railway superstructure and substructure maintenance, scheduling and organising possesions, preparation of railway lines reconstruction and maintenance, process of ralway line reconstruction. | | | |
| 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. | | | |
| 12Y1VR | Public Transport in Cities and Regions | KZ | 2 |
| Professional and political pillars of public transport. Accessibility of public transport. Transport demand management and directional coordination of lines. Principles of line tracing. Basic operating parameters and transport variations. Types of lines according to their routing and basic operating parameters. Time coordination of lines. Operational traffic control. Organization of tram operation in Prague. Tram safety. | | | |

| Code | Name | | Type | Credits |
|------|------|---|------|---------|
| 12Y1ZU | Principles of Urbanism | | KZ | 2 |
| Survey on history of city and settlement building. Functional components and their mutual relations (working, living, recreation, transportation). Spacial 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. | | | | |
| 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 openen loop and control in closed loop, reactive systems, control using finite state machines. Dynamic system identification. Measurement of basic electric and other physical quantities, principles of measurement instruments, DC and AC measurement, actuators, measurement automation, measurement laboratories. | | | | |
| 14ASD | Algorithm and Data Structures | | KZ | 3 |
| Students will analyze problems, design a theoretical solution to a given problem and write the resulting algorithm using flowcharts, practice reading algorithms written using flowcharts, and use basic Boolean algebra to construct constraints in algorithms. Students will be introduced to the basics of the Python programming language - variable, branching, loops, they will learn to work with variables of basic data types (integer, floating point and string) and the list data structure in their programs. | | | | |
| 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. | | | | |
| 14DPK | Digital Support for Designing of Roads and Highways | | Z | 0 |
| Seminars possibilities of technical processing problems focused on designing of roads and highways. | | | | |
| 14DZT | Digital Support for Railway Lines | | Z | 0 |
| Seminars possibilities of technical processing problems solved in the field of railway lines. | | | | |
| 14ISYD | Information Systems in Transportation | | Z,ZK | 7 |
| Architecture and cloud services concept, eGovernment-structure. Electronic communication and signature. IS life cycle and IT projects. Types of information systems and specific implementation in transport. Roles, processes, management, optimization in IS. Oracle data types. SQL Developer, SQL queries. Comprehensive example and web application programming. | | | | |
| 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 possibilites, AutoCAD environment profiles, drawings with raster foundaments). | | | | |
| 14PRG | Programming | | KZ | 2 |
| The Course Programming builds on and fully extends the course 14ASD (Algorithmization and Data Structures). The knowledge of the Python programming language is expanded here so that the participant gains skills and can apply them to solve various follow-up tasks. Main topics: lists, multidimensional arrays, sorting and searching, tuples, sets, dictionaries, working with date and time, regular expressions, functions and procedures, working with files (CSV, JSON, XML). | | | | |
| 14X31S | Project 1 ITS | | Z | 2 |
| 14X32S | Project 2 ITS | | Z | 2 |
| 14X33S | Project 3 ITS | | Z | 2 |
| 14Y1AV | Animation and Visualization | | KZ | 2 |
| Advanced modifications and modeling of NURBS, Patch objects, selection of objects (according to filter and properties). 3D Studio MAX systems and Space Warp objects. Atmospheric and other effects, rendering filters, Motion blur, advanced animations, Motion panel. Modeling for morphing and animation, bone formation, animation using Inverse Kinematics. | | | | |
| 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 |
| Computer architecture, basics of logical circuits design and their realization using FPGA. In detail, description of computer architecture and separate parts designing - controllers, arithmetic and logical units, I/O subsystem. | | | | |
| 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. | | | | |
| 14Y1OJ | Object - oriented programming in JAVA | | KZ | 2 |
| Objective thinking. Encapsulation. Classes. Attributes. Access modifiers. Methods and overloading. Special methods (constructors, getters / setters ...). Basic object methods. Reference data types. Inheritance. Polymorphism. Statics, constants, interfaces, abstract classes, enum, packages, exceptions, collections, generics, lambda expressions, anonymous functions. | | | | |
| 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 processess. 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 cummunication projecting (clotoidic 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, syntatic 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. | | | |
| 14Y1PJ | C Programming Language | KZ | 2 |
| C programming language. Preprocessor, basics of the C language (data types, syntax, commands), functions, pointes, dynamical memory allocation, string, files, structures and unions. Implementations of abstract data types (FIFO, LIFO, list), programming techniques (sorting, searching, recursion), using bitwise oprerators. | | | |
| 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. | | | |
| 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. | | | |
| 14Y1WG | Webdesign | KZ | 2 |
| Students will learn the basics of HTTP communication, URL and addressing, HTML5 markup language, advanced CSS3 techniques, accessible and usable web rules, responsive webdesign, content management systems, web server installation + configuration directives. The subject matter will be trained on examples. | | | |
| 14Y1ZJ | Fundamentals of programming in JAVA | KZ | 2 |
| Introduction to the Java SE Platform. IDE Installation and First Project. Comments. Variables and Type System. Operators. User Input and Parsing. Chain and Chain Conversion. Text Chain and Mathematical Methods. Terms. Relational Operators and Switches. Cycles for, while, foreach. Field - declaration, initialization, methods for field work. ASCII. Functions, parameters, return value, recursion. Program creation. | | | |
| 14Y1ZM | Fundamentals of parametric and adaptive modeling | 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. | | | |
| 15X31S | Project 1 ITS | Z | 2 |
| 15X32S | Project 2 ITS | Z | 2 |
| 15X33S | Project 3 ITS | Z | 2 |
| 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, nacism, 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. | | | |

| Code | Name | Type | Credits |
|---|---|---|---|
| 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 |
| Beginnings of flying, development of aircrafts lighter than air. Beginnings of aircrafts heavier than air. Czechoslovak aviation pioneers. Development of airports in the Czech Republic. World airports. Famous aviators. Helicopters. CSA airplanes. Development of aircrafts in Czechoslovakia between the years 1945-1989. Classic era of aviation. Golden era of civil aviation. Modern era of civil aviation. Airline companies. Supersonic flying. | | | |
| 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 | Transport 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 |
| 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. | | | |
| 16X31S | Project 1 ITS | Z | 2 |
| 16X32S | Project 2 ITS | Z | 2 |
| 16X33S | Project 3 ITS | 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 simulators and simulations | KZ | 2 |
| Simulation theory and application of computing equipment. Creating computing models. Mechanical and dynamic systems and their mathematical models. Computing methods. Simulation of vehicle dynamics, on-land carriage in particular. Virtual reality systems. Practical exercise with simulation software and interactive simulators. | | | |
| 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, Manufacturying, 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. Maintenence 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. | | | |
| 16Y1SO | Strategy and innovation in mobility | KZ | 2 |
| Introduction to innovation, definition. Innovation strategy. Innovation life cycle and ecosystem, main sources and funding opportunities. Successful innovation project, KPIs, budget; co-financing, evaluation. Sprint method and its use. Innovative business model - main patterns and examples, design, strategy, processes and outlook (business plan and possibilities of use). Creating an innovation strategy. Customer and value map, design and testing. | | | |
| 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. | | | |
| 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. | | | |
| 17TEDL | Transport Technology and Logistics | KZ | 3 |
| Basic terms in transport technology and logistics, particular steps of transport planning, line planning, timetabling, planning in pasanger 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 aplication using various transport modus. | | | |
| 17X31S | Project 1 ITS | Z | 2 |
| 17X32S | Project 2 ITS | Z | 2 |
| 17X33S | Project 3 ITS | Z | 2 |
| 17Y1EV | Public Sector Economy | KZ | 2 |
| Economic and financial theory of public sector, public choice theory, externalites, decisions about public finance allocation, economic assesment of public projects (CBA, MCA, CEA), tax system of the CR, state budget, management of public projects a their economic efficiency assessment, way of elaboration of PPP projects, funding from EU funds, program HDM-4. | | | |

| 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. | | | |
| 17Y1SK | Urban and Regional Rail Transport Systems | KZ | 2 |
| Factors affecting transport demand, modal-split, distribution of passenger flows on public regional transport lines. Optimization of line management, line networking. Creating and evaluation of the timetable. Vehicle circulation creation. Optimizing driver shifts and arranging them in turnus. Effects of barrier-free and public transport preferences. The role of marketing. | | | |
| 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 in bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joints of structures. Analysis of deflection curve of beams. Torsion of circular cross sections. Combined loading. Stability. | | | |
| 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. | | | |
| 18SPP | Seminary from Elasticity and Strength | Z | 0 |
| Excersise for practice. Tension and compression. Bending of beam. Shear stress during bending of beam. Design and analysis of cross section of beam. Analysis of deflection curve of beam. Torsion of circle cross section. Combined loading. Stability of compressed bar and buckling. | | | |
| 18SS | Seminary from Structural Analysis | Z | 0 |
| Examples for practise. General system of forces. Reactions of mass objects and compound systems. Internal forces on statically determinate beam and simple framework. Application of principle of virtual works for calculation of reactions of staticaly determinate systems. Determination of axial forces in truss construction - method of joints and method of sections. Geometry of cross sections. Plane fiber polygons. | | | |
| 18STD | Seminary from Technical Documentation | Z | 0 |
| Technical standards, international standardization, technical drawings, representation of technical objects, technical diagrams and charts, dimensional and geometrical accuracy, arrangement of drawing sheets. | | | |
| 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. | | | |
| 18X31S | Project 1 ITS | Z | 2 |
| 18X32S | Project 2 ITS | Z | 2 |
| 18X33S | Project 3 ITS | 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 tools 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. | | | |

| 20APEL | 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). | | | |
| 20ATEL | Applied Telematics | Z,ZK | 7 |
| Transport telematics - definition, benefits, ITS legislation, ITS organizations, ITS architecture and its practical use, data structures and data, geographic information systems, toll systems, e-call, fleet management, check-in and information systems, ITS connection to Smart City, ITS applications on specific examples. | | | |
| 20ELKA | 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. | | | |
| 20RISI | Road Traffic Control | Z,ZK | 7 |
| Traffic node management - basic concepts, SSZ design criteria, SSZ production project, dynamic SSZ management, public transport preferences, traffic area management, microscopic traffic models, macroscopic traffic models, traffic management on motorways, tunnel systems. | | | |
| 20RIZE | Railway Traffic Management | Z,ZK | 7 |
| Historical development of security technology, external elements (switches, signals, detection means), station, track and crossing security equipment, existing train security equipment and ETCS, traffic control structure, traffic control technology, automation and traffic control optimization, power supply systems, energy calculations and train running dynamics. | | | |
| 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. | | | |
| 20TAMS | Telecommunications and Local Area Networks | Z,ZK | 7 |
| Summary of the current state and introduction of the new trends in the development of telecommunication systems. The legal environment for the provision and use of telecommunication services is explained, basic telecommunication solutions in the hierarchical architecture of telecommunication networks are presented, and the links between the parameters of the parts and the performance of telecommunication systems. | | | |
| 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. | | | |
| 20X31S | Project 1 ITS | Z | 2 |
| 20X32S | Project 2 ITS | Z | 2 |
| 20X33S | Project 3 ITS | 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 specifed such forms of financing in transportation and telecomunications, 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 telecomunication 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. | | | |
| 20Y1KP | Communication and presentation skills | KZ | 2 |
| Motivation, priorities and their fulfillment, current communication networks, work with various sources, formal requirements of emails and final theses, basic typology of personalities, teamwork, emotional intelligence, manipulation and way of working with it, coping with stressful situations, formal requirements of presentations, ways of communication during presentation, presentation skills, presentation skills in online environment. | | | |
| 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). | | | |
| 20Y1OK | Road Lighting | KZ | 2 |
| Basic lighting quantities and terms, street lighting components (luminaires, control cabinets for street lighting, street lighting cables), characteristics of luminaires (lifetime of light sources, light distribution), standards, measurement of illuminance and luminance in road lighting, tunnels, conceptual approach to street lighting design, lighting calculations in DIALux and Relux, street lighting control systems. | | | |
| 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. | | | |

| 21SLD | Seminar of Air Transport | Z | 0 |
|---|---|---|---|
| | 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. | | |
| 21X31S | Project 1 ITS | Z | 2 |
| 21X32S | Project 2 ITS | Z | 2 |
| 21X33S | Project 3 ITS | Z | 2 |
| 21Y1AM | Aeronautical Information Management (AIM) | KZ | 2 |
| | Definition and basic overview of AIS and AIM. Transition from AIS to AIM. Regulatory base. Provision of AIS/AIM in the Czech Rep. AIP (Aeronautical Inf. Publication). VFR Manual of the Czech Rep. AIRAC System. NOTAM messages.PIB (Pre-flight Informtion Bulletin). AIC (Aeoronautical Inf. Circulars). Aeronautical Charts. EAD (Europena AIS Database). QMS (Quality Mng. System). ADQ (Aeronautical Data Quality). AIXM (Aeronautical Inf. Exchnage Format). | | |
| 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. | | |
| 21Y1LJ | Aeronautical Radio and Flight Instruments | KZ | 2 |
| | Basic definitions, history of aircraft instrumentation, aerometric instrumentation, Earth magnetism, aircraft electric equipment, gyroscopic instrumentation, airframe instrumentation and other aircraft equipment, engine instrumentation, warning and recording systems, instrumentation operational requirements, radiocommunication and radionavigation. | | |
| 21Y1LS | Air Traffic Services | KZ | 2 |
| | Airspace structure in Czech Republic and other countries. Introduction and description of ATS units in Czech Republic. Practical examples of TWR, APP a ACC control. History of ATS at USA and Czechoslovakia. ATS - Model of financing. Training System of Air Traffic Controllers. Future development of ATS. | | |
| 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. | | |
| 21Y1OH | Airline Business and Operations | KZ | 2 |
| | The course provides a comprehensive view of the commercial, operational and transportation activities of air transport companies. It focuses on the organizational structure of companies, various aspects of their strategy, economic and operational indicators. It introduces students in detail to operational processes and the essentials of transportation processes. It provides a basic view of the economic aspects of air transport. | | |
| 21Y1PC | ATC Procedures and Activities | KZ | 2 |
| | Air traffic control procedures, basics of communication and phraseology, aircraft identification, spacing and traffic coordination. In addition, the course discusses air traffic control at the airports and low visibility operational procedures. Students will during the course learn basic safety management applications applied across the infrastructure. | | |
| 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. | | |
| 21Y1SI | ATC Simulator | KZ | 2 |
| | Familiarization with the simulation environment, acquiring basic habits, aircraft identification procedures, vectoring, level changes, ATC clearance, use of RNAV points. Practical exercises focusing on basic vectoring, early application of vertical separation, EST and REV message passing. Practical exercises in the APPROACH area, practicing arrival and departure management procedures, conflict resolution. | | |
| 21Y1UL | Aircraft Maintenance | KZ | 2 |
| | Aircraft operations and technical operations. Maintenance and work processes. Defects search methods, status check diagnostic tools. Selection and qualification of aviation personnel. Basic documentation for maintenance. Optimization of time maintenance intervals. Regulation no. 1321/2014 Part 145. Human factors of aircraft maintenance. Regulation of director EASA for aircraft maintenance. Seminars will be focused on practical application. | | |
| 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. | | |
| 22X31S | Project 1 ITS | Z | 2 |
| 22X32S | Project 2 ITS | Z | 2 |
| 22X33S | Project 3 ITS | Z | 2 |
| 23X31S | Project 1 ITS | Z | 2 |
| 23X32S | Project 2 ITS | Z | 2 |
| 23X33S | Project 3 ITS | Z | 2 |
| 23Y1EH | Electronics and hardware in security of transportation | KZ | 2 |
| | Types and parameters of signals. Passive circuits, properties, basic measurements. Passive filters, semiconductors. Operational amplifiers, basic circuits, parameters. Active filters. Power supplies. Logic circuits. AD converters. Connection of analog and digital parts. Basic blocks of digital signal processing. Measurement processing. Design and fabrication methods in electronics. | | |
| 23Y1KB | Cyber security in transportation | KZ | 2 |
| | Basic concepts of security and cyber security, legal status in the field of cyber security, virtual cyberspace and communities, taxonomy of crimes in cyberspace, social impacts, social engineering, cyber attack technology, information security, cyber attacks on telematics systems, security of systems with artificial intelligence, norms and standards. | | |
| 23Y1KM | Crisis Management | KZ | 2 |
| | Theory and legal frame of crisis management with direction to Rescue system (IZS). After introduction to safety domain, there are terms and knowledge on: theory and position of crisis management and its targets; IZS-crisis management-crisis planning; and basic legislation. Practical part is concentrated to responsibility matrix compilation. | | |
| 23Y1KO | Quantum Physics and Optoelectronics | KZ | 2 |
| | Ground of quantum physics. Application of quantum physics in practice. Optoelectronics. Production of optoelectronics components. | | |
| 23Y1KY | Cybernality | KZ | 2 |
| | Juridical aspects of behavior on the computer network and computer systems. Cybernetic crime technology. Theory basis and models. Cyberterrorism. Infoware and connected aspects. | | |
| 23Y1MK | Crisis Situation Management in Critical Infrastructure | KZ | 2 |
| | Determination of critical infrastructe elements on all levels, their protection systems, responsibilities of particular agencies of the state administration and the self-government, and their responsibilities to anounce particular safety provisions. Physical and cyber protection of critical infrastructure with special attention to the soft targets. | | |

| 23Y1MU | Emergency Events Management Solution in Transport Infrastructure | KZ | 2 |
|---|---|---|---|
| Basic solutions of emergency events with emphasis of the transport infrastructure events and their solution management. Knowledge in the emergency planning and special procedures in liquidation work within the transport infrastructure. | | | |
| 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. | | | |
| 23Y1TP | Criminal Law in IT and Transportation | KZ | 2 |
| Introduction of criminal law into legal order, conception of culpability and criminal delict, consequency of other legal standards. international treaty and criminal law, investigation of crime, specific indicia of criminal court cases, practical examples. | | | |
| 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 |
| TVKLV | Physical Education Course | Z | 0 |
| TVKZV | Physical Education Course | Z | 0 |

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