# Recomended pass through the study plan

## Name of the pass: Bachelor Full-Time TET-ITS from 2025/26

Faculty/Institute/Others:
Department:
Pass through the study plan: Bachelor TET-ITS Full-Time from 2025/26
Branch of study guranteed by the department: Welcome page
Guarantor of the study branch:
Program of study: Technology in Transportation and Telecommunications
Type of study: Bachelor full-time
Note on the pass:

**Coding of roles of courses and groups of courses:**
**P - compulsory courses of the program, PO - compulsory courses of the branch, Z - compulsory courses, S - compulsory elective courses, PV - compulsory elective courses, F - elective specialized courses, V - elective courses, T - physical training courses**

**Coding of ways of completion of courses (KZ/Z/ZK) and coding of semesters (Z/L):**
**KZ - graded assesment, Z - assesment, ZK - examination, L - summer semester, Z - winter semester**

Number of semester: 1

| 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 |
|---|---|---|---|---|---|---|
| 14ASD | **Algorithm and Data Structures** *Tomáš Brandejský, Michal Jeřábek, Alena Kubáčová, Jan Procházka, Vít Fábera, Martin Fiala, Lukáš Svoboda, Tereza Panská **Vít Fábera** Vít Fábera (Gar.)* | KZ | 3 | 0P+2C+8B | Z | z |
| 11CAL1 | **Calculus 1** *Tomáš Třasák, Olga Vraštilová, Magdalena Hykšová, Bohumil Kovář, Ondřej Navrátil **Bohumil Kovář** Ondřej Navrátil (Gar.)* | Z,ZK | 7 | 2P+4C+22B | Z | z |
| 11GIE | **Geometry** *Oldřich Hykš, Pavel Provinský, Šárka Voráčová **Oldřich Hykš** Oldřich Hykš (Gar.)* | KZ | 3 | 2P+2C+12B | Z | z |
| 11LA | **Linear Algebra** *Magdalena Hykšová, Pavel Provinský, Lucie Kárná, Martina Bečvářová **Magdalena Hykšová** Martina Bečvářová (Gar.)* | Z,ZK | 3 | 2P+1C+10B | Z | z |
| 18MTY | **Materials Science and Engineering** *Tomáš Doktor, Jaromír Kylar, Veronika Drechslerová, Nela Krčmářová, Jitka Řezníčková, Jaroslav Valach, Vít Malinovský, Jaromír Kylar **Jaroslav Valach** Tomáš Doktor (Gar.)* | Z,ZK | 3 | 2P+1C+10B | Z | z |
| 18TKK | **Technical Drawing and Designing** *Lukáš Svoboda, Jitka Řezníčková, Vít Malinovský, Jan Šleichrt, Martin Brumovský, Jan Mejstřík, Drahomír Schmidt, Jan Vogl, Jiří Zeisek, ..... **Jan Šleichrt** Jan Šleichrt (Gar.)* | KZ | 4 | 2P+2C+16B | Z | z |
| TV-1 | **Physical Education** | Z | 1 | | Z | z |
| 16UDOP | **Introduction into Vehicles** *Zuzana Radová, Petr Bouchner* | Z | 2 | 2P+0C+8B | Z | z |
| 12ZADY | **Introduction to Transportation Engineering** *Zuzana Čarská, Dagmar Kočárková, Jana Štikarová Dagmar Kočárková (Gar.)* | Z,ZK | 4 | 2P+2C | Z | z |
| 18STD | **Seminary from Technical Documentation** | Z | 0 | 0P+2C | Z | v |
| TVKZV | **Physical Education Course** | Z | 0 | 7dní | Z | v |

Number of semester: 2

| Code | Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors, **authors** and guarantors (gar.)* | Completion | Credits | Scope | Semester | Role |
|---|---|---|---|---|---|---|
| 11CAL2 | **Calculus 2** ***Magdalena Hykšová*** | Z,ZK | 5 | 2P+3C+20B | L | z |
| 14PRG | **Programming** ***Jana Kaliková*** | KZ | 2 | 0P+2C+8B | L | z |
| 18SAT | **Structural Analysis** | Z,ZK | 4 | 2P+2C+14B | L | z |
| 11STAT | **Statistics** ***Pavla Pecherková*** | Z,ZK | 4 | 2P+2C+12B | L | z |
| 20SYSA | **Systems Analysis** | Z,ZK | 5 | 2P+2C+14B | L | z |
| 17TEDL | **Transport Technology and Logistics** | KZ | 3 | 2P+1C | L | z |

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|---|---|---|---|---|---|---|
| TV-2 | **Physical Education** | Z | 1 | | L | z |
| 21ZALD | **Basics of Air Transport** | KZ | 2 | 0P+2C+8B | L | z |
| 12ZTS | **Railway Lines and Stations** | Z,ZK | 4 | 2P+2C+10B | L | z |
| 14DZT | **Digital Support for Railway Lines**<br>***Martin Brumovský*** | Z | 0 | 0P+2C | L | v |
| 21SLD | **Seminar of Air Transport** | Z | 0 | 0P+2C | L | v |
| 18SS | **Seminary from Structural Analysis** | Z | 0 | 0P+2C | L | v |
| 11SSF | **Secondary School Physics Course**<br>***Zuzana Malá*** | Z | 0 | 0P+2C | L | v |
| TVKLV | **Physical Education Course** | Z | 0 | 7dní | L | v |

## Number of semester: 3

| 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 |
|---|---|---|---|---|---|---|
| 15JZ1A | **Foreign Language - English 1**<br>*Markéta Vojanová, Dana Boušová, Marie Michlová, Marek Tomeček, Jan Feit, Markéta Musilová, Peter Morpuss, Jitka Heřmanová, Eva Rezlerová Lenka Monková (Gar.)* | Z | 3 | 0P+4C+10B | Z | z |
| 14DATS | **Database Systems**<br>*Jan Krčál, Jana Kaliková* ***Jana Kaliková*** *Jana Kaliková (Gar.)* | KZ | 2 | 1P+1C+10B | Z | z |
| 11FYZ | **Physics**<br>*Oldřich Hykš, Pavel Demo, Zuzana Malá, Tomáš Vítů, Jana Kuklová* ***Jana Kuklová*** *Pavel Demo (Gar.)* | Z,ZK | 5 | 2P+2C+18B | Z | z |
| 12MDE | **Transport Models and Transport Excesses**<br>*Tomáš Padělek, Josef Kocourek* | Z,ZK | 3 | 2P+1C+8B | Z | z |
| 12PPOK | **Designing Roads, Highways and Motorways**<br>*Tomáš Padělek, Josef Kocourek, Petr Kumpošt Josef Kocourek (Gar.)* | KZ | 3 | 1P+2C+10B | Z | z |
| 18PZP | **Elasticity and Strength**<br>*Tomáš Doktor, Jitka Řezníčková, Jan Šleichrt, Josef Jíra, Jan Vyčichl, Daniel Kytýř, Ondřej Jiroušek* ***Ondřej Jiroušek*** *Ondřej Jiroušek (Gar.)* | Z,ZK | 3 | 2P+1C+10B | Z | z |
| 11TGA | **Graph Theory and its Applications in Transport**<br>*Alena Rybičková, Denisa Mocková, Dušan Teichmann* ***Alena Rybičková*** *Alena Rybičková (Gar.)* | Z,ZK | 4 | 2P+2C+12B | Z | z |
| 20UITS | **Introduction to Intelligent Transport Systems**<br>*Martin Šrotýř, Martin Langr, Jiří Růžička, Patrik Horažďovský, Vladimír Faltus, Pavel Hrubeš, Kristýna Navrátilová, Eva Hajčiarová* ***Martin Langr*** | Z,ZK | 7 | 3P+2C+20B | Z | z |
| 14DPK | **Digital Support for Designing of Roads and Highways**<br>*Drahomír Schmidt, Libor Žídek* ***Drahomír Schmidt*** *Drahomír Schmidt (Gar.)* | Z | 0 | 0P+2C | Z | v |
| 11SCFZ | **Seminar of Physics**<br>*Oldřich Hykš, Zuzana Malá, Tomáš Vítů, Jana Kuklová* ***Zuzana Malá*** *Zuzana Malá (Gar.)* | Z | 0 | 0P+2C | Z | v |
| 18SPP | **Seminary from Elasticity and Strength**<br>*Tomáš Doktor, Jan Vyčichl* ***Jan Vyčichl*** *Jan Vyčichl (Gar.)* | Z | 0 | 0P+2C | Z | v |

## Number of semester: 4

| 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 |
|---|---|---|---|---|---|---|
| 14AM | **Automation and Measurement**<br>***Vít Fábera*** | Z,ZK | 6 | 3P+3C | L | z |
| 15JZ2A | **Foreign Language - English 2**<br>*Marek Tomeček (Gar.)* | Z,ZK | 3 | 0P+4C+10B | L | z |
| 16DOTE | **Transport Technology**<br>***Josef Mík*** | Z,ZK | 6 | 3P+3C | L | z |
| 11MAMY | **Mathematical Methods**<br>***Jan Přikryl*** | Z,ZK | 7 | 3P+3C | L | z |
| 11SEMO | **Seminar of Electromagnetic Field and Optics**<br>***Zuzana Malá*** | Z | 0 | 0P+2C | L | ZP |
| X1-BP-ITS-22/23 | **Projekty Bc. prezenční TET-ITS od 2022/23**<br>*15X31S,14X31S,..... (see the list of groups below)* | Min. cours. 3<br>Max. cours. 3 | Min/Max 6/6 | | | ZP |
| 4S-BP-ITS-V1-22/23 | **4. sem. Bc. prezenční TET-ITS výběr předmětu od 2022/23**<br>*11EMO,20ZEKT* | Min. cours. 1<br>Max. cours. | Min/Max 4/4 | | | z |

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| Y1-BP-ITS-24/25 | **PVP-B Bc. prezenční TET-ITS od 2024/25**<br>*21Y1AM,00Y1XB,..... (see the list of groups below)* | Min. cours. 3<br>Max. cours. 3 | Min/Max 6/6 | | | PV |

## Number of semester: 5

| 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 |
|---|---|---|---|---|---|---|
| 20ELKA | **Qualification in Electrical Engineering**<br>*Daniel Beránek, Jindřich Sadil* ***Daniel Beránek*** | KZ | 2 | 2P+0C | Z | Z |
| 14ISYD | **Information Systems in Transportation**<br>*Jan Krčál, Jana Kaliková, Marek Kalika* ***Marek Kalika*** *Marek Kalika (Gar.)* | Z,ZK | 7 | 2P+4C | Z | Z |
| 20RIZE | **Railway Traffic Management**<br>*Martin Leso, Jindřich Sadil, Dušan Kamenický, Petr Koutecký* ***Dušan Kamenický*** | Z,ZK | 7 | 3P+3C | Z | ZP |
| 20TAMS | **Telecommunications and Local Area Networks**<br>*Martin Šrotýř, Zdeněk Lokaj, Tomáš Zelinka Tomáš Zelinka (Gar.)* | Z,ZK | 7 | 3P+3C | Z | Z |
| X1-BP-ITS-22/23 | **Projekty Bc. prezenční TET-ITS od 2022/23**<br>*15X31S,14X31S,..... (see the list of groups below)* | Min. cours. 3<br>Max. cours. 3 | Min/Max 6/6 | | | ZP |
| JZ-BP-TET-22/23 | **Bc. TET (mimo LED) druhý jazyk od 2022/23**<br>*15JZ3F,15JZ3I,..... (see the list of groups below)* | Min. cours. 2<br>Max. cours. 2 | Min/Max 6/6 | | | J |
| Y1-BP-ITS-24/25 | **PVP-B Bc. prezenční TET-ITS od 2024/25**<br>*21Y1AM,00Y1XB,..... (see the list of groups below)* | Min. cours. 3<br>Max. cours. 3 | Min/Max 6/6 | | | PV |

## Number of semester: 6

| 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 |
|---|---|---|---|---|---|---|
| 20APEL | **Applied Electronics** | KZ | 2 | 0P+2C | L | Z |
| 20ATEL | **Applied Telematics** | Z,ZK | 7 | 3P+3C | L | Z |
| 20RISI | **Road Traffic Control** | Z,ZK | 7 | 3P+3C | L | ZP |
| 16SVIR | **Vehicle Systems and Interaction with Driver** | Z,ZK | 7 | 3P+3C | L | Z |
| X1-BP-ITS-22/23 | **Projekty Bc. prezenční TET-ITS od 2022/23**<br>*15X31S,14X31S,..... (see the list of groups below)* | Min. cours. 3<br>Max. cours. 3 | Min/Max 6/6 | | | ZP |
| JZ-BP-TET-22/23 | **Bc. TET (mimo LED) druhý jazyk od 2022/23**<br>*15JZ3F,15JZ3I,..... (see the list of groups below)* | Min. cours. 2<br>Max. cours. 2 | Min/Max 6/6 | | | J |
| Y1-BP-ITS-24/25 | **PVP-B Bc. prezenční TET-ITS od 2024/25**<br>*21Y1AM,00Y1XB,..... (see the list of groups below)* | Min. cours. 3<br>Max. cours. 3 | Min/Max 6/6 | | | PV |

## List of groups of courses of this pass with the complete content of members of individual groups

| Kód | Name of the group of courses and codes of members of this group (for specification see here or below the list of courses) | Completion | Credits | Scope | Semester | Role |
|---|---|---|---|---|---|---|
| **4S-BP-ITS-V1-22/23** | **4. sem. Bc. prezenční TET-ITS výběr předmětu od 2022/23** | **Min. cours. 1 Max. cours. 1** | **Min/Max** 4/4 | | | **Z** |

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|---|---|---|---|---|---|
| 11EMO | Electromagnetic Field and Optics | 20ZEKT | Fundamentals of Electrical Engin ... | | |

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| **JZ-BP-TET-22/23** | **Bc. TET (mimo LED) druhý jazyk od 2022/23** | **Min. cours. 2 Max. cours. 2** | **Min/Max** 6/6 | | **J** |

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|---|---|---|---|---|---|
| 15JZ3F | Foreign Language - French 3 | 15JZ3I | Foreign Language - Italian 3 | 15JZ3N | Foreign Language - German 3 |
| 15JZ3R | Foreign Language - Russian 3 | 15JZ3S | Foreign Language - Spanish 3 | 15JZ4F | Foreign Language - French 4 |
| 15JZ4I | Foreign Language - Italian 4 | 15JZ4N | Foreign Language - German 4 | 15JZ4R | Foreign Language - Russian 4 |
| 15JZ4S | Foreign Language - Spanish 4 | | | | |

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|---|---|---|---|---|---|
| **X1-BP-ITS-22/23** | **Projekty Bc. prezenční TET-ITS od 2022/23** | **Min. cours. 3 Max. cours. 3** | **Min/Max** 6/6 | | **ZP** |

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

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| **Y1-BP-ITS-24/25** | **PVP-B Bc. prezenční TET-ITS od 2024/25** | **Min. cours. 3 Max. cours. 3** | **Min/Max** 6/6 | | **PV** |

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|---|---|---|---|---|---|
| 21Y1AM | Aeronautical Information Managem ... | 00Y1XB | Active participation in a scient ... | 20Y1AF | Alternative Forms of Transportat ... |
| 18Y1AM | Anatomy, Mobility and Safety of ... | 14Y1AV | Animation and Visualization | 12Y1AE | Applied Ecology |
| 20Y1AE | Applied Electronics | 14Y1BE | Barrierless Transport | 15Y1BO | Work Safety and Health Protectio ... |
| 11Y1BK | Error Detection Codes for Interl ... | 21Y1BS | Unmanned aircraft systems 1 | 14Y1BM | Biometric Methods |
| 15Y1DZ | History of Railway | 12Y1DS | Project Documentation in Practic ... | 20Y1EK | Qualification in Electrical Engi ... |
| 16Y1EN | Energy Requirements of Vehicles | 20Y1EA | Environmental Aspects of Transpo ... | 15Y1EH | European Integration within Hist ... |
| 18Y1EM | Experimental Methods in Mechanic ... | 15Y1FD | French Area Studies and Transpor ... | 14Y1HW | Computer Hardware |
| 15Y1HL | History of Civil Aviation | 15Y1HD | History of City Mass Transport | 12Y1HD | Traffic Noise |
| 15Y1HE | Work Hygiene and Ergonomics in T ... | 16Y1IS | Interactive simulators and simul ... | 12Y1KN | Combined Transportation |
| 12Y1KP | Communication and Promotion of T ... | 20Y1KP | Communication and presentation s ... | 21Y1LJ | Aeronautical Radio and Flight In ... |
| 21Y1LS | Air Traffic Services | 17Y1LL | Logistics of Passenger and Freig ... | 20Y1LN | Location and Navigation |
| 17Y1MD | Marketing in Transportation | 18Y1MT | Engineering Materials | 21Y1MP | Matlab for project-oriented stud ... |
| 14Y1MP | Modeling Complex Assemblies and ... | 15Y1MK | Modern History in Context: Every ... | 15Y1NE | German in the Economy and Societ ... |
| 21Y1OH | Airline Business and Operations | 20Y1OI | Fare Collection and Information ... | 14Y1OJ | Object - oriented programming in ... |
| 14Y1OP | Operating System | 17Y1OF | Personal Finance | 20Y1OK | Road Lighting |
| 11Y1PV | Parametrical and Multicriterial ... | 17Y1PM | Personnel Management | 12Y1PC | Pedestrian and Cycling Transport |
| 14Y1PG | Computer Graphics | 14Y1P2 | Computer Aid of Transportation P ... | 18Y1PS | Computer Simulations in Mechanic ... |
| 14Y1PI | Corporate Information System | 14Y1PZ | Advanced Data Processing in Spre ... | 21Y1PC | ATC Procedures and Activities |
| 20Y1PK | Product Quality Management Proce ... | 14Y1PJ | C Programming Language | 12Y1C1 | Designing Roads in Civil 3D I |
| 12Y1C2 | Designing Roads in Civil 3D II | 14Y1PA | 3D Modeling in AutoCAD | 16Y1PV | Operation, Construction and Main ... |
| 12Y1PU | Organization Disposition of Rail ... | 12Y1RU | Railway Lines Reconstruction | 16Y1RE | Control and Electronic Vehicle S ... |
| 21Y1RZ | Human Resources Management | 17Y1ST | Titan Simulation | 21Y1SI | ATC Simulator |
| 20Y1SC | Sensors and Actuators | 17Y1SL | Sociology of Human Resources | 11Y1SI | Transportation Software Engineer ... |
| 16Y1KS | Quality and Reliability of Vehic ... | 12Y1SU | Road Management and Maintenance | 16Y1SO | Strategy and innovation in mobil ... |
| 17Y1SK | Urban and Regional Rail Transpor ... | 11Y1TG | Graph Theory | 14Y1TI | Creating Interactive Internet Ap ... |
| 21Y1UL | Aircraft Maintenance | 14Y1UP | Editing of Theses in MS Word | 18Y1UK | Introduction of Rail Vehicles |
| 12Y1VR | Public Transport in Cities and R ... | 14Y1VM | Development of Applications for ... | 16Y1VT | Development in Railroad Vehicles |
| 14Y1WG | Webdesign | 14Y1W1 | Webdesign 1 | 14Y1W2 | Webdesign 2 |
| 16Y1ZG | Introduction into Applied Comput ... | 14Y1ZM | Fundamentals of parametric and a ... | 11Y1ZM | Foundation of MATLAB Programming |

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|---|---|---|---|---|---|
| 14Y1ZJ | Fundamentals of programming in J ... | 12Y1ZU | Principles of Urbanism | 15Y1ZV | East-West dichotomy: Prelude to ... |
| 16Y1ZL | Vehicle Testing, Legislation and ... | | | | |

## 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. | | |
| 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 |

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| 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. | | | |
| 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. | | | |
| 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. | | | |
| 12ZADY | Introduction to Transportation Engineering | Z,ZK | 4 |
| 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. | | | |
| 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. | | | |

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| 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. | | | |

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| 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. | | | |
| 15JZ1A | Foreign Language - English 1 | Z | 3 |
| Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric. | | | |
| 15JZ2A | Foreign Language - English 2 | Z,ZK | 3 |
| Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric. | | | |
| 15JZ3F | Foreign Language - French 3 | Z | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ3I | Foreign Language - Italian 3 | Z | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ3N | Foreign Language - German 3 | Z | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ3R | Foreign Language - Russian 3 | Z | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ3S | Foreign Language - Spanish 3 | Z | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ4F | Foreign Language - French 4 | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ4I | Foreign Language - Italian 4 | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ4N | Foreign Language - German 4 | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ4R | Foreign Language - Russian 4 | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 15JZ4S | Foreign Language - Spanish 4 | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. | | | |
| 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. | | | |

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| 15Y1HD | History of City Mass Transport | KZ | 2 |
| History of city mass transport in the world, development of tram, bus and trolley-bus systems. History of transport networks in the world, current trends and developments of tariff and clearance systems. History of city transport in Prague and Brno. History of tram, bus and trolley-bus operation systems in the Czech Republic and Slovakia. | | | |
| 15Y1HE | Work Hygiene and Ergonomics in Traffic | KZ | 2 |
| Basic knowledge of occupational hygiene and ergonomics, and their application in transport. Working environment factors, and the influence of these factors on health of workers. Creation and protection of working conditions that do not damage public health. Mutual links: man-machine-environment. Adaptation of technology to possibilities and skills of a man. Practical examples from the field of transportation; relevant legislature. | | | |
| 15Y1HL | History of Civil Aviation | KZ | 2 |
| 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 |

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| 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. | | | |
| 18TKK | Technical Drawing and Designing | KZ | 4 |
| 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). | | | |

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| 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. | | | |

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| 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 |
| 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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