

# Study plan

## Name of study plan: MED bak.prez.11/12

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch: prof. Ing. Tomáš Zelinka, CSc.

Program of study: Technology in Transportation and Telecommunications

Type of study: Bachelor full-time

Required credits: 180

Elective courses credits: 0

Sum of credits in the plan: 180

Note on the plan:

Name of the block: Semestrální projekt

Minimal number of credits of the block: 6

The role of the block: ZP

Code of the group: XP4,5,6 11/12

Name of the group: Projekty prez.4.5.6.sem.11/12

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 |
|-------|--|------------|---------|-------|----------|------|
| 15X31 | <b>Project 1</b><br>Eva Rezlerová  | Z          | 2       | 0P+1C | L        | ZP   |
| 14X31 | <b>Project 1</b><br>Jana Kalíková, Jan Krčál, Tomáš Zelinka, Martin Šrotýř, Zdeněk Lokaj, Tomáš Brandejský, Vít Fábera, Jan Zelenka, Ota Hajzler                           | Z          | 2       | 0P+1C | L        | ZP   |
| 13X31 | <b>Project 1</b>   | Z          | 2       | 0+1   |          | ZP   |
| 12X31 | <b>Project 1</b><br>Zuzana Čarská, Dagmar Kočárková, Karolína Moudrá, Kristýna Neubergová, Martin Jacura, Vojtěch Novotný, Ondřej Trešl, David Vodák, Tomáš Javořík, ..... | Z          | 2       | 0P+1C | L        | ZP   |
| 11X31 | <b>Project 1</b>   | Z          | 2       | 0P+1C | L        | ZP   |
| 23X31 | <b>Project 1</b><br>Mílena Macková   | Z          | 2       | 0P+1C | L        | ZP   |
| 17X31 | <b>Project 1</b><br>Rudolf Vávra, Petr Fridrišek, Dominik Mazel, Stanislav Metelka, Václav Baroch, Dušan Teichmann, Edvard Březina, Michal Drábek, Tomáš Horák, .....      | Z          | 2       | 0P+1C | L        | ZP   |
| 18X31 | <b>Project 1</b><br>Daniel Kytýř, Tomáš Doktor, Jan Šleicrt  | Z          | 2       | 0P+1C | L        | ZP   |
| 20X31 | <b>Project 1</b><br>Patrik Horažďovský   | Z          | 2       | 0P+1C | L        | ZP   |
| 21X31 | <b>Project 1</b><br>Lenka Hanáková, Tereza Topková, Vladimír Socha, Helena Binová, Jakub Hospodka, Šárka Hulínská, Iveta Kameníková, Jakub Kraus, Andrej Lališ, .....      | Z          | 2       | 0P+1C | L        | ZP   |
| 22X31 | <b>Project 1</b><br>Michal Frydrýn, Luboš Nouzovský, Zdeněk Svatý, Karel Kocián  | Z          | 2       | 0P+1C | L        | ZP   |
| 16X31 | <b>Project 1</b><br>Petr Bouchner, Přemysl Toman, Josef Mík  | Z          | 2       | 0P+1C | L        | ZP   |
| 15X32 | <b>Project 2</b><br>Eva Rezlerová  | Z          | 2       | 0P+2C | Z        | ZP   |
| 14X32 | <b>Project 2</b><br>Jana Kalíková, Jan Krčál, Tomáš Zelinka, Martin Šrotýř, Zdeněk Lokaj, Ota Hajzler, Eva Fantová, Filip Müller   | Z          | 2       | 0P+2C | Z        | ZP   |
| 13X32 | <b>Project 2</b>   | Z          | 2       | 0+2   |          | ZP   |

|       |  |   |   |       |   |    |
|-------|--|---|---|-------|---|----|
| 12X32 | <b>Project 2</b><br>Zuzana Čarská, Dagmar Kočárková, Karolína Moudrá, Kristýna Neubergová, Martin Jacura, Vojtěch Novotný, Ondřej Trešl, David Vodák, Tomáš Javořík, ..... | Z | 2 | 0P+2C | Z | ZP |
| 11X32 | <b>Project 2</b>   | Z | 2 | 0P+2C | Z | ZP |
| 16X32 | <b>Project 2</b><br>Josef Mík, Petr Bouchner   | Z | 2 | 0P+2C | Z | ZP |
| 23X32 | <b>Project 2</b><br>Milena Macková, Václav Jirovský  | Z | 2 | 0P+2C | Z | ZP |
| 22X32 | <b>Project 2</b><br>Michal Frydrýn, Luboš Nouzovský, Zdeněk Svatý, Karel Kocián, Tomáš Mičunek   | Z | 2 | 0P+2C | Z | ZP |
| 21X32 | <b>Project 2</b>   | Z | 2 | 0P+2C | Z | ZP |
| 20X32 | <b>Project 2</b><br>Patrik Horažďovský, Jiří Růžička, Pavel Hrubeš, Martin Leso, Petr Bureš, Martin Langr  | Z | 2 | 0P+2C | Z | ZP |
| 18X32 | <b>Project 2</b>   | Z | 2 | 0P+2C | Z | ZP |
| 17X32 | <b>Project 2</b><br>Václav Baroch, Dušan Teichmann, Edvard Březina, Michal Drábek, Tomáš Horák, Vít Janoš, Milan Kříž, Olga Mertlová, Zdeněk Michl, .....                  | Z | 2 | 0P+2C | Z | ZP |
| 11X33 | <b>Project 3</b>   | Z | 2 | 0P+1C | L | ZP |
| 12X33 | <b>Project 3</b><br>Zuzana Čarská, Dagmar Kočárková, Karolína Moudrá, Kristýna Neubergová, Martin Jacura, Vojtěch Novotný, Ondřej Trešl, David Vodák, Tomáš Javořík, ..... | Z | 2 | 0P+1C | L | ZP |
| 13X33 | <b>Project 3</b>   | Z | 2 | 0+1   |   | ZP |
| 14X33 | <b>Project 3</b><br>Tomáš Zelinka, Martin Šrotýř, Zdeněk Lokaj, Ota Hajzler  | Z | 2 | 0P+1C | L | ZP |
| 15X33 | <b>Project 3</b><br>Eva Rezlerová  | Z | 2 | 0P+1C | L | ZP |
| 23X33 | <b>Project 3</b>   | Z | 2 | 0P+1C | L | ZP |
| 21X33 | <b>Project 3</b><br>Lenka Hanáková, Vladimír Socha, Helena Bínová, Jakub Hospodka, Šárka Hulínská, Iveta Kameníková, Jakub Kraus, Andrej Lališ, Roman Matyáš, .....        | Z | 2 | 0P+1C | L | ZP |
| 20X33 | <b>Project 3</b>   | Z | 2 | 0P+1C | L | ZP |
| 18X33 | <b>Project 3</b>   | Z | 2 | 0P+1C | L | ZP |
| 17X33 | <b>Project 3</b><br>Václav Baroch, Dušan Teichmann, Edvard Březina, Michal Drábek, Tomáš Horák, Vít Janoš, Milan Kříž, Olga Mertlová, Zdeněk Michl, .....                  | Z | 2 | 0P+1C | L | ZP |
| 16X33 | <b>Project 3</b><br>Petr Bouchner, Přemysl Toman, Josef Mík, Adam Orlický, Jaroslav Machan   | Z | 2 | 0P+1C | L | ZP |
| 22X33 | <b>Project 3</b><br>Michal Frydrýn, Luboš Nouzovský, Zdeněk Svatý, Karel Kocián  | Z | 2 | 0P+1C | L | ZP |

**Characteristics of the courses of this group of Study Plan: Code=XP4,5,6 11/12 Name=Projekty prez.4.5.6.sem.11/12**

|       |           |   |   |
|-------|-----------|---|---|
| 15X31 | Project 1 | Z | 2 |
| 14X31 | Project 1 | Z | 2 |
| 13X31 | Project 1 | Z | 2 |
| 12X31 | Project 1 | Z | 2 |
| 11X31 | Project 1 | Z | 2 |
| 23X31 | Project 1 | Z | 2 |
| 17X31 | Project 1 | Z | 2 |
| 18X31 | Project 1 | Z | 2 |
| 20X31 | Project 1 | Z | 2 |
| 21X31 | Project 1 | Z | 2 |
| 22X31 | Project 1 | Z | 2 |
| 16X31 | Project 1 | Z | 2 |
| 15X32 | Project 2 | Z | 2 |
| 14X32 | Project 2 | Z | 2 |
| 13X32 | Project 2 | Z | 2 |
| 12X32 | Project 2 | Z | 2 |
| 11X32 | Project 2 | Z | 2 |
| 16X32 | Project 2 | Z | 2 |
| 23X32 | Project 2 | Z | 2 |
| 22X32 | Project 2 | Z | 2 |
| 21X32 | Project 2 | Z | 2 |
| 20X32 | Project 2 | Z | 2 |
| 18X32 | Project 2 | Z | 2 |
| 17X32 | Project 2 | Z | 2 |
| 11X33 | Project 3 | Z | 2 |
| 12X33 | Project 3 | Z | 2 |

|       |           |   |   |
|-------|-----------|---|---|
| 13X33 | Project 3 | Z | 2 |
| 14X33 | Project 3 | Z | 2 |
| 15X33 | Project 3 | Z | 2 |
| 23X33 | Project 3 | Z | 2 |
| 21X33 | Project 3 | Z | 2 |
| 20X33 | Project 3 | Z | 2 |
| 18X33 | Project 3 | Z | 2 |
| 17X33 | Project 3 | Z | 2 |
| 16X33 | Project 3 | Z | 2 |
| 22X33 | Project 3 | Z | 2 |

Name of the block: Compulsory courses

Minimal number of credits of the block: 133

The role of the block: Z

Code of the group: 1.S.BP 10/11

Name of the group: 1.sem.bak.prez.10/11

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 12 courses

Credits in the group: 30

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 |
|--------|---|------------|---------|-------|----------|------|
| 13E    | <b>Economics</b>  | Z,ZK       | 3       | 2+1   | Z        | z    |
| 11GIE  | <b>Geometry</b><br>Oldřich Hykš, Šárka Voráčová, Pavel Provinský  | KZ         | 3       | 2P+2C | Z        | z    |
| 14KSP  | <b>Constructing with Computer Aid</b><br>Filip Müller, Martin Brumovský, Lukáš Kozel, Radek Kratochvil, Drahomír Schmidt, Lukáš Svoboda, Monika Stambolidis     | KZ         | 2       | 0P+2C | Z        | z    |
| 11LA   | <b>Linear Algebra</b><br>Pavel Provinský, Martina Bečvářová, Lucie Kárná, Jan Píkrýl  | Z,ZK       | 3       | 2P+1C | Z        | z    |
| 11MTA  | <b>Mathematical Analysis</b>  | Z,ZK       | 4       | 2+2   | Z        | z    |
| 18MRI1 | <b>Materials 1</b>  | Z,ZK       | 3       | 2+1   | Z        | z    |
| 18TTED | <b>Creation of Technical Documentation</b>  | KZ         | 2       | 2+1   | Z        | z    |
| 00TVC1 | <b>Physical Education 1</b>   | Z          | 1       | 0+2   | Z        | z    |
| 12ZADI | <b>Introduction to Transportation Engineering</b>   | Z,ZK       | 3       | 2+1   | Z        | z    |
| 14ZINF | <b>Fundamentals of Informatics</b>  | KZ         | 2       | 0+2   | Z        | z    |
| 21ZLD  | <b>Introduction to Air Transport</b>  | KZ         | 2       | 2+1   | Z        | z    |
| 22UN   | <b>Traffic Accidents Introduction</b>   | Z          | 2       | 2+0   | Z        | z    |

**Characteristics of the courses of this group of Study Plan: Code=1.S.BP 10/11 Name=1.sem.bak.prez.10/11**

|        |                                     |      |   |  |
|--------|-------------------------------------|------|---|--|
| 13E    | Economics                           | Z,ZK | 3 | Microeconomic and macroeconomic interpretation of economic relations. Method and subject of the economics. Economic decision making of consumers and producers. Market structures. Labour and capital, efficiency, ownership, public choice.   |
| 11GIE  | Geometry                            | KZ   | 3 | Orthographic and oblique projections, linear perspective. Topographic surfaces and their orthogonal projection. Differential geometry of curves - parameterization, arc of the curve, torsion and curvature, Frenet's trihedron. Kinematics - a curve as a trajectory of the motion, the velocity and acceleration of a particle moving on a curved path.  |
| 14KSP  | Constructing with Computer Aid      | KZ   | 2 | "CAD systems" term determination. CAD role in projecting system model. Existing CAD systems on Czech market. Project creation, basic common work rules in graphic applications and CA systems. Co-ordinated systems, CAD environment skill (basics of constructing, dimensioning, modifications, user interfaces, projecting possibilities, AutoCAD environment profiles, drawings with raster foundations). |
| 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.   |
| 11MTA  | Mathematical Analysis               | Z,ZK | 4 | Sequences and series of real numbers and its convergence. Basic properties of functions. Differential and integral calculus of the real function of one real variable. Power series, Fourier series and foundations of Fourier transform.  |
| 18MRI1 | Materials 1                         | Z,ZK | 3 | Crystal structure. Basics of thermodynamics of metals and their alloys. Balanced binary diagrams. Alloys of iron with carbon. Deterioration of solid solutions. Heating processing of steel and cast irons. Physical features. Mechanical features. Dephctostopic testing. Corosion.   |
| 18TTED | Creation of Technical Documentation | KZ   | 2 | Technical standards, international standardization, types of technical drawings, representation of technical objects, technical diagrams and charts, dimensional and geometrical accuracy, arrangement of drawing sheets, types of schemes and their creation.   |

|        |   |      |   |
|--------|---|------|---|
| 00TVC1 | Physical Education 1<br>Practical instruction and training in a wide variety of sports and games: from basic recreational coaching to competitive top level training. Included are: basketball, volleyball, soccer, tennis, squash, floorball, bodybuilding, swimming, canoeing, aerobic.   | Z    | 1 |
| 12ZADI | Introduction to Transportation Engineering<br>Traffic survey. Terrestrial roads. Residential zone. Land - use planning. Railway transport. Public mass transport. Integrated traffic systems. Traffic prognosis. Traffic safety. Air transport. Traffic and environment.  | Z,ZK | 3 |
| 14ZINF | Fundamentals of Informatics<br>Introduction to faculty network, MS-Word and Open Office, use of styles and advanced features, computer functions and information transmission. Number systems incl. arithmetic calculations. Algorithms and their proprieties. Flow charts for algorithms drawing. Mathematic and logic ordering algorithms incl. functions and procedures. Work with MS-Excel - tables, graphs, calculations, functions. | KZ   | 2 |
| 21ZLD  | Introduction to Air Transport<br>Air transport as a component of complex transport system. International status of civil aviation. International organizations in Europe and worldwide. Characteristics of air transport. Commercial air transport. Technical operations of aeroplanes.   | KZ   | 2 |
| 22UN   | Traffic Accidents Introduction<br>Traffic accident as a physical process, systematic submission, vehicle x human x infrastructure interaction, accidents statistics, aircraft accidents, accidents on railways, accidents on waterways, road traffic accidents, other aspects, accidental prevention.   | Z    | 2 |

Code of the group: 2.S.BP 10/11

Name of the group: 2.sem.bak.prez.10/11

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 12 courses

Credits in the group: 30

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 |
|--------|---|------------|---------|-------|----------|------|
| 13EDOT | <b>Economy, Transport, Telecommunications</b>   | KZ         | 2       | 2+0   | L        | z    |
| 11FY1  | <b>Physics 1</b><br>Zuzana Malá, Tomáš Vitů, Marek Honců Zuzana Malá (Gar.)   | Z,ZK       | 4       | 2P+2C | L        | z    |
| 11MVP  | <b>Mathematical Analysis of Function of More Variables</b>  | Z,ZK       | 3       | 2+2   | L        | z    |
| 18MRI2 | <b>Materials 2</b>  | KZ         | 2       | 2+0   | L        | z    |
| 11PT   | <b>Probability</b>  | Z          | 2       | 1+1   | L        | z    |
| 12PKD  | <b>Rail Transport Designing</b>   | Z,ZK       | 3       | 2+2   | L        | z    |
| 18ST   | <b>Statics</b>  | Z,ZK       | 3       | 2+1   | L        | z    |
| 14SIAP | <b>Networks and Protocols</b>   | KZ         | 2       | 1+1   | L        | z    |
| 17TDL  | <b>Transport Technology and Logistics</b>   | Z,ZK       | 3       | 2+2   | L        | z    |
| 00TVC2 | <b>Physical Education 2</b>   | Z          | 1       | 0+2   | L        | z    |
| 20UIS  | <b>Introduction to ITS</b>  | Z,ZK       | 3       | 2+1   | L        | z    |
| 14UPRO | <b>Introduction to Programming</b>  | KZ         | 2       | 0+2   | L        | z    |

Characteristics of the courses of this group of Study Plan: Code=2.S.BP 10/11 Name=2.sem.bak.prez.10/11

|        |   |      |   |
|--------|---|------|---|
| 13EDOT | Economy, Transport, Telecommunications<br>Transport, telecommunications, demand, supply, indicators, economic development, legislation, European union, regulation, liberalisation, transport modes, ITS, sustainability.   | KZ   | 2 |
| 11FY1  | Physics 1<br>Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics, electric field, directed electric current.  | Z,ZK | 4 |
| 11MVP  | Mathematical Analysis of Function of More Variables<br>Metric spaces, sequences in metric spaces, limit of sequence in metric space. Differential calculus of functions of several variables, differential of function, partial derivations, implicitly defined functions, extremes of functions of several variables. Integral calculus of functions of several variables, Riemann integral, integral over curves and surfaces in R3, application of integral calculus in physics. | Z,ZK | 3 |
| 18MRI2 | Materials 2<br>Fundamental concepts, notions. The main materials groups. Semiconductors. Polymers. Special types of steel. Properties and application of the composite materials.   | KZ   | 2 |
| 11PT   | Probability<br>Descriptive statistics. Basic probability concepts: elementary events and events, definitions and interpretation of probability. Random variable, probability distribution, probability mass and density, moments, some discrete and continuous distributions. Random vectors: joint and marginal distributions, mean vector, covariance matrix. Mixed distributions, mixture of distributions. Law of large numbers, central limit theorem.                         | Z    | 2 |
| 12PKD  | Rail Transport Designing<br>Railway lines network. Vehicle and track relation. Traction. Track geometrical parameters. Clearance profile. Railway lines routing. Superstructure and substructure of the railway lines. Switches. Railway stations. City rail transport.   | Z,ZK | 3 |
| 18ST   | Statics<br>General system of forces. Calculation of reactions of mass objects and compound systems. Assessment of internal forces on statically determinate beam and simple framework. Principle of virtual works. Kinematic method for calculation of reactions of statically determinate systems. Determination of axial forces in truss construction, method of joints and method of sections. Geometry of cross sections. Plane fiber polygons and catenary cables.             | Z,ZK | 3 |

|   |                                    |      |   |
|---|------------------------------------|------|---|
| 14SIAP  | Networks and Protocols             | KZ   | 2 |
| Basic communication model, history and development of the Internet, principle of data transfer through computer networks (TCP/IP), performance of basic network protocols (ARP, RARP, TCP, UDP, Telnet, FTP, DNS, DHCP POP3, IMAP), data acquisition from the Internet sources, communicating ability via the Internet and fundamentals of own web presentation design by the means of web sites.   |                                    |      |   |
| 17TDL   | Transport Technology and Logistics | Z,ZK | 3 |
| Basic terms in transport technology and logistics. Particular steps of transport planning. Quantification of carriage relations. Line planning. Timetabling. Planning in passenger and freight transport. Organisation of traffic in each transport means. Technological factors from the point of view of operator and client. Organisation of public city transport. Logistic technologies and their application using various transport means. |                                    |      |   |
| 00TVC2  | Physical Education 2               | Z    | 1 |
| Practical instruction and training in a wide variety of sports and games: from basic recreational coaching to competitive top level training. Included are: basketball, volleyball, soccer, tennis, squash, floorball, bodybuilding, swimming, canoeing, aerobic.   |                                    |      |   |
| 20UIS   | Introduction to ITS                | Z,ZK | 3 |
| Intelligent Transport Systems (ITS), their objectives and vision. ITS in the world, in Europe and in the Czech Republic. Architecture of ITS and the role of standardization. Information and navigation systems. ITS in road, rail and combine transport. Design of ITS, organization, preparation and implementation of the project. Current projects in the Czech Republic.  |                                    |      |   |
| 14UPRO  | Introduction to Programming        | KZ   | 2 |
| Algorithm development, methods of structured programming, high-level programming languages, basics of C programming languages (types, variables, conditions, cycles, arrays, functions), programming techniques, complexity.  |                                    |      |   |

Code of the group: 3.S.BP 11/12

Name of the group: 3.sem.bak.prez.11/12

Requirement credits in the group: In this group you have to gain 27 credits

Requirement courses in the group: In this group you have to complete 10 courses

Credits in the group: 27

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 |
|--------|---|------------|---------|-------|----------|------|
| 11DAD  | <b>Differential and Difference Equations</b>  | Z,ZK       | 3       | 2+1   | Z        | z    |
| 11FY2  | <b>Physics 2</b>  | Z,ZK       | 4       | 2+2   | Z        | z    |
| 12MDE  | <b>Transport Models and Transport Excesses</b><br><i>Josef Kocourek, Milan Dont</i>   | Z,ZK       | 3       | 2P+1C | Z        | z    |
| 12PPOK | <b>Designing Roads, Highways and Motorways</b><br><i>Jiří Čarský, Tomáš Padělek, Jan Gallia, Petr Kumpošt, Petr Šatra</i>   | KZ         | 3       | 1P+2C | Z        | z    |
| 18PZP  | <b>Elasticity and Strength</b><br><i>Daniel Kytýr, Tomáš Doktor, Jan Šleichrt, Josef Jíra, Ondřej Jiroušek, Jan Šleichrt, Petr Koudelka, Petr Zlámal, Jan Vyčichl, ..... Ondřej Jiroušek (Gar.)</i> | Z,ZK       | 3       | 2P+1C | Z        | z    |
| 11SIS  | <b>Statistics</b>   | Z,ZK       | 2       | 1+1   | Z        | z    |
| 20SSA  | <b>Systems Analysis</b>   | Z,ZK       | 3       | 2+1   | Z        | z    |
| 14ZAET | <b>Fundamentals of Electrotechnics</b>  | KZ         | 2       | 2+1   | Z        | z    |
| 14UATT | <b>Introduction to Automatization and Telecommunication Systems</b>   | KZ         | 2       | 3+0   | Z        | z    |
| 16UDDM | <b>Introduction to Transportation and Manipulation Technics</b>   | ZK         | 2       | 2+0   | Z        | z    |

**Characteristics of the courses of this group of Study Plan: Code=3.S.BP 11/12 Name=3.sem.bak.prez.11/12**

|  |   |      |   |
|--|---|------|---|
| 11DAD  | Differential and Difference Equations   | Z,ZK | 3 |
| Difference equations and its systems. Some solvable types of differential equations of the first order. Linear differential equations of the n-th order. Methods for solution of the homogeneous equation, solution of inhomogeneous equation by means of variation of constants. Power series and their use for solution of differential equation. Boundary value problem. Eigennumbers and function for differential equation. Fourier series of function. |   |      |   |
| 11FY2  | Physics 2                               | Z,ZK | 4 |
| Magnetic field, electromagnetic field. Optics, quantum character of electromagnetic radiation. Introduction into quantization, hydrogen atom. Multi-electron atoms, the nuclei. Basics of solid body physics.  |   |      |   |
| 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.  |   |      |   |
| 18PZP  | Elasticity and Strength                 | Z,ZK | 3 |
| Tension and compression. Bending of beam. Shear stress during bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joint of structure. Analysis of deflection curve of beam. Torsion of circle cross section. Combined loading. Stability of compressed bar and buckling. Beam on elastic foundation. Strength analysis.  |   |      |   |
| 11SIS  | Statistics                              | Z,ZK | 2 |
| Point estimation, properties of point estimators, methods of point estimation. Testing statistical hypothesis. Fit test, independence test. Regression and correlation, linear regression, correlation coefficient, coefficient of determination, general linear model, statistical inference in linear regression, analysis of variance, multiple regression, use of matrices in regression.  |   |      |   |
| 20SSA  | Systems Analysis                        | Z,ZK | 3 |
| Systems identification. Typical tasks of systems analysis: on the interface, routes in system, decomposition and integration, on systems feedback. Capacity tasks, process analysis. Task about behaviour, aim behaviour, the genetic code, architecture and identity of systems. Fundamentals of technical cybernetics, stability and reliability of systems.   |   |      |   |

|  |  |    |   |
|--|--|----|---|
| 14ZAET   | Fundamentals of Electrotechnics                              | KZ | 2 |
| Basic electrotechnic terms, circuit quantities. Periodic courses characteristics. Electric circuits elements and basic circuit members. Assignating of bipoles and basic circuit elements. Solution to direct current circuits with a help of circuit analysis elementar methods: method of consecutive reduction, unloaded voltage divider, current divider. Transfiguration star-triangel and principle of superposition in direct current circuits. |  |    |   |
| 14UATT   | Introduction to Automatization and Telecommunication Systems | KZ | 2 |
| Basic axioms of technical cybernetics, automatization in transportation, human as the weakest element, signalling in transportation, modelling and projecting of transport systems, integrated technological and information system in post, principle of telecommunication signal transmission, solving of telecommunication networks, modulating methods, multimedial networks and services, NGN networks.   |  |    |   |
| 16UDDM   | Introduction to Transportation and Manipulation Technics     | ZK | 2 |
| Means of transportation and transportation systems. Principles, functions and arrangement of means of transportation. Motors and their characteristics. Water transportation. Manipulating technics. Principles of lifting machines and conveyors. Legislature.  |  |    |   |

Code of the group: 5.S.BPMED 12/13

Name of the group: 5.sem.MED bak.prez. 12/13

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

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

Credits in the group: 21

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><i>Tutors, authors and guarantors (gar.)</i> | Completion | Credits | Scope | Semester | Role |
|--------|--|------------|---------|-------|----------|------|
| 14DB   | Database Systems   | KZ         | 2       | 0+2   | Z        | z    |
| 17DNV  | Transportation of Dangerous Goods  | KZ         | 2       | 2+0   | Z        | z    |
| 13FIF  | Finances and Financing   | KZ         | 2       | 2+0   | Z        | z    |
| 13KM   | Crisis Management  | KZ         | 2       | 2+0   | Z        | z    |
| 17LOS  | Logistic Systems   | Z,ZK       | 3       | 2+1   | Z        | z    |
| 13MSTP | Small and Medium Enterprise  | KZ         | 2       | 2+0   | Z        | z    |
| 17PDO  | Designing of Public Transport Services   | KZ         | 3       | 2+1   | Z        | z    |
| 13TCHR | Tourist Trade Techniques   | Z          | 1       | 2+0   | Z        | z    |
| 17TGA  | Graph Theory and its Applications in Transport<br><i>Dušan Teichmann, Denisa Mocková, Alena Rybičková Alena Rybičková (Gar.)</i>                                       | Z,ZK       | 4       | 2P+2C | Z        | z    |

Characteristics of the courses of this group of Study Plan: Code=5.S.BPMED 12/13 Name=5.sem.MED bak.prez. 12/13

|   |  |      |   |
|---|--|------|---|
| 14DB  | 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.   |  |      |   |
| 17DNV   | Transportation of Dangerous Goods              | KZ   | 2 |
| Legal measures. Kinds of hazards. Classification. Carriage by road, railways, inland waterways, air and maritime transport. Obligations of consignors, carriers, consignees and safety advisors. System of international obligatory conditions. Enumerated list of dangerous goods. Packing and marking of packages. Transport documentation. Exempted and unlimited quantity. Crew, equipment, approval, marking, operation and construction of road vehicles.   |  |      |   |
| 13FIF   | Finances and Financing                         | KZ   | 2 |
| Cash flow, cost and revenue flow. Financial system functions. Financial assets. Types of financing. Company cash flow. Short-term financing instruments. Long-term financing instruments. Trading financial instruments. Banking financial instruments. Financial risk allocation instruments. Payment and hedging instruments. Loan capital. Risk capital.   |  |      |   |
| 13KM  | Crisis Management                              | KZ   | 2 |
| Extraordinary events in transport. Crisis states. Authorities of crisis management of the state. Crisis and emergency planning. Precautions of economic mobilization of the state. Use of state material reserves. Organization conditions for crisis states treatment. Technical means for elimination of results of extraordinary events. Protection and renewal of transport infrastructure, ensuring of operation. Information systems of crisis management.  |  |      |   |
| 17LOS   | Logistic Systems                               | Z,ZK | 3 |
| Definition of logistics, development and science basics of logistics. Basic elements of logistic system, logistic chain. Technology in logistics. Goals and strategies of company logistic system. Transport in logistic system. Logistic technologies in air, rail and water transport. Information systems in logistics and passenger transport. Storage and distribution in logistics. Position of logistics in the Czech Republic and Europe.                 |  |      |   |
| 13MSTP  | Small and Medium Enterprise                    | KZ   | 2 |
| SME, design, plan, market, analysis, finance, management, decision making, survival, growth.  |  |      |   |
| 17PDO   | Designing of Public Transport Services         | KZ   | 3 |
| Transport planning, demand elasticity. Strategy and hierarchical planning of public transport system. Line network planning, concept of offer. Integrated periodic timetable. Planning process of long-distance and regional transport. Optimised number of rolling-stock, circulation plan of rolling-stock, rolling-stock strategy. Public service liability for various segments. Harmony of particular long-term plans. Controlled competition. Case studies. |  |      |   |
| 13TCHR  | Tourist Trade Techniques                       | Z    | 1 |
| Development and importance of the tourist trade, summary of tourist trade services with more detailed analysis of transport services and means of transport in the air, water and land (rail and road) transport.   |  |      |   |
| 17TGA   | Graph Theory and its Applications in Transport | Z,ZK | 4 |
| Basic terms of graph theory, paths in graphs, flows in networks, location problems, design problems on graphs, optimum routing, use of graphs in other scientific disciplines.  |  |      |   |

Code of the group: 5.S.BPMED VÝBĚR 12/1

Name of the group: 5.sem.MED výběr předmětu 12/13

Requirement credits in the group: In this group you have to gain 2 credits

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

Credits in the group: 2

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 |
|-------|---|------------|---------|-------|----------|------|
| 14TEU | Creation of Scripts and Macros for Economic Tasks   | KZ         | 2       | 0+2   | Z        | z    |
| 14WS2 | Webdesign With Web Standards 2  | KZ         | 2       | 0+2   | Z        | z    |

Characteristics of the courses of this group of Study Plan: Code=5.S.BPMED VÝBĚR 12/1 Name=5.sem.MED výběr předmětu 12/13

|       |   |    |   |  |  |  |
|-------|---|----|---|--|--|--|
| 14TEU | Creation of Scripts and Macros for Economic Tasks<br>Fundamentals of VBA, functions and procedures, examples of their use. Forms and offers for user oriented applications, cooperation with other applications, solution to compatibility problems among different spreadsheet programs versions. Everything with the respect to economic tasks. | KZ | 2 |  |  |  |
| 14WS2 | Webdesign With Web Standards 2<br>Advanced CSS techniques. Multi-level menu. SEO - Search Engine Optimization. Web technologies: JavaScript, Flash, PHP, AJAX. AccessKey, Favicon, rollovers, lightboxes. Using API for maps or searching. Audit and page statistics. Use of useful scripts. Systems for content management.                      | KZ | 2 |  |  |  |

Code of the group: 6.S.BPMED 12/13

Name of the group: 6.sem.MED bak.prez. 12/13

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 10 courses

Credits in the group: 23

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 |
|--------|---|------------|---------|-------|----------|------|
| 17DAS  | Transportation and Communication Law  | Z          | 1       | 2+0   | L        | z    |
| 17DU   | Public Transport Service in a Territory   | KZ         | 2       | 2+0   | L        | z    |
| 13ERP  | Company Economy and Management  | Z,ZK       | 3       | 2+1   | L        | z    |
| 14ISYS | Information Systems   | KZ         | 2       | 2+0   | L        | z    |
| 13KS   | Quality of Transport and Telecommunication Systems  | KZ         | 2       | 2+0   | L        | z    |
| 13MPD  | Management of Techonology Systems of Land Transport   | Z,ZK       | 3       | 2+1   | L        | z    |
| 13MR   | Managerial Decision Making  | KZ         | 3       | 2+1   | L        | z    |
| 17ODS  | Optimization on Transportation Networks   | Z,ZK       | 3       | 2+1   | L        | z    |
| 17PZL  | Carriage and Forwarding   | Z,ZK       | 3       | 2+1   | L        | z    |
| 13TAC  | Tariffs and Prices in Transport   | Z          | 1       | 2+0   | L        | z    |

Characteristics of the courses of this group of Study Plan: Code=6.S.BPMED 12/13 Name=6.sem.MED bak.prez. 12/13

|        |  |      |   |  |  |  |
|--------|--|------|---|--|--|--|
| 17DAS  | Transportation and Communication Law<br>Transportation and communication law - railway, road transport, ropeway, water road, air transport, telecommunication, post, patent.   | Z    | 1 |  |  |  |
| 17DU   | Public Transport Service in a Territory<br>Transport policy. Impact of European integration.Configuration and links. Contract ensuring. Funding. Tariff and ticketing system. Legal conditions. Survey and quantification of carriage demand. Transport scheduling. Quality criteria and standards. IT, Publicity, Promotion, Marketing. Case study on an Integrated Public Transport System.  | KZ   | 2 |  |  |  |
| 13ERP  | Company Economy and Management<br>Company and its neighbourhood, structure of assets and liabilities, depreciation, costs, revenues and profit, break-even point, costing, inventory, financial management, investment appraisal, basics of management, organizational structures, human resources management, marketing, company strategy, business plan.   | Z,ZK | 3 |  |  |  |
| 14ISYS | Information Systems<br>State-of-the-art tools of objects control (control and planning) including problems related to these tools use, theory of information and knowledge, knowledge and expert systems, IS planning methodologies, transaction systems, theory of computer networks, semantic webs and sensitivity analysis.   | KZ   | 2 |  |  |  |
| 13KS   | Quality of Transport and Telecommunication Systems<br>Quality, systems, company, customer, norms, assessment, methods, indicators, satisfaction, loyalty.  | KZ   | 2 |  |  |  |
| 13MPD  | Management of Techonology Systems of Land Transport<br>Structure of vehicle systems, rational assessment, decision making in the managing activity, operation-technical and economic properties, technological subsystems in the field of the road and rail transport.   | Z,ZK | 3 |  |  |  |
| 13MR   | Managerial Decision Making<br>Decision making, rationality, process, state of the world, CPM, PERT, trees, group, certainty, risk, uncertainty, preference.  | KZ   | 3 |  |  |  |
| 17ODS  | Optimization on Transportation Networks<br>Introduction to optimization and heuristic methods, metaheuristic methods, the history of optimization.Lagrangean approach, assignment problem - Hungarian method, minimum weighted matching, Little's algorithm, vehicle routing problem - an extension of TSP, heuristic solution approaches to vehicle routing problem, local search techniques, Tabu Search, location problems - heuristic algorithms, genetic algorithms and extensions of genetic algorithms. | Z,ZK | 3 |  |  |  |

|       |  |      |   |
|-------|--|------|---|
| 17PZL | Carriage and Forwarding<br>Carriage, forwarding, economy, transport, supply, storage, warehouses, goods, passengers, insurance, distribution, customs.   | Z,ZK | 3 |
| 13TAC | Tariffs and Prices in Transport<br>Transport and division of labour. Costs in transport. External costs. Financing of traffic in transport. Prices and tariffs. Tariffs of railway transport. Tariffs of road transport. Tariffs of air and water contract. Transport market. Service arrangement in public interest. Pricing policy history. Pricing in the EU. | Z    | 1 |

Name of the block: Compulsory courses in the program

Minimal number of credits of the block: 23

The role of the block: P

Code of the group: 4.S.BPMED 11/12

Name of the group: 4.sem.MED bak.prez.11/12

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 10 courses

Credits in the group: 23

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><i>Tutors, authors and guarantors (gar.)</i> | Completion | Credits | Scope    | Semester | Role |
|--------|--|------------|---------|----------|----------|------|
| 17DPAS | Transport Policy and Strategy  | KZ         | 2       | 2+0      | L        | P    |
| 17EM   | Management Science   | KZ         | 2       | 2+0      | L        | P    |
| 14EAT  | Economic Analyses in Spreadsheets Programs Environment   | KZ         | 2       | 0+2      | L        | P    |
| 13EDTP | Economy and Management of Transport and Telecommunication Processes  | Z,ZK       | 3       | 2+1      | L        | P    |
| 13HG   | Economic Geography   | Z          | 2       | 2+0      | L        | P    |
| 18KIAD | Kinematics and Dynamics  | Z,ZK       | 2       | 2+1      | L        | P    |
| 13MVD  | Marketing in Transportation  | Z,ZK       | 2       | 2+1      | L        | P    |
| 17MEKA | Methods of Economics Analysis<br><i>Otto Pastor</i>  | KZ         | 2       | 2P+0C    | Z        | P    |
| 11MSP  | Modeling of Systems and Processes<br><i>Lucie Kármá, Jan Příkryl, Marek Honců, Bohumil Kovář, Elena Alexeeva<br/>Bohumil Kovář Bohumil Kovář (Gar.)</i>                | Z,ZK       | 4       | 2P+2C+1B | L        | P    |
| 14WS1  | Webdesign With Web Standards 1   | KZ         | 2       | 0+2      | L        | P    |
| 17RIP  | Project Management   | KZ         | 2       | 2+0      | L        | P    |

Characteristics of the courses of this group of Study Plan: Code=4.S.BPMED 11/12 Name=4.sem.MED bak.prez.11/12

|        |  |      |   |
|--------|--|------|---|
| 17DPAS | Transport Policy and Strategy<br>Goals, principles and tools of the transport policy. Development of transport policy of the EU and the ČR. Decreasing negative impacts on environment. Sustainable development strategy. Transport enterprise and access to transport market. Transport in regions. Public service obligation in transport. Transport infrastructure and vehicles, financing. Safety and reliability in transport. Relations of individual transport modes.             | KZ   | 2 |
| 17EM   | Management Science<br>Linear Programming, graphical interpretation and solution of LP problem. Types of distribution problems, transportation problem. Models of network analysis. Models of queuing theory. Models of inventory management. Simulation models.  | KZ   | 2 |
| 14EAT  | Economic Analyses in Spreadsheets Programs Environment<br>Work with spreadsheet programs with the respect to economic problems, use of nested functions and conditional formatting, statistic and mathematic functions. Creation of graphs and other graphic outputs. Data analysis, lists and contingent tables.  | KZ   | 2 |
| 13EDTP | Economy and Management of Transport and Telecommunication Processes<br>Transport and telecommunication system, financing of transport infrastructure, transport policy, transport service, energy sources, public goods, externalities in transport and their treatment, assessment of public projects, CBA method, transport company, costing in transportation, transport quality.   | Z,ZK | 3 |
| 13HG   | Economic Geography<br>Introduction of the issues, definitions and introductory concepts. World geography and its research subject. Economic geography - Europe, Asia, Africa, Australia, America, the Czech Republic. Transport geography and its research subject. Characteristics of transportation as one of the branches of the global economy. Transport systems and their location in the world. Particular transport modes as part of the economy and the world transport system. | Z    | 2 |
| 18KIAD | Kinematics and Dynamics<br>Motion along a line, motion along a curve. Kinematics of rigid plane, kinematics of rigid body. Point mass kinematics, system of point masses. Point mass dynamics and system of point masses, equation of motion. Method of Newton. Principle of D'Alembert. Free and forced vibration with one degree of freedom. Viscous damping. Impact theory. Introduction to the solution of vibration with multiple degrees of freedom.                               | Z,ZK | 2 |
| 13MVD  | Marketing in Transportation<br>General principles of the marketing applied in transportation. Marketing, marketing research, macroworld, microworld, markets, market positioning, products, brands, package, service, pricing, distribution channels, physical distribution, retail, wholesale, promotion, advertising, segmentation, placement, action plan.  | Z,ZK | 2 |
| 17MEKA | Methods of Economics Analysis<br>The techniques of economical analysis in the domain of analysis of dependencies, analysis and construction of time series and comparison of statistical values using differences and indices.   | KZ   | 2 |



|   |                                   |      |   |
|---|-----------------------------------|------|---|
| 11MSP   | Modeling of Systems and Processes | Z,ZK | 4 |
| Mathematical methods and algorithms as a basis for system analysis. Methods for modelling and evaluating the systems in continuous and discrete time domain. Laplace transform, z-transform, and the recursive algorithms in solution of differential and difference equations, as an instrument for system description. Practical use of technical computing environment (MATLAB).   |                                   |      |   |
| 14WS1   | Webdesign With Web Standards 1    | KZ   | 2 |
| HTTP, URL, markup languages HTML and XHTML, anchors, tables, images, lists, forms, features of CSS, rules of accessible web pages, usability of web pages, problems of different browsers, one, two and three column pages, page validation, conditional comments, CSS hacks.   |                                   |      |   |
| 17RIP   | Project Management                | KZ   | 2 |
| Project, influences, pressures and influences. Entrepreneurial plan and capital decision making. Marketing, break-even point assessment. Project management and his characters. Organizational structures in project management. Feasibility study. Capital and operational costs assessment. Process of choosing optimal variant. Cost Benefit Analysis. Models of project financing. Life cycle of project. Financial anal. of capital projects. Project risks. |                                   |      |   |

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 6

The role of the block: PV

Code of the group: Y1-B 11/12

Name of the group: PVP bak.prez. od 11/12

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><i>Tutors, authors and guarantors (gar.)</i> | Completion | Credits | Scope | Semester | Role |
|--------|--|------------|---------|-------|----------|------|
| 17Y1AF | <b>Alternative Forms of Transportation Project Financing</b>   | KZ         | 2       | 2+0   | Z        | PV   |
| 18Y1AM | <b>Anatomy, Mobility and Safety of Man</b>   | KZ         | 2       | 2P+0C | Z        | PV   |
| 14Y1AV | <b>Animation and Visualization</b>   | KZ         | 2       | 2P+0C | L        | PV   |
| 14Y1AP | <b>Automatization in Mail</b>  | KZ         | 2       | 2+0   | Z        | PV   |
| 17Y1BB | <b>Banks and Banking</b>   | KZ         | 2       | 2+0   | Z        | PV   |
| 14Y1BE | <b>Barrierless Transport</b><br><i>Jan Krčál</i>   | KZ         | 2       | 2P+0C | L        | PV   |
| 15Y1BO | <b>Work Safety and Health Protection in Transportation</b><br><i>Eva Rezlerová, Jan Feit, Petr Musil</i>   | KZ         | 2       | 2P+0C | L        | PV   |
| 17Y1DZ | <b>Transported Commodities Cognization</b>   | KZ         | 2       | 2+0   | L        | PV   |
| 18Y1D1 | <b>Dynamics of Routes and Vehicles 1</b>   | KZ         | 2       | 2+0   | Z        | PV   |
| 15Y1DU | <b>History of Art and Society</b>  | KZ         | 2       | 2+0   | Z        | PV   |
| 15Y1DZ | <b>History of Railway</b><br><i>Eva Rezlerová, Martin Jacura, Jan Feit</i>   | KZ         | 2       | 2P+0C | L        | PV   |
| 13Y1EA | <b>Economic - Energetic Analysis of Land Transport</b>   | KZ         | 2       | 2+0   | Z        | PV   |
| 17Y1EV | <b>Public Sector Economy</b>   | KZ         | 2       | 2+0   | Z        | PV   |
| 13Y1EV | <b>Public Sector Economy</b>   | KZ         | 2       | 2+0   | Z        | PV   |
| 15Y1EH | <b>European Integration within Historical Context</b><br><i>Eva Rezlerová, Jan Feit</i>  | KZ         | 2       | 2P+0C | Z        | PV   |
| 18Y1EV | <b>Experimental Methods and Numerical Modelling</b>  | KZ         | 2       | 2+0   | L        | PV   |
| 15Y1FD | <b>French Area Studies and Transportation</b><br><i>Irena Veselková</i>  | KZ         | 2       | 2P+0C | L        | PV   |
| 14Y1GD | <b>GIS and Maps Digitalization</b>   | KZ         | 2       | 2+0   | Z        | PV   |
| 20Y1GI | <b>Geographical Information Systems</b>  | KZ         | 2       | 2+0   | L        | PV   |
| 14Y1HW | <b>Computer Hardware</b><br><i>Vít Fábera</i>  | KZ         | 2       | 2P+0C | L        | PV   |
| 15Y1HL | <b>History of Air Transport</b><br><i>Eva Rezlerová, Jakub Kraus, Vladimír Plos, Jan Feit</i>  | KZ         | 2       | 2P+0C | L        | PV   |
| 15Y1HD | <b>History of City Mass Transport</b>  | KZ         | 2       | 2+0   | Z        | PV   |
| 12Y1HD | <b>Traffic Noise</b><br><i>Libor Ládyš</i>   | KZ         | 2       | 2P+0C | L        | PV   |
| 15Y1HE | <b>Work Hygiene and Ergonomics in Traffic</b><br><i>Eva Rezlerová, Jan Feit, Petr Musil</i>  | KZ         | 2       | 2P+0C | Z        | PV   |
| 20Y1IC | <b>Human Machine Interaction</b>   | KZ         | 2       | 2+0   | L        | PV   |
| 16Y1KJ | <b>Railroad Vehicles</b>   | KZ         | 2       | 2+0   | L        | PV   |
| 12Y1KN | <b>Combined Transportation</b>   | KZ         | 2       | 2+0   | Z        | PV   |

|        |   |    |   |       |   |    |
|--------|---|----|---|-------|---|----|
| 20Y1K  | <b>Cybernetics</b>  | KZ | 2 | 2+0   | Z | PV |
| 21Y1LM | <b>Aviation Meteorology</b>   | KZ | 2 | 2+0   | L | PV |
| 21Y1LR | <b>Radio Technology in Aviation</b>   | KZ | 2 | 2+0   | L | PV |
| 21Y1L  | <b>Airports - Design and Operation</b>  | KZ | 2 | 2+0   | L | PV |
| 21Y1LC | <b>Human Factor</b>   | KZ | 2 | 2+0   | Z | PV |
| 11Y1LP | <b>Linear Programming</b>   | KZ | 2 | 2+0   | L | PV |
| 17Y1LL | <b>Logistics of Passenger and Freight Air Transport</b><br><i>Petra Skolliová</i> | KZ | 2 | 2P+0C | L | PV |
| 11Y1MM | <b>Mathematical Models in Economy</b>   | KZ | 2 | 2P+0C | Z | PV |
| 18Y1MT | <b>Engineering Materials</b><br><i>Jaroslav Valach</i>                            | KZ | 2 | 2P+0C | L | PV |
| 14Y1NP | <b>Non-parametric 3D Modelling</b>  | KZ | 2 | 2+0   | Z | PV |
| 20Y1NS | <b>Neural Networks</b>  | KZ | 2 | 2+0   | Z | PV |
| 17Y1ND | <b>Maritime Transportation</b>  | KZ | 2 | 2+0   | Z | PV |
| 14Y1NH | <b>Databases Design and Programming</b>   | KZ | 2 | 2+0   | L | PV |
| 14Y1NB | <b>Databases Design and Programming</b>   | KZ | 2 | 2+0   | L | PV |
| 20Y1OI | <b>Fare Collection and Information Systems</b><br><i>Milan Sliacky</i>            | KZ | 2 | 2P+0C | L | PV |
| 14Y1OL | <b>Linux Operating System</b>   | KZ | 2 | 2+0   | Z | PV |
| 14Y1OS | <b>Operating Systems</b>  | KZ | 2 | 2+0   | Z | PV |
| 15Y1OP | <b>Turning Points of the Czech Nation</b>   | KZ | 2 | 2+0   | L | PV |
| 11Y1PV | <b>Parametrical and Multicriterial Programming</b>                                | KZ | 2 | 2+0   | Z | PV |
| 13Y1PM | <b>Personal Management</b>  | KZ | 2 | 2+0   | L | PV |
| 13Y1PD | <b>The Participation of Transport in Tourist Trade Management</b>                 | KZ | 2 | 2+0   | L | PV |
| 14Y1PM | <b>Advanced Methods of Parametric Programming</b>                                 | KZ | 2 | 2+0   | L | PV |
| 21Y1PU | <b>Aircraft Maintenance Technology</b>  | KZ | 2 | 2+0   | L | PV |
| 12Y1PD | <b>Assessment of Transport Structures</b><br><i>Kristýna Neubergová</i>           | KZ | 2 | 2P+0C | Z | PV |
| 20Y1PO | <b>Weather, Air Quality and Transportation</b>                                    | KZ | 2 | 2+0   | Z | PV |
| 14Y1PG | <b>Computer Graphics</b>  | KZ | 2 | 2P+0C | L | PV |
| 11Y1PE | <b>Computer Controlled Experiments</b>  | KZ | 2 | 2+0   | L | PV |
| 14Y1PJ | <b>C Programming Language</b>   | KZ | 2 | 2P+0C | Z | PV |
| 12Y1C1 | <b>Designing Roads in Civil 3D I</b><br><i>Tomáš Honc</i>                         | KZ | 2 | 2P+0C | L | PV |
| 12Y1C2 | <b>Designing Roads in Civil 3D II</b><br><i>Tomáš Honc</i>                        | KZ | 2 | 2P+0C | Z | PV |
| 18Y1P1 | <b>Design of Structures 1</b>   | KZ | 2 | 2+0   | L | PV |
| 16Y1PV | <b>Operation, Construction and Maintenance of Vehicles</b>                        | KZ | 2 | 2P+0C | L | PV |
| 12Y1PU | <b>Organization Disposition of Railway Stations</b><br><i>Martin Jacura</i>       | KZ | 2 | 2P+0C | L | PV |
| 12Y1PC | <b>Pedestrian and Cycling Transport</b>   | KZ | 2 | 2P+0C | L | PV |
| 12Y1RZ | <b>Railway Lines Reconstruction</b>   | KZ | 2 | 2+0   | Z | PV |
| 13Y1SM | <b>MESE Simulation</b>  | KZ | 2 | 2+0   | Z | PV |
| 20Y1SC | <b>Sensors and Actuators</b><br><i>Pavel Hrubeš</i>                               | KZ | 2 | 2P+0C | L | PV |
| 11Y1SI | <b>Transportation Software Engineering</b>  | KZ | 2 | 2+0   | Z | PV |
| 12Y1SU | <b>Road Management and Maintenance</b><br><i>Martin Höfler, Otakar Vacin</i>      | KZ | 2 | 2P+0C | L | PV |
| 18Y1SN | <b>Statically Nondetermined Structures</b>  | KZ | 2 | 2+0   | Z | PV |
| 16Y1TJ | <b>Technological Quality Aspects</b>  | KZ | 2 | 2+0   | Z | PV |
| 20Y1TE | <b>Technology of Electronic Systems</b>   | KZ | 2 | 2+0   | L | PV |
| 20Y1TD | <b>Telematics Databases</b>   | KZ | 2 | 2+0   | Z | PV |
| 11Y1TG | <b>Graph Theory</b>   | KZ | 2 | 2P+0C | L | PV |
| 16Y1TR | <b>Theory of Railroad Vehicle Driving</b>   | KZ | 2 | 2+0   | Z | PV |
| 16Y1TZ | <b>Transporting Devices</b>   | KZ | 2 | 2+0   | L | PV |
| 14Y1TI | <b>Creating Interactive Internet Applications</b>                                 | KZ | 2 | 2P+0C | L | PV |
| 14Y1VB | <b>Visual Basic</b>   | KZ | 2 | 2+0   | L | PV |
| 12Y1VC | <b>Waterways and Shipping</b>   | KZ | 2 | 2+0   | Z | PV |

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|--------|--|----|---|-------|---|----|
| 14Y1VM | <b>Development of Applications for Mobile Devices</b>  | KZ | 2 | 2+0   | Z | PV |
| 21Y1ZT | <b>ATM Systems</b>   | KZ | 2 | 2+0   | Z | PV |
| 16Y1ZL | <b>Vehicle Testing, Legislation and Construction</b><br><i>Josef Mik</i>                     | KZ | 2 | 2P+0C | Z | PV |
| 16Y1ZG | <b>Introduction into Applied Computer Graphics</b><br><i>Adam Orlický, Stanislav Novotný</i> | KZ | 2 | 2P+0C | L | PV |
| 18Y1ZD | <b>Basics of Two-Dimensional Design</b>  | KZ | 2 | 2+0   | Z | PV |
| 11Y1ZF | <b>Introduction to Solid State Physics</b>   | KZ | 2 | 2+0   | Z | PV |
| 14Y1ZM | <b>Fundamentals of Parametric and Adaptive Programming</b>                                   | KZ | 2 | 2P+0C | L | PV |
| 18Y1ZT | <b>Basics of Three-Dimensional Design</b>  | KZ | 2 | 2+0   | L | PV |
| 12Y1ZU | <b>Principles of Urbanism</b><br><i>Karel Hájek</i>  | KZ | 2 | 2P+0C | Z | PV |
| 18Y1UK | <b>Introduction of Rail Vehicles</b><br><i>Josef Kolář</i>                                   | KZ | 2 | 2P+0C | L | PV |
| 16Y1RE | <b>Control and Electronic Vehicle Systems</b><br><i>Josef Mik, Jiří First</i>                | KZ | 2 | 2P+0C | Z | PV |
| 16Y1RV | <b>Railroad Vehicles Driving</b>   | KZ | 2 | 2+0   | L | PV |
| 21Y1RL | <b>Air Traffic Control</b>   | KZ | 2 | 2+0   | L | PV |

**Characteristics of the courses of this group of Study Plan: Code=Y1-B 11/12 Name=PVP bak.prez. od 11/12**

|   |   |    |   |  |  |  |
|---|---|----|---|--|--|--|
| 17Y1AF  | Alternative Forms of Transportation Project Financing | KZ | 2 |  |  |  |
| There will be specified such forms of financing in transportation, where the public sector body perform the final debtor, i. e. debtor 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 project.   |   |    |   |  |  |  |
| 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 |  |  |  |
| Introducing and basic 3D primitives and their basic modifications and transformations. Creating 3D scenes. Transformations of 3D primitives, connection / interaction / combination of 3D primitives, creating 3D bodies as non-primitives. Using of surfaces. Working with materials and material editors. Lightnings. Setting of light and material parameters. Scene capturing. Camera settings, moving in the scene. Rendering and making animation.        |   |    |   |  |  |  |
| 14Y1AP  | Automatization in Mail                                | KZ | 2 |  |  |  |
| Technology of post shipment submission, transport, and delivery via physic and electronic way, virtual post operation. Technology of information transmission by electronic way, application of new information and communication technologies in an offer of permanent, mobile, and NGN e-communication networks, solutions to e-communication network interfaces, technological principles of end telecommunication devices.                                  |   |    |   |  |  |  |
| 17Y1BB  | Banks and Banking                                     | KZ | 2 |  |  |  |
| Banks and banking system. Balance sheet, income statement, bank's capital and its functions. Banking risks. Banking products. Interest types, pay-off and loan securing, financial loan products. Banking deposit products. Banking payment-clearing products. Financial intermediation, open-end and closed-end funds, collective investment schemes. Central bank and its role. Bank regulation and supervision. International banking.                       |   |    |   |  |  |  |
| 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.   |   |    |   |  |  |  |
| 17Y1DZ  | Transported Commodities Cognization                   | KZ | 2 |  |  |  |
| Useful features. Quality. Testing. Standardization. Features relevant for the transport. Packing. Stress. Protection of goods and damage prevention during the carriage. Optimization of the choice and effective transport means utility.  |   |    |   |  |  |  |
| 18Y1D1  | Dynamics of Routes and Vehicles 1                     | KZ | 2 |  |  |  |
| Theory and analysis of vibration of multimass systems. Dynamical model of vehicle and interaction with transport structure. Assessment of structure vibration and allowable criteria. Vibroisolation and absorbers of dynamical effects. Methods of experimental dynamics. FEM in structure dynamics.   |   |    |   |  |  |  |
| 15Y1DU  | History of Art and Society                            | KZ | 2 |  |  |  |
| History of art - definitions, terminology, division into periods. Architecture, fine arts, design. Situation in Central Europe, today in the Czech Republic. Stations, bridges, industrial buildings. Design of transport vehicles.   |   |    |   |  |  |  |
| 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.        |   |    |   |  |  |  |
| 13Y1EA  | Economic - Energetic Analysis of Land Transport       | KZ | 2 |  |  |  |
| Vehicle traction systems, traction-energetic properties, laws of vehicle motion, assessment of energy demands, traction-energetic conceptions, technical, economical and social aspects.  |   |    |   |  |  |  |
| 17Y1EV  | Public Sector Economy                                 | KZ | 2 |  |  |  |
| Economic and financial theory of public sector, public choice theory, externalities, 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.  |   |    |   |  |  |  |
| 13Y1EV  | Public Sector Economy                                 | KZ | 2 |  |  |  |
| Summary of basic economic findings, public goods - definition, public sector domains, state budget, taxes, public goods and externalities, externalities in transportation and their treatment, methods of assessment of public projects, transport projects and their funding, benefits of transport projects, the assessment of transport projects by the CBA method, HDM-4, CSHS.  |   |    |   |  |  |  |

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|---|--|----|---|
| 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. |  |    |   |
| 18Y1EV  | Experimental Methods and Numerical Modelling     | KZ | 2 |
| Physical properties measured in structural mechanics and dynamics. Principles of strain gauge measurement. Theory of photoelasticity, experimental methods in structural dynamics. Basic principles of numerical methods in structural mechanics and dynamics. Finite element method in statics and dynamics. Geometry development, discretization to elements, types of structural elements. Boundary conditions. Material models. Solution of problems.         |  |    |   |
| 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.  |  |    |   |
| 14Y1GD  | GIS and Maps Digitalization                      | KZ | 2 |
| Work with map sources and their creating. Maps digitalization and creation. Use and creation of other (non-graphic) information with use of databases. Interlinking external references with drawings containing maps.  |  |    |   |
| 20Y1GI  | Geographical Information Systems                 | KZ | 2 |
| Introduction to geographical information systems, creating real-world model, data models, storage of geographical data, methods of data entry, digitization, geographical coordinate systems, map projections, raster and vector representation, spatial algorithms and operations, and general transport roles in GIS.   |  |    |   |
| 14Y1HW  | Computer Hardware                                | KZ | 2 |
| Design combinational and sequential logical circuits and their implementation on FPGA, VHDL language. Computer architecture, structures of computer components - controller, ALU, memories, I/O subsystem, typical interfaces and buses (PCI Express, I2C, SPI, USB).   |  |    |   |
| 15Y1HL  | History of Air Transport                         | KZ | 2 |
| Aeronautics. Beginnings of aircrafts heavier than air. Czechoslovak aviation pioneers. Development of airports in the Czech Republic. World airports. Airlines of the world. Helicopters. CSA airplanes. Famous aviators. Classic era of aviation. Golden era of civil aviation. Supersonic flying. Modern era of civil aviation. Flying in the world.  |  |    |   |
| 15Y1HD  | History of City Mass Transport                   | KZ | 2 |
| History of city mass transport in the world, development of tram, bus and trolley-bus systems. History of transport networks in the world, current trends and developments of tariff and clearance systems. History of city transport in Prague and Brno. History of tram, bus and trolley-bus operation systems in the Czech Republic and Slovakia.  |  |    |   |
| 12Y1HD  | Traffic Noise                                    | KZ | 2 |
| Acoustic introduction, basic terms, quantities. Basics of physiological acoustic, noise impacts on human body. Acoustic legislation, standarts, regulations. Creation acoustic climate in area, principles of urban acoustic, noise transmission, soundproofing. Types of noise sources in area. Determination of acoustic situation in the area of interest. Methodology of computing and measurement of transport noise. Acoustic studies, measuring protocol.  |  |    |   |
| 15Y1HE  | Work Hygiene and Ergonomics in Traffic           | KZ | 2 |
| Basic knowledge of occupational hygiene and ergonomics, and their application in transport. Working environment factors, and the influence of these factors on health of workers. Creation and protection of working conditions that do not damage public health. Mutual links: man-machine-environment. Adaptation of technology to possibilities and skills of a man. Practical examples from the field of transportation; relevant legislature.                |  |    |   |
| 20Y1IC  | Human Machine Interaction                        | KZ | 2 |
| Interaction of human-system. Methods and procedures for detecting decrease in attention. Used software and hardware tools. Bio-feedback, EEG measurements.  |  |    |   |
| 16Y1KJ  | Railroad Vehicles                                | KZ | 2 |
| 21st century mobility. Recent construction of railroad, city and intercity public vehicles, future and present situation, speed as a solution, maglev. From principle to design and construction; some realization in the world. Division and ways of drive, efficient electronics, changers, railroad traction, energetic calculation. Railroad safety signalling systems, railroad vehicle and infrastructure compliance (interference). Testing.               |  |    |   |
| 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.  |  |    |   |
| 20Y1K   | Cybernetics                                      | KZ | 2 |
| Fundamentals of information theory, dynamic systems, the principle of feedback, logical systems. Finite automata as a special case of dynamical systems. Relations between languages and automata.  |  |    |   |
| 21Y1LM  | Aviation Meteorology                             | KZ | 2 |
| Structure of atmosphere. Vertical stratification. Pressures QNH, QFE, QFF, QME. Instability. Atmospheric fronts. Atmospheric precipitation, origin & categorisation. Turbulence. Forces producing wind. Cyclone and anticyclone. Gradient wind. Geostrophical and geocyclostrophical wind. Visibilities in air transport. Dangerous meteorological aspects. Meteorological maps. Climatology. Circulation. Intertropical front. Meteorological information.       |  |    |   |
| 21Y1LR  | Radio Technology in Aviation                     | KZ | 2 |
| Electric signals and the wave spectrum. Analog and digital modulations. Noises. Filters. Resonance circuits. Electromagnetic field. Electromagnetic wave propagation. Wave ranges in aviation, radiation and reception of electromagnetic field. Antennas in aviation, receivers and transmitters.  |  |    |   |
| 21Y1L   | Airports - Design and Operation                  | KZ | 2 |
| Introductory conditions for development of planning of runway systems and terminal facilities. Road construction, approximate analysis of RWY distance. Investment planning - operator activities. Certification of international airports - standard checking. Unexpected events and their handling.   |  |    |   |
| 21Y1LC  | Human Factor                                     | KZ | 2 |
| Human performance & limitations, ability & competence, accident statistics, flight safety, basics of flight physiology, individuals & environment, breathing & circulation, sensory system, health & hygiene, health preservation, intoxication, incapacitation, basics of flight psychology, human information processing, memory & learning, theory & model of human error, biorhythms & sleep, stress, fatigue, working methods.                               |  |    |   |
| 11Y1LP  | Linear Programming                               | KZ | 2 |
| Definition of the optimization problem of linear programming, application of the linear programming on economic and technical problems, normal traffic problems and traffic problems with constrains. Geometrical interpretation of linear programming problems, simplex method, duality principle.   |  |    |   |
| 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.  |  |    |   |
| 11Y1MM  | Mathematical Models in Economy                   | KZ | 2 |
| The goal of the course is to teach selected methods of linear programming, with theoretical procedures applicable for individual tasks and their program implementation. The outcome of the course is the ability to implement and solve basic tasks from the queue theory, graph theory and both free and constrained optimization.  |  |    |   |
| 18Y1MT  | Engineering Materials                            | KZ | 2 |
| Systematic overview of main classes of materials used in technical design. In addition to main classes of materials, i. e. metals, ceramics, polymers and composites, attention is paid to biological materials and to biomimetics. Integral approach to material selection process is also demonstrated based on so called Ashby's selection charts.   |  |    |   |

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| 14Y1NP   | Non-parametric 3D Modelling                                | 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.  |  |    |   |
| 20Y1NS   | Neural Networks  | KZ | 2 |
| The basic structure and function of human brain and its main functional blocks and building elements - neurons. Models of neurons, modelling their networks and the basic paradigms of artificial neural networks.   |  |    |   |
| 17Y1ND   | Maritime Transportation                                    | KZ | 2 |
| History and importance of the maritime transportation, theoretical discipline in maritime transportation, seafaring vessels, maritime ports and their utilization, inland logistic centre and maritime ports, transport corridors and link by maritime, river and rail transport I and II, global maritime corridors, logistics of maritime transportation, maritime transportation and smart containers, ITS in maritime transport.                     |  |    |   |
| 14Y1NH   | Databases Design and Programming                           | KZ | 2 |
| Students in this course will deepen their knowledge and skills in database design and learn the procedural extension of SQL, PL/SQL, which makes it possible to ensure data integrity on the level of the database engine.   |  |    |   |
| 14Y1NB   | Databases Design and Programming                           | KZ | 2 |
| Every student will design his own application - that means design database, programme basic graphical interface and requested application behaviour.   |  |    |   |
| 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).  |  |    |   |
| 14Y1OL   | Linux Operating System                                     | KZ | 2 |
| Distributions. GNU/Linux system installation. X-window system. Rights - Users and Groups, ACL rights. Filesystems and file attributes. Programs and processes. Boot of OS, runlevels. Basic console commands. Configuration files. Managing SW system. Programs in graphic mode - tools for text, graphics, sound, video, communication. Services management. Principles of OS secure configuration. Remote administration.                              |  |    |   |
| 14Y1OS   | Operating Systems  | KZ | 2 |
| Operating systems, their function and architecture, process and memory management, virtual memory, threads, interprocess communication, synchronization, file systems, architecture of operating systems Win and Linux, start of PC and operating systems, networking, safety in OS, terminals in MS Win and Linux, batch files. Domains and workgroups in MS Win, users and their rights, configuration of networks, Windows registry, remote desktop.  |  |    |   |
| 15Y1OP   | Turning Points of the Czech Nation                         | KZ | 2 |
| Crucial moments of more than a thousand-year long history of Western Slavs in Central Europe. Emphasis on relations to bordering nations and Europe as a whole. The Premyslid state. Lands of the Czech Crown as a part of Habsburg monarchy. 19th century political programmes. Foundation of Czechoslovakia. Disputes over the sense of Czech history. Changes of power structure in Europe during 20th century and the position of the Czech nation.  |  |    |   |
| 11Y1PV   | Parametrical and Multicriterial Programming                | KZ | 2 |
| Solution to the problem of linear programming with a parameter in objective function, on right sides and in the matrix of coefficients of linear constraints. Computation of efficient solution.   |  |    |   |
| 13Y1PM   | Personal Management  | KZ | 2 |
| Basic overview of leadership issue from the viewpoint of an employee as well as a manager. The accent at the experience of basic situations through a simulation game. Systemic approach to the personal management, the assessment as a process, SWOT analysis, basic principles of personal management, theory and practice of motivation, managerial leadership styles.   |  |    |   |
| 13Y1PD   | The Participation of Transport in Tourist Trade Management | KZ | 2 |
| Tourist trade, transport, typology, market, marketing mix, transport service providers, contract cooperation, reservation systems, transport valuables, standard air carriers, low cost air carriers, IATA, ICAO, road, water, rail transport.   |  |    |   |
| 14Y1PM   | Advanced Methods of Parametric Programming                 | 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.   |  |    |   |
| 21Y1PU   | Aircraft Maintenance Technology                            | KZ | 2 |
| Basics of aircraft maintenance technology, legislation, aircraft release into operation, safety, equipment.  |  |    |   |
| 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.   |  |    |   |
| 20Y1PO   | Weather, Air Quality and Transportation                    | 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.   |  |    |   |
| 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.   |  |    |   |
| 11Y1PE   | Computer Controlled Experiments                            | KZ | 2 |
| Implementation of experiment consisting of designing, measurement method selection according to required results accuracy and available measurement devices, selection of computer-recorded parameters, data acquisition and results calculation. Evaluation of measurement method accuracy and result uncertainty.  |  |    |   |
| 14Y1PJ   | C Programming Language                                     | KZ | 2 |
| C programming language. Preprocessor, basics of the C language (data types, syntax, commands), functions, pointers, dynamical memory allocation, string, files, structures and unions. Implementations of abstract data types (FIFO, LIFO, list), programming techniques (sorting, searching, recursion), using bitwise operators.   |  |    |   |
| 12Y1C1   | Designing Roads in Civil 3D I                              | KZ | 2 |
| The course is devoted to the traffic buildings design field, specifically the design of roads as such, by the means of a 3D software. Students go through the complete design of this particular linear building, from the initial situation, over the longitudinal section, to the model and work sections and the cubic capacity calculation. The course also includes a basic explanation of the traffic building design in the real-life profession. |  |    |   |
| 12Y1C2   | Designing Roads in Civil 3D II                             | KZ | 2 |
| The course is devoted to the traffic buildings design field, specifically the design of roads as such, by the means of a 3D software. Students go through the complete design of this particular linear building, from the initial situation, over the longitudinal section, to the model and work sections and the cubic capacity calculation. The previously acquired skills are improved and developed. Students learn to design intersections.       |  |    |   |
| 18Y1P1   | Design of Structures 1                                     | KZ | 2 |
| Deformations of beam elements, virtual work. Strength method. Frame analysis by strength method. Deformation method. Frame analysis by deformation method. Simple planar grid. Beam on elastic Winkler's foundation. Calculation of beam on elastic foundation. Basics of the mathematical elasticity. Wall as a structural element. Plate as a structural member. Statical function of shells. Examples of calculations.                                |  |    |   |

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| 16Y1PV   | Operation, Construction and Maintenance of Vehicles | KZ | 2 |
| Methods of vehicle production. Vehicle maintenance. Vehicle diagnostics. Maintenance and repair plans. Engine maintenance and emission measurement. Transmission mechanism. General principles of engine diagnostics.  |   |    |   |
| 12Y1PU   | Organization Disposition of Railway Stations        | KZ | 2 |
| Connecting station. Passenger transport equipment. Freight transport equipment. Branch lines and railway traffic inside industrial company areas. Zone stations. Formation yards. Reserve stations. Technology of work in railway station with regard to its disposition. Railway station documentations in the Czech Republic railway network.  |   |    |   |
| 12Y1PC   | Pedestrian and Cycling Transport                    | KZ | 2 |
| Routes for pedestrians. Pedestrian crossings. Modifications for blind, dim-sighted and disabled people. Design of cycle routes network. Ways of cycle route layout and design parameters for cyclists. Separation of cyclists from other transport modes. Cycle tracks and its design - one way streets, reserved traffic lanes, bus stops, crossings with other transport modes, crossroads. Traffic signs and road marking for cyclists.   |   |    |   |
| 12Y1RZ   | Railway Lines Reconstruction                        | KZ | 2 |
| Principles of track maintenance technology. Track maintenance machinery, superstructure and substructure building machinery and special rail vehicles. Degradation of track geometrical parameters - causes and elimination principles. Track sections and station tracks exclusion planning. Reconstruction timetable design of railway superstructure and substructure.  |   |    |   |
| 13Y1SM   | MESE Simulation                                     | KZ | 2 |
| Management game simulating corporate decision making. Groups of students produce the same product, give the volume of available production capacity, plan budgets for marketing, research and development.   |   |    |   |
| 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.   |   |    |   |
| 11Y1SI   | Transportation Software Engineering                 | KZ | 2 |
| Basic concepts of software engineering, ranging from domain analysis, requirement analysis and software architectures to analyses, design and implementation using formal techniques and practical usage.  |   |    |   |
| 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. |   |    |   |
| 18Y1SN   | Statically Nondetermined Structures                 | KZ | 2 |
| Deformations of the beam element, virtual work. Strength method. Frame analysis by strength method. Deformation method. Frame analysis by deformation method. Simple planar grid. Beam on elastic Winkler's foundation. Calculation beam on elastic foundation. Basement of the mathematical elasticity. Calculation of walls. Calculation of plates. Cylindrical shells. Examples of calculations.  |   |    |   |
| 16Y1TJ   | Technological Quality Aspects                       | KZ | 2 |
| Certification and accreditation. Quality management. Standards of Quality Management and its application. Quality system creation. Tools and methods of quality improvement. Conformity verification. Environmental certification. Workplace certification. QMS integration. Classification, certification of products and producers.  |   |    |   |
| 20Y1TE   | Technology of Electronic Systems                    | KZ | 2 |
| Characteristics of the technological process, the relation of the design, construction and technology. General scheme of technological process. Principles and characteristics of basic electronic elements. Basic technology of integrated circuits. Synthesis of integrated circuits. Higher levels of technology components. Measurement, diagnostics, reliability. Operational aspects of electronic systems.                            |   |    |   |
| 20Y1TD   | Telematics Databases                                | KZ | 2 |
| Issue of telematics databases, work with OpenStreetMap layer, use of Linux OS and PostgreSQL with PostGIS extension, real traffic data.  |   |    |   |
| 11Y1TG   | Graph Theory  | KZ | 2 |
| Directed and undirected graphs, weighted graphs, matrices describing graphs, minimal spanning tree, minimal path, Eulerian paths, graph traversing, matching in bipartite graphs, flow networks. Algorithms for problems of existence and optimization. Solving of NP-hard problems, heuristic approach.   |   |    |   |
| 16Y1TR   | Theory of Railroad Vehicle Driving                  | KZ | 2 |
| Legislation in railroad transportation. Technical condition of railroad vehicles and responsibility for their condition. Railroad traffic regulations. Railroad traffic safety. Signal systems. Radiocommunication system. Powering system. Power distribution.  |   |    |   |
| 16Y1TZ   | Transporting Devices                                | KZ | 2 |
| Flow of masses, material transport technology, loose material transport - conveyors with tractive elements, conveyors without tractive elements, transport of piece material - continual transport devices, cyclic transport devices, crane mechanisms, steel constructions. Vertical transport, transport in mines, long-distance conveyor belt transport.  |   |    |   |
| 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.   |   |    |   |
| 14Y1VB   | Visual Basic  | KZ | 2 |
| Applications developing for Visual Basic on MS-Windows .NET platform with use of .NET libraries or Visual Studio tools for graphic or console mode. Further, creation of installation utilities for these applications. Work with VBA at superstructures creation for MS-Windows applications supporting VBA.  |   |    |   |
| 12Y1VC   | Waterways and Shipping                              | KZ | 2 |
| Basic modes of transport. The position of water transport in the transport system of the Czech Republic and the EU. Advantages and disadvantages of water transport. Basic systems of waterways in Europe, a network of waterways in the Czech Republic. Construction of the waterway and its equipment. Management of waterways and its operation. The legal regime in inland navigation, navigation rules of operation, navigation maps.   |   |    |   |
| 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.   |   |    |   |
| 21Y1ZT   | ATM Systems   | KZ | 2 |
| The course introduces classical and modern facilities, systems and technologies designed for ATS. Student obtains knowledge of technical principles and solutions of communication, navigation and surveillance systems used in aviation.  |   |    |   |
| 16Y1ZL   | Vehicle Testing, Legislation and Construction       | KZ | 2 |
| Vehicle, bus and motorbike construction, aggregate computing, driving resistance, build and parameters of traction, constructional arrangement of personal cars, trucks, buses, motorbikes, legislation in the EU and in the world, technical legislation creation, testing methods, vehicle tests, accelerated tests, mathematical modelling in testing.  |   |    |   |
| 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.  |   |    |   |

|   |   |    |   |
|---|---|----|---|
| 18Y1ZD  | Basics of Two-Dimensional Design                    | KZ | 2 |
| The comprehensive teaching method includes primary creative principles and the introduction to the logic of free shapes in the plane. The "step-by-step" procedure passing from simple relationships to more complex ones. The topics are closed by two-dimensional variations on basic conceptual elements and other tasks of the creative character.  |   |    |   |
| 11Y1ZF  | Introduction to Solid State Physics                 | KZ | 2 |
| Structure of solids, crystal lattice, Bloch function, Brillouin zones. Band theory of solids. Dynamics of 1D lattice. Phonons. Thermodynamic properties of solids. Semiconductors. Magnetism.   |   |    |   |
| 14Y1ZM  | Fundamentals of Parametric and Adaptive Programming | KZ | 2 |
| Basics of work at products and parts creation. Sketch drawing by help of geometric relations, parametric dimensions, creation of adaptive models from 2D sketches. Import and export from and to another systems. Fundamentals of assemblies creation.  |   |    |   |
| 18Y1ZT  | Basics of Three-Dimensional Design                  | KZ | 2 |
| The design tasks focus first on the three-dimensional design in defined space. The next step is the synthesis of the internal space with three-dimensional elements and correct shape modelling.  |   |    |   |
| 12Y1ZU  | Principles of Urbanism                              | KZ | 2 |
| Survey on history of city and settlement building. Functional components and their mutual relations (working, living, recreation, transportation). Spatial arrangement of settlements. Types of towns or cities with a certain prevailing function, forms of their development. Brief overview of land-use planning.  |   |    |   |
| 18Y1UK  | Introduction of Rail Vehicles                       | KZ | 2 |
| Basic characteristics and parameters rail transport systems - railway and urban transport. Basis driving mechanics rail vehicles - equation of motion train and unit trains. Rolling and track resistance. Total running resistance. Acceleration force. Analyzing driving cycle rail vehicle. Speed-power diagrams and characteristics rail vehicle - hydromechanic, hydrodynamic and electric drive. Design concept rail vehicles and drive of wheel set. |   |    |   |
| 16Y1RE  | Control and Electronic Vehicle Systems              | KZ | 2 |
| Elementary concepts of regulation. Tools for analytical solution, linear system description. Basic types of a regulator (PID), properties, advantages, disadvantages, function. Conventional and hybrid drive control. Electric drive. Vehicle communication bus (CAN, LIN, FlexRay, ISOBus, KWP2000 protocols etc.). Vehicle electronic control, safety, communication and comfort systems.  |   |    |   |
| 16Y1RV  | Railroad Vehicles Driving                           | KZ | 2 |
| Electric circuits in railroad vehicles. Railroad vehicle parameters regulation. Servicing and operation of the railroad vehicles. Rail traction technology. Solution of emergency situations. Searching and solving faults.   |   |    |   |
| 21Y1RL  | Air Traffic Control                                 | KZ | 2 |
| Air traffic services and their distribution. Organization of air traffic, flow and capacity management. Airspace management. System support for aircraft flying through space. Flight plan, form, content. Separation of aircraft. Reports of air traffic services, form, content. Harmonization and integration of ATC. CFMU and its subsystems. Flexible use of airspace - FUA. RVSM, RNP. New trends in the area of ATC.                                 |   |    |   |

Name of the block: Jazyky

Minimal number of credits of the block: 12

The role of the block: J

Code of the group: JZ-B-3.4 12/13

Name of the group: Jazyk bak. 5.6.sem. od 12/13

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

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

Credits in the group: 6

Note on the group:

| Code   | Name of the course / Name of the group of courses<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 |
|--------|---|------------|---------|-----------|----------|------|
| 15JZ3A | Foreign Language - English 3  | Z          | 3       | 0+4       | Z        | J    |
| 15JZ4A | Foreign Language - English 4  | Z,ZK       | 3       | 0+4       | L        | J    |
| 15JZ3F | Foreign Language - French 3<br>Eva Rezlerová, Jan Feit, Irena Veselková   | Z          | 3       | 0P+4C     | Z        | J    |
| 15JZ4F | Foreign Language - French 4<br>Eva Rezlerová, Jan Feit, Irena Veselková   | Z,ZK       | 3       | 0P+4C+10B | L        | J    |
| 15JZ3N | Foreign Language - German 3<br>Eva Rezlerová, Jan Feit, Jana Štikarová, Alexej Kusák, Petra Mračková<br>Vavroušová Eva Rezlerová (Gar.)                         | Z          | 3       | 0P+4C     | Z        | J    |
| 15JZ4N | Foreign Language - German 4<br>Eva Rezlerová, Jan Feit, Jana Štikarová  | Z,ZK       | 3       | 0P+4C+10B | L        | J    |
| 15JZ3R | Foreign Language - Russian 3<br>Eva Rezlerová, Jan Feit, Marie Michlová   | Z          | 3       | 0P+4C     | Z        | J    |
| 15JZ4R | Foreign Language - Russian 4<br>Eva Rezlerová, Jan Feit, Marie Michlová   | Z,ZK       | 3       | 0P+4C+10B | L        | J    |
| 15JZ3S | Foreign Language - Spanish 3<br>Eva Rezlerová, Jan Feit, Petra Mračková Vavroušová, Nina Hricsina Puškinová<br>Petra Mračková Vavroušová (Gar.)                 | Z          | 3       | 0P+4C     | Z        | J    |
| 15JZ4S | Foreign Language - Spanish 4<br>Eva Rezlerová, Jan Feit, Nina Hricsina Puškinová Nina Hricsina Puškinová<br>(Gar.)  | Z,ZK       | 3       | 0P+4C+10B | L        | J    |

Characteristics of the courses of this group of Study Plan: Code=JZ-B-3.4 12/13 Name=Jazyk bak. 5.6.sem. od 12/13

|  |                              |      |   |
|--|------------------------------|------|---|
| 15JZ3A   | Foreign Language - English 3 | Z    | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation. |                              |      |   |
| 15JZ4A   | Foreign Language - English 4 | Z,ZK | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation. |                              |      |   |
| 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.             |                              |      |   |
| 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.             |                              |      |   |
| 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.             |                              |      |   |
| 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.             |                              |      |   |
| 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.             |                              |      |   |
| 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.             |                              |      |   |
| 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.             |                              |      |   |
| 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.             |                              |      |   |

Code of the group: JZ-B-1,2 11/12

Name of the group: Jazyk bak.3.4.sem.od 11/12

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

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

Credits in the group: 6

Note on the group:

| Code   | Name of the course / Name of the group of courses<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 | <b>Foreign Language - English 1</b><br>Eva Rezlírová, Jan Feit, Marie Michlová, Klára Lancová, Lenka Monková, Jitka Heřmanová, Dana Boušová, Barbora Horáčková, Marek Tomeček, .....<br>Jitka Heřmanová (Gar.) | Z          | 3       | 0P+4C     | Z        | J    |
| 15JZ2A | <b>Foreign Language - English 2</b><br>Eva Rezlírová, Jan Feit, Marie Michlová, Lenka Monková, Jitka Heřmanová, Dana Boušová, Barbora Horáčková, Marek Tomeček, Peter Morpuss, .....                           | Z,ZK       | 3       | 0P+4C+10B | L        | J    |
| 15JZ1F | <b>Foreign Language - French 1</b>   | Z          | 3       | 0+4       | Z        | J    |
| 15JZ2F | <b>Foreign Language - French 2</b>   | Z,ZK       | 3       | 0+4       | L        | J    |
| 15JZ1N | <b>Foreign Language - German 1</b>   | Z          | 3       | 0+4       | Z        | J    |
| 15JZ2N | <b>Foreign Language - German 2</b>   | Z,ZK       | 3       | 0+4       | L        | J    |
| 15JZ1R | <b>Foreign Language - Russian 1</b>  | Z          | 3       | 0+4       | Z        | J    |
| 15JZ2R | <b>Foreign Language - Russian 2</b>  | Z,ZK       | 3       | 0+4       | L        | J    |
| 15JZ1S | <b>Foreign Language - Spanish 1</b>  | Z          | 3       | 0+4       | Z        | J    |
| 15JZ2S | <b>Foreign Language - Spanish 2</b>  | Z,ZK       | 3       | 0+4       | L        | J    |

Characteristics of the courses of this group of Study Plan: Code=JZ-B-1,2 11/12 Name=Jazyk bak.3.4.sem.od 11/12



|  |                              |      |   |
|--|------------------------------|------|---|
| 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.   |                              |      |   |
| 15JZ1F   | Foreign Language - French 1  | Z    | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation. |                              |      |   |
| 15JZ2F   | Foreign Language - French 2  | Z,ZK | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation. |                              |      |   |
| 15JZ1N   | Foreign Language - German 1  | Z    | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation. |                              |      |   |
| 15JZ2N   | Foreign Language - German 2  | Z,ZK | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation. |                              |      |   |
| 15JZ1R   | Foreign Language - Russian 1 | Z    | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation. |                              |      |   |
| 15JZ2R   | Foreign Language - Russian 2 | Z,ZK | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation. |                              |      |   |
| 15JZ1S   | Foreign Language - Spanish 1 | Z    | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation. |                              |      |   |
| 15JZ2S   | Foreign Language - Spanish 2 | Z,ZK | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation. |                              |      |   |

### List of courses of this pass:

| Code   | Name of the course                    | Completion | Credits |
|--|---------------------------------------|------------|---------|
| 00TVC1   | Physical Education 1                  | Z          | 1       |
| Practical instruction and training in a wide variety of sports and games: from basic recreational coaching to competitive top level training. Included are: basketball, volleyball, soccer, tennis, squash, floorball, bodybuilding, swimming, canoeing, aerobic.  |                                       |            |         |
| 00TVC2   | Physical Education 2                  | Z          | 1       |
| Practical instruction and training in a wide variety of sports and games: from basic recreational coaching to competitive top level training. Included are: basketball, volleyball, soccer, tennis, squash, floorball, bodybuilding, swimming, canoeing, aerobic.  |                                       |            |         |
| 11DAD  | Differential and Difference Equations | Z,ZK       | 3       |
| Difference equations and its systems. Some solvable types of differential equations of the first order. Linear differential equations of the n-th order. Methods for solution of the homogeneous equation, solution of inhomogeneous equation by means of variation of constants. Power series and their use for solution of differential equation. Boundary value problem. Eigennumbers and function for differential equation. Fourier series of function. |                                       |            |         |
| 11FY1  | Physics 1                             | Z,ZK       | 4       |
| Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics, electric field, directed electric current.  |                                       |            |         |
| 11FY2  | Physics 2                             | Z,ZK       | 4       |
| Magnetic field, electromagnetic field. Optics, quantum character of electromagnetic radiation. Introduction into quantization, hydrogen atom. Multi-electron atoms, the nuclei. Basics of solid body physics.  |                                       |            |         |
| 11GIE  | Geometry                              | KZ         | 3       |
| Orthographic and oblique projections, linear perspective. Topographic surfaces and their orthogonal projection. Differential geometry of curves - parameterization, arc of the curve, torsion and curvature, Frenet's trihedron. Kinematics - a curve as a trajectory of the motion, the velocity and acceleration of a particle moving on a curved path.  |                                       |            |         |
| 11LA   | Linear Algebra                        | Z,ZK       | 3       |
| Vector spaces (linear combinations, linear independence, dimension, basis, coordinates). Matrices and operations. Systems of linear equations and their solvability. Determinants and their applications. Scalar product. Similarity of matrices (eigenvalues and eigenvectors). Quadratic forms and their classification.   |                                       |            |         |

|  |   |      |   |
|--|---|------|---|
| 11MSP  | Modeling of Systems and Processes                   | Z,ZK | 4 |
| Mathematical methods and algorithms as a basis for system analysis. Methods for modelling and evaluating the systems in continuous and discrete time domain. Laplace transform, z-transform, and the recursive algorithms in solution of differential and difference equations, as an instrument for system description. Practical use of technical computing environment (MATLAB).  |   |      |   |
| 11MTA  | Mathematical Analysis                               | Z,ZK | 4 |
| Sequences and series of real numbers and its convergence. Basic properties of functions. Differential and integral calculus of the real function of one real variable. Power series, Fourier series and foundations of Fourier transform.  |   |      |   |
| 11MVP  | Mathematical Analysis of Function of More Variables | Z,ZK | 3 |
| Metric spaces, sequences in metric spaces, limit of sequence in metric space. Differential calculus of functions of several variables, differential of function, partial derivations, implicitly defined functions, extremes of functions of several variables. Integral calculus of functions of several variables, Riemann integral, integral over curves and surfaces in R <sup>3</sup> , application of integral calculus in physics.                        |   |      |   |
| 11PT   | Probability   | Z    | 2 |
| Descriptive statistics. Basic probability concepts: elementary events and events, definitions and interpretation of probability. Random variable, probability distribution, probability mass and density, moments, some discrete and continuous distributions. Random vectors: joint and marginal distributions, mean vector, covariance matrix. Mixed distributions, mixture of distributions. Law of large numbers, central limit theorem.                     |   |      |   |
| 11SIS  | Statistics  | Z,ZK | 2 |
| Point estimation, properties of point estimators, methods of point estimation. Testing statistical hypothesis. Fit test, independence test. Regression and correlation, linear regression, correlation coefficient, coefficient of determination, general linear model, statistical inference in linear regression, analysis of variance, multiple regression, use of matrices in regression.  |   |      |   |
| 11X31  | Project 1   | Z    | 2 |
| 11X32  | Project 2   | Z    | 2 |
| 11X33  | Project 3   | Z    | 2 |
| 11Y1LP   | Linear Programming                                  | KZ   | 2 |
| Definition of the optimization problem of linear programming, application of the linear programming on economic and technical problems, normal traffic problems and traffic problems with constraints. Geometrical interpretation of linear programming problems, simplex method, duality principle.   |   |      |   |
| 11Y1MM   | Mathematical Models in Economy                      | KZ   | 2 |
| The goal of the course is to teach selected methods of linear programming, with theoretical procedures applicable for individual tasks and their program implementation. The outcome of the course is the ability to implement and solve basic tasks from the queue theory, graph theory and both free and constrained optimization.   |   |      |   |
| 11Y1PE   | Computer Controlled Experiments                     | KZ   | 2 |
| Implementation of experiment consisting of designing, measurement method selection according to required results accuracy and available measurement devices, selection of computer-recorded parameters, data acquisition and results calculation. Evaluation of measurement method accuracy and result uncertainty.  |   |      |   |
| 11Y1PV   | Parametrical and Multicriterial Programming         | KZ   | 2 |
| Solution to the problem of linear programming with a parameter in objective function, on right sides and in the matrix of coefficients of linear constraints. Computation of efficient solution.   |   |      |   |
| 11Y1SI   | Transportation Software Engineering                 | KZ   | 2 |
| Basic concepts of software engineering, ranging from domain analysis, requirement analysis and software architectures to analyses, design and implementation using formal techniques and practical usage.  |   |      |   |
| 11Y1TG   | Graph Theory  | KZ   | 2 |
| Directed and undirected graphs, weighted graphs, matrices describing graphs, minimal spanning tree, minimal path, Eulerian paths, graph traversing, matching in bipartite graphs, flow networks. Algorithms for problems of existence and optimization. Solving of NP-hard problems, heuristic approach.   |   |      |   |
| 11Y1ZF   | Introduction to Solid State Physics                 | KZ   | 2 |
| Structure of solids, crystal lattice, Bloch function, Brillouin zones. Band theory of solids. Dynamics of 1D lattice. Phonons. Thermodynamic properties of solids. Semiconductors. Magnetism.  |   |      |   |
| 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.  |   |      |   |
| 12PKD  | Rail Transport Designing                            | Z,ZK | 3 |
| Railway lines network. Vehicle and track relation. Traction. Track geometrical parameters. Clearance profile. Railway lines routing. Superstructure and substructure of the railway lines. Switches. Railway stations. City rail transport.  |   |      |   |
| 12PPOK   | Designing Roads, Highways and Motorways             | KZ   | 3 |
| Definition, types, ownership, maintenance, management and categorization of roads and highways. Curve and transition curve. Sinuosity and standard speed. Route in rural areas. Range of vision for stopping and overtaking. Road body - shapes and proportions, bottom and superstructure. Drainage and components of roads. Safety device. Crossings, junctions, intersections.  |   |      |   |
| 12X31  | Project 1   | Z    | 2 |
| 12X32  | Project 2   | Z    | 2 |
| 12X33  | Project 3   | Z    | 2 |
| 12Y1C1   | Designing Roads in Civil 3D I                       | KZ   | 2 |
| The course is devoted to the traffic buildings design field, specifically the design of roads as such, by the means of a 3D software. Students go through the complete design of this particular linear building, from the initial situation, over the longitudinal section, to the model and work sections and the cubic capacity calculation. The course also includes a basic explanation of the traffic building design in the real-life profession.         |   |      |   |
| 12Y1C2   | Designing Roads in Civil 3D II                      | KZ   | 2 |
| The course is devoted to the traffic buildings design field, specifically the design of roads as such, by the means of a 3D software. Students go through the complete design of this particular linear building, from the initial situation, over the longitudinal section, to the model and work sections and the cubic capacity calculation. The previously acquired skills are improved and developed. Students learn to design intersections.               |   |      |   |
| 12Y1HD   | Traffic Noise                                       | KZ   | 2 |
| Acoustic introduction, basic terms, quantities. Basics of physiological acoustic, noise impacts on human body. Acoustic legislation, standards, regulations. Creation acoustic climate in area, principles of urban acoustic, noise transmission, soundproofing. Types of noise sources in area. Determination of acoustic situation in the area of interest. Methodology of computing and measurement of transport noise. Acoustic studies, measuring protocol. |   |      |   |
| 12Y1KN   | Combined Transportation                             | KZ   | 2 |
| Combined transport strategy and legislation. Load units. Means of transport in combined transport. Combined transport systems. Transshipping areas. Multimodal logistic centres.   |   |      |   |

|        |   |      |   |
|--------|---|------|---|
| 12Y1PC | <b>Pedestrian and Cycling Transport</b><br>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.           | KZ   | 2 |
| 12Y1PD | <b>Assessment of Transport Structures</b><br>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.   | KZ   | 2 |
| 12Y1PU | <b>Organization Disposition of Railway Stations</b><br>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.  | KZ   | 2 |
| 12Y1RZ | <b>Railway Lines Reconstruction</b><br>Principles of track maintainance technology. Track maintainance machinery, superstructure and substructure building machinery and special rail vehicles. Degradation of track geometrical parameters - causes and elimination principles. Track sections and station tracks exclusion planning. Reconstruction timetable design of railway superstructure and substructure.  | KZ   | 2 |
| 12Y1SU | <b>Road Management and Maintenance</b><br>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.          | KZ   | 2 |
| 12Y1VC | <b>Waterways and Shipping</b><br>Basic modes of transport. The position of water transport in the transport system of the Czech Republic and the EU. Advantages and disadvantages of water transport. Basic systems of waterways in Europe, a network of waterways in the Czech Republic. Construction of the waterway and its equipment. Management of waterways and its operation. The legal regime in inland navigation, navigation rules of operation, navigation maps.                     | KZ   | 2 |
| 12Y1ZU | <b>Principles of Urbanism</b><br>Survey on history of city and settlement building. Functional components and their mutual relations (working, living, recreation, transportation). Spatial arrangement of settlements. Types of towns or cities with a certain prevailing function, forms of their development. Brief overview of land-use planning.   | KZ   | 2 |
| 12ZADI | <b>Introduction to Transportation Engineering</b><br>Traffic survey. Terrestrial roads. Residential zone. Land - use planning. Railway transport. Public mass transport. Integrated traffic systems. Traffic prognosis. Traffic safety. Air transport. Traffic and environment.   | Z,ZK | 3 |
| 13E    | <b>Economics</b><br>Microeconomic and macroeconomic interpretation of economic relations. Method and subject of the economics. Economic decision making of consumers and producers. Market structures. Labour and capital, efficiency, ownership, public choice.  | Z,ZK | 3 |
| 13EDOT | <b>Economy, Transport, Telecommunications</b><br>Transport, telecommunications, demand, supply, indicators, economic development, legislation, European union, regulation, liberalisation, transport modes, ITS, sustainability.  | KZ   | 2 |
| 13EDTP | <b>Economy and Management of Transport and Telecommunication Processes</b><br>Transport and telecommunication system, financing of transport infrastructure, transport policy, transport service, energy sources, public goods, externalities in transport and their treatment, assessment of public projects, CBA method, transport company, costing in transportation, transport quality.   | Z,ZK | 3 |
| 13ERP  | <b>Company Economy and Management</b><br>Company and its neighbourhood, structure of assets and liabilities, depreciation, costs, revenues and profit, break-even point, costing, inventory, financial management, investment appraisal, basics of management, organizational structures, human resources management, marketing, company strategy, business plan.   | Z,ZK | 3 |
| 13FIF  | <b>Finances and Financing</b><br>Cash flow, cost and revenue flow. Financial system functions. Financial assets. Types of financing. Company cash flow. Short-term financing instruments. Long-term financing instruments. Trading financial instruments. Banking financial instruments. Financial risk allocation instruments. Payment and hedging instruments. Loan capital. Risk capital.  | KZ   | 2 |
| 13HG   | <b>Economic Geography</b><br>Introduction of the issues, definitions and introductory concepts. World geography and its research subject. Economic geography - Europe, Asia, Africa, Australia, America, the Czech Republic. Transport geography and its research subject. Characteristics of transportation as one of the branches of the global economy. Transport systems and their location in the world. Particular transport modes as part of the economy and the world transport system. | Z    | 2 |
| 13KM   | <b>Crisis Management</b><br>Extraordinary events in transport. Crisis states. Authorities of crisis management of the state. Crisis and emergency planning. Precautions of economic mobilization of the state. Use of state material reserves. Organization conditions for crisis states treatment. Technical means for elimination of results of extraordinary events. Protection and renewal of transport infrastructure, ensuring of operation. Information systems of crisis management.    | KZ   | 2 |
| 13KS   | <b>Quality of Transport and Telecommunication Systems</b><br>Quality, systems, company, customer, norms, assessment, methods, indicators, satisfaction, loyalty.  | KZ   | 2 |
| 13MPD  | <b>Management of Techonology Systems of Land Transport</b><br>Structure of vehicle systems, rational assessment, decision making in the managing activity, operation-technical and economic properties, technological subsystems in the field of the road and rail transport.   | Z,ZK | 3 |
| 13MR   | <b>Managerial Decision Making</b><br>Decision making, rationality, process, state of the world, CPM, PERT, trees, group, certainty, risk, uncertainty, preference.  | KZ   | 3 |
| 13MSTP | <b>Small and Medium Enterprise</b><br>SME, design, plan, market, analysis, finance, management, decision making, survival, growth.  | KZ   | 2 |
| 13MVD  | <b>Marketing in Transportation</b><br>General principles of the marketing applied in transportation. Marketing, marketing research, macroworld, microworld, markets, market positioning, products, brands, package, service, pricing, distribution channels, physical distribution, retail, wholesale, promotion, advertising, segmentation, placement, action plan.  | Z,ZK | 2 |
| 13TAC  | <b>Tariffs and Prices in Transport</b><br>Transport and division of labour. Costs in transport. External costs. Financing of traffic in transport. Prices and tariffs. Tariffs of railway transport. Tariffs of road transport. Tariffs of air and water contract. Transport market. Service arrangement in public interest. Pricing policy history. Pricing in the EU.   | Z    | 1 |
| 13TCHR | <b>Tourist Trade Techniques</b><br>Development and importance of the tourist trade, summary of tourist trade services with more detailed analysis of transport services and means of transport in the air, water and land (rail and road) transport.  | Z    | 1 |
| 13X31  | <b>Project 1</b>  | Z    | 2 |
| 13X32  | <b>Project 2</b>  | Z    | 2 |

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| 13X33   | Project 3  | Z  | 2 |
| 13Y1EA  | Economic - Energetic Analysis of Land Transport              | KZ | 2 |
| Vehicle traction systems, traction-energetic properties, laws of vehicle motion, assessment of energy demands, traction-energetic conceptions, technical, economical and social aspects.  |  |    |   |
| 13Y1EV  | Public Sector Economy  | KZ | 2 |
| Summary of basic economic findings, public goods - definition, public sector domains, state budget, taxes, public goods and externalities, externalities in transportation and their treatment, methods of assessment of public projects, transport projects and their funding, benefits of transport projects, the assessment of transport projects by the CBA method, HDM-4, CSHS.  |  |    |   |
| 13Y1PD  | The Participation of Transport in Tourist Trade Management   | KZ | 2 |
| Tourist trade, transport, typology, market, marketing mix, transport service providers, contract cooperation, reservation systems, transport valuables, standard air carriers, low cost air carriers, IATA, ICAO, road, water, rail transport.  |  |    |   |
| 13Y1PM  | Personal Management  | KZ | 2 |
| Basic overview of leadership issue from the viewpoint of an employee as well as a manager. The accent at the experience of basic situations through a simulation game. Systemic approach to the personal management, the assessment as a process, SWOT analysis, basic principles of personal management, theory and practice of motivation, managerial leadership styles.  |  |    |   |
| 13Y1SM  | MESE Simulation  | KZ | 2 |
| Management game simulating corporate decision making. Groups of students produce the same product, give the volume of available production capacity, plan budgets for marketing, research and development.  |  |    |   |
| 14DB  | 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.   |  |    |   |
| 14EAT   | Economic Analyses in Spreadsheets Programs Environment       | KZ | 2 |
| Work with spreadsheet programs with the respect to economic problems, use of nested functions and conditional formatting, statistic and mathematic functions. Creation of graphs and other graphic outputs. Data analysis, lists and contingent tables.   |  |    |   |
| 14ISYS  | Information Systems  | KZ | 2 |
| State-of-the-art tools of objects control (control and planning) including problems related to these tools use, theory of information and knowledge, knowledge and expert systems, IS planning methodologies, transaction systems, theory of computer networks, semantic webs and sensitivity analysis.   |  |    |   |
| 14KSP   | Constructing with Computer Aid                               | KZ | 2 |
| "CAD systems" term determination. CAD role in projecting system model. Existing CAD systems on Czech market. Project creation, basic common work rules in graphic applications and CA systems. Co-ordinated systems, CAD environment skill (basics of constructing, dimensioning, modifications, user interfaces, projecting possibilities, AutoCAD environment profiles, drawings with raster foundations).  |  |    |   |
| 14SIAP  | Networks and Protocols                                       | KZ | 2 |
| Basic communication model, history and development of the Internet, principle of data transfer through computer networks (TCP/IP), performance of basic network protocols (ARP, RARP, TCP, UDP, Telnet, FTP, DNS, DHCP POP3, IMAP), data acquirement from the Internet sources, communicating ability via the Internet and fundamentals of own web presentation design by the means of web sites.   |  |    |   |
| 14TEU   | Creation of Scripts and Macros for Economic Tasks            | KZ | 2 |
| Fundamentals of VBA, functions and procedures, examples of their use. Forms and macros for user oriented applications, cooperation with other applications, solution to compatibility problems among different spreadsheet programs versions. Everything with the respect to economic tasks.  |  |    |   |
| 14UATT  | Introduction to Automatization and Telecommunication Systems | KZ | 2 |
| Basic axioms of technical cybernetics, automatization in transportation, human as the weakest element, signalling in transportation, modelling and projecting of transport systems, integrated technological and information system in post, principle of telecommunication signal transmission, solving of telecommunication networks, modulating methods, multimedial networks and services, NGN networks.  |  |    |   |
| 14UPRO  | Introduction to Programming                                  | KZ | 2 |
| Algorithm development, methods of structured programming, high-level programming languages, basics of C programming languages (types, variables, conditions, cycles, arrays, functions), programming techniques, complexity.  |  |    |   |
| 14WS1   | Webdesign With Web Standards 1                               | KZ | 2 |
| HTTP, URL, markup languages HTML and XHTML, anchors, tables, images, lists, forms, features of CSS, rules of accessible web pages, usability of web pages, problems of different browsers, one, two and three column pages, page validation, conditional comments, CSS hacks.   |  |    |   |
| 14WS2   | Webdesign With Web Standards 2                               | KZ | 2 |
| Advanced CSS techniques. Multi-level menu. SEO - Search Engine Optimization. Web technologies: JavaScript, Flash, PHP, AJAX. AccessKey, Favicon, rollovers, lightboxes. Using API for maps or searching. Audit and page statistics. Use of useful scripts. Systems for content management.  |  |    |   |
| 14X31   | Project 1  | Z  | 2 |
| 14X32   | Project 2  | Z  | 2 |
| 14X33   | Project 3  | Z  | 2 |
| 14Y1AP  | Automatization in Mail                                       | KZ | 2 |
| Technology of post shipment submission, transport, and delivery via physical and electronic way, virtual post operation. Technology of information transmission by electronic way, application of new information and communication technologies in an offer of permanent, mobile, and NGN e-communication networks, solutions to e-communication network interfaces, technological principles of end telecommunication devices.                                |  |    |   |
| 14Y1AV  | Animation and Visualization                                  | KZ | 2 |
| Introducing and basic 3D primitives and their basic modifications and transformations. Creating 3D scenes. Transformations of 3D primitives, connection / interaction / combination of 3D primitives, creating 3D bodies as non-primitives. Using of surfaces. Working with materials and material editors. Lightnings. Setting of light and material parameters. Scene capturing. Camera settings, moving in the scene. Rendering and making animation.        |  |    |   |
| 14Y1BE  | Barrierless Transport  | KZ | 2 |
| The issue of barrierless accessible public transportation in terms of architectural barriers and also for transportation-technological point of view. Students will gain theoretical knowledge of barrierless environment roads, railway stations, public transport stops, terminal buildings, vehicles, public transport, information and orientation systems and transportation technology. Theoretical knowledge will be supplemented by practical examples. |  |    |   |
| 14Y1GD  | GIS and Maps Digitalization                                  | KZ | 2 |
| Work with map sources and their creating. Maps digitalization and creation. Use and creation of other (non-graphic) information with use of databases. Interlinking external references with drawings containing maps.  |  |    |   |
| 14Y1HW  | Computer Hardware  | KZ | 2 |
| Design combinational and sequential logical circuits and their implementation on FPGA, VHDL language. Computer architecture, structures of computer components - controller, ALU, memories, I/O subsystem, typical interfaces and buses (PCI Express, I2C, SPI, USB).   |  |    |   |

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| 14Y1NB  | Databases Design and Programming                    | KZ   | 2 |
| Every student will design his own application - that means design database, programme basic graphical interface and requested application behaviour.  |   |      |   |
| 14Y1NH  | Databases Design and Programming                    | KZ   | 2 |
| Students in this course will deepen their knowledge and skills in database design and learn the procedural extension of SQL, PL/SQL, which makes it possible to ensure data integrity on the level of the database engine.  |   |      |   |
| 14Y1NP  | Non-parametric 3D Modelling                         | 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.   |   |      |   |
| 14Y1OL  | Linux Operating System                              | KZ   | 2 |
| Distributions. GNU/Linux system installation. X-window system. Rights - Users and Groups, ACL rights. Filesystems and file attributes. Programs and processes. Boot of OS, runlevels. Basic console commands. Configuration files. Managing SW system. Programs in graphic mode - tools for text, graphics, sound, video, communication. Services management. Principles of OS secure configuration. Remote administration.                             |   |      |   |
| 14Y1OS  | Operating Systems                                   | KZ   | 2 |
| Operating systems, their function and architecture, process and memory management, virtual memory, threads, interprocess communication, synchronization, file systems, architecture of operating systems Win and Linux, start of PC and operating systems, networking, safety in OS, terminals in MS Win and Linux, batch files. Domains and workgroups in MS Win, users and their rights, configuration of networks, Windows registry, remote desktop. |   |      |   |
| 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.  |   |      |   |
| 14Y1PJ  | C Programming Language                              | KZ   | 2 |
| C programming language. Preprocessor, basics of the C language (data types, syntax, commands), functions, pointers, dynamical memory allocation, string, files, structures and unions. Implementations of abstract data types (FIFO, LIFO, list), programming techniques (sorting, searching, recursion), using bitwise operators.  |   |      |   |
| 14Y1PM  | Advanced Methods of Parametric Programming          | 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.  |   |      |   |
| 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.  |   |      |   |
| 14Y1VB  | Visual Basic  | KZ   | 2 |
| Applications developing for Visual Basic on MS-Windows .NET platform with use of .NET libraries or Visual Studio tools for graphic or console mode. Further, creation of installation utilities for these applications. Work with VBA at superstructures creation for MS-Windows applications supporting VBA.   |   |      |   |
| 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.  |   |      |   |
| 14Y1ZM  | Fundamentals of Parametric and Adaptive Programming | KZ   | 2 |
| Basics of work at products and parts creation. Sketch drawing by help of geometric relations, parametric dimensions, creation of adaptive models from 2D sketches. Import and export from and to another systems. Fundamentals of assemblies creation.  |   |      |   |
| 14ZAET  | Fundamentals of Electrotechnics                     | KZ   | 2 |
| Basic electrotechnic terms, circuit quantities. Periodic courses characteristics. Electric circuits elements and basic circuit members. Assignating of bipoles and basic circuit elements. Solution to direct current circuits with a help of circuit analysis elementary methods: method of consecutive reduction, unloaded voltage divider, current divider. Transfiguration star-triangel and principle of superposition in direct current circuits. |   |      |   |
| 14ZINF  | Fundamentals of Informatics                         | KZ   | 2 |
| Introduction to faculty network, MS-Word and Open Office, use of styles and advanced features, computer functions and information transmission. Number systems incl. arithmetic calculations. Algorithms and their proprieties. Flow charts for algorithms drawing. Mathematic and logic ordering algorithms incl. functions and procedures. Work with MS-Excel - tables, graphs, calculations, functions.  |   |      |   |
| 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.  |   |      |   |
| 15JZ1F  | Foreign Language - French 1                         | Z    | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.                |   |      |   |
| 15JZ1N  | Foreign Language - German 1                         | Z    | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.                |   |      |   |
| 15JZ1R  | Foreign Language - Russian 1                        | Z    | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.                |   |      |   |
| 15JZ1S  | Foreign Language - Spanish 1                        | Z    | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.                |   |      |   |
| 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.  |   |      |   |
| 15JZ2F  | Foreign Language - French 2                         | Z,ZK | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.                |   |      |   |

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| 15JZ2N  | Foreign Language - German 2                         | Z,ZK | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.                          |   |      |   |
| 15JZ2R  | Foreign Language - Russian 2                        | Z,ZK | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.                          |   |      |   |
| 15JZ2S  | Foreign Language - Spanish 2                        | Z,ZK | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.                          |   |      |   |
| 15JZ3A  | Foreign Language - English 3                        | Z    | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.                          |   |      |   |
| 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.                                      |   |      |   |
| 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.                                      |   |      |   |
| 15JZ4A  | Foreign Language - English 4                        | Z,ZK | 3 |
| Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their 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.                                      |   |      |   |
| 15JZ4N  | Foreign Language - German 4                         | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.                                      |   |      |   |
| 15JZ4R  | Foreign Language - Russian 4                        | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.                                      |   |      |   |
| 15JZ4S  | Foreign Language - Spanish 4                        | Z,ZK | 3 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.                                      |   |      |   |
| 15X31   | Project 1   | Z    | 2 |
| 15X32   | Project 2   | Z    | 2 |
| 15X33   | Project 3   | Z    | 2 |
| 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.   |   |      |   |
| 15Y1DU  | History of Art and Society                          | KZ   | 2 |
| History of art - definitions, terminology, division into periods. Architecture, fine arts, design. Situation in Central Europe, today in the Czech Republic. Stations, bridges, industrial buildings. Design of transport vehicles.   |   |      |   |
| 15Y1DZ  | History of Railway                                  | KZ   | 2 |
| Horse-drawn railways, steam railways, railway network development in the 2nd half of 19th century, regional railways epoch, railways of the "First Republic", electric traction, World War II railways, railway development in the 2nd half of 20th century, high-speed railway origins, railway lines closing, important long-distance train connections, railway lines construction, railway accidents, railway junctions. Excursions and projections.          |   |      |   |
| 15Y1EH  | European Integration within Historical Context      | KZ   | 2 |
| Versailles system, formation of new states. Europe and the powers, League of Nations. European policy in the 1920s. Fascism, nazism, communism. Little Entente, its principles and goals. Europe after Hitler's getting to power, system of bilateral agreements. Decline of the LN. Rearrangement of powers during WWII. Cold war and its consequences for Europe. New quality of French-German relationship - a driving power of starting European integration. |   |      |   |

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| 15Y1FD | <b>French Area Studies and Transportation</b><br>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.   | KZ | 2 |
| 15Y1HD | <b>History of City Mass Transport</b><br>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.   | KZ | 2 |
| 15Y1HE | <b>Work Hygiene and Ergonomics in Traffic</b><br>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.         | KZ | 2 |
| 15Y1HL | <b>History of Air Transport</b><br>Aeronautics. Beginnings of aircrafts heavier than air. Czechoslovak aviation pioneers. Development of airports in the Czech Republic. World airports. Airlines of the world. Helicopters. CSA airplanes. Famous aviators. Classic era of aviation. Golden era of civil aviation. Supersonic flying. Modern era of civil aviation. Flying in the world.   | KZ | 2 |
| 15Y1OP | <b>Turning Points of the Czech Nation</b><br>Crucial moments of more than a thousand-year long history of Western Slavs in Central Europe. Emphasis on relations to bordering nations and Europe as a whole. The Premyslid state. Lands of the Czech Crown as a part of Habsburgh monarchy. 19th century political programmes. Foundation of Czechoslovakia. Disputes over the sense of Czech history. Changes of power structure in Europe during 20th century and the position of the Czech nation.       | KZ | 2 |
| 16UDDM | <b>Introduction to Transportation and Manipulation Technics</b><br>Means of transportation and transportation systems. Principles, functions and arrangement of means of transportation. Motors and their characteristics. Water transportation. Manipulating technics. Principles of lifting machines and conveyors. Legislature.  | ZK | 2 |
| 16X31  | <b>Project 1</b>  | Z  | 2 |
| 16X32  | <b>Project 2</b>  | Z  | 2 |
| 16X33  | <b>Project 3</b>  | Z  | 2 |
| 16Y1KJ | <b>Railroad Vehicles</b><br>21st century mobility. Recent construction of railroad, city and intercity public vehicles, future and present situation, speed as a solution, maglev. From principle to design and construction; some realization in the world. Division and ways of drive, efficient electronics, changers, railroad traction, energetic calculation. Railroad safety signalling systems, railroad vehicle and infrastructure compliance (interference). Testing.                             | KZ | 2 |
| 16Y1PV | <b>Operation, Construction and Maintenance of Vehicles</b><br>Methods of vehicle production. Vehicle maintenance. Vehicle diagnostics. Maintenance and repair plans. Engine maintenance and emission measurement. Transmission mechanism. General principles of engine diagnostics.   | KZ | 2 |
| 16Y1RE | <b>Control and Electronic Vehicle Systems</b><br>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.   | KZ | 2 |
| 16Y1RV | <b>Railroad Vehicles Driving</b><br>Electric circuits in railroad vehicles. Railroad vehicle parametres regulation. Servicing and operation of the railroad vehicles. Rail traction technology. Solution of emergency situations. Searching and solving faults.   | KZ | 2 |
| 16Y1TJ | <b>Technological Quality Aspects</b><br>Certification and accreditation. Quality management. Standards of Quality Management and its application. Quality system creation. Tools and methods of quality improvement. Conformity verification. Environmental certification. Workplace certification. QMS integration. Classification, certification of products and producers.   | KZ | 2 |
| 16Y1TR | <b>Theory of Railroad Vehicle Driving</b><br>Legislation in railroad transportation. Technical condition of railroad vehicles and responsibility for their condition. Railroad traffic regulations. Railroad traffic safety. Signal systems. Radiocommunication system. Powering system. Power distribution.  | KZ | 2 |
| 16Y1TZ | <b>Transporting Devices</b><br>Flow of masses, material transport technology, loose material transport - conveyors with tractive elements, conveyors without tractive elements, transport of piece material - continual transport devices, cyclic transport devices, crane mechanisms, steel constructions. Vertical transport, transport in mines, long-distance conveyor belt transport.  | KZ | 2 |
| 16Y1ZG | <b>Introduction into Applied Computer Graphics</b><br>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.   | KZ | 2 |
| 16Y1ZL | <b>Vehicle Testing, Legislation and Construction</b><br>Vehicle, bus and motorbike construction, aggregate computing, driving resistance, build and parameters of traction, constructional arrangement of personal cars, trucks, buses, motorbikes, legislation in the EU and in the world, technical legislation creation, testing methods, vehicle tests, accelerated tests, mathematical modelling in testing.   | KZ | 2 |
| 17DAS  | <b>Transportation and Communication Law</b><br>Transportation and communication law - railway, road transport, ropeway, water road, air transport, telecommunication, post, patent.   | Z  | 1 |
| 17DNV  | <b>Transportation of Dangerous Goods</b><br>Legal measures. Kinds of hazards. Classification. Carriage by road, railways, inland waterways, air and maritime transport. Obligations of consignors, carriers, consignees and safety advisors. System of international obligatory conditions. Enumerated list of dangerous goods. Packing and marking of packages. Transport documentation. Exempted and unlimited quantity. Crew, equipment, approval, marking, operation and construction of road vehicles. | KZ | 2 |
| 17DPAS | <b>Transport Policy and Strategy</b><br>Goals, principles and tools of the transport policy. Development of transport policy of the EU and the ČR. Decreasing negative impacts on environment. Sustainable development strategy. Transport enterprise and access to transport market. Transport in regions. Public service obligation in transport. Transport infrastructure and vehicles, financing. Safety and reliability in transport. Relations of individual transport modes.                         | KZ | 2 |
| 17DU   | <b>Public Transport Service in a Territory</b><br>Transport policy. Impact of European integration. Configuration and links. Contract ensuring. Funding. Tariff and ticketing system. Legal conditions. Survey and quantification of carriage demand. Transport scheduling. Quality criteria and standards. IT, Publicity, Promotion, Marketing. Case study on an Integrated Public Transport System.   | KZ | 2 |
| 17EM   | <b>Management Science</b><br>Linear Programming, graphical interpretation and solution of LP problem. Types of distribution problems, transportation problem. Models of network analysis. Models of queuing theory. Models of inventory management. Simulation models.  | KZ | 2 |

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|--------|--|------|---|
| 17LOS  | <b>Logistic Systems</b><br>Definition of logistics, development and science basics of logistics. Basic elements of logistic system, logistic chain. Technology in logistics. Goals and strategies of company logistic system. Transport in logistic system. Logistic technologies in air, rail and water transport. Information systems in logistics and passenger transport. Storage and distribution in logistics. Position of logistics in the Czech Republic and Europe.   | Z,ZK | 3 |
| 17MEKA | <b>Methods of Economics Analysis</b><br>The techniques of economical analysis in the domain of analysis of dependencies, analysis and construction of time series and comparison of statistical values using differences and indices.  | KZ   | 2 |
| 17ODS  | <b>Optimization on Transportation Networks</b><br>Introduction to optimization and heuristic methods, metaheuristic methods, the history of optimization. Lagrangean approach, assignment problem - Hungarian method, minimum weighted matching, Little's algorithm, vehicle routing problem - an extension of TSP, heuristic solution approaches to vehicle routing problem, local search techniques, Tabu Search, location problems - heuristic algorithms, genetic algorithms and extensions of genetic algorithms. | Z,ZK | 3 |
| 17PDO  | <b>Designing of Public Transport Services</b><br>Transport planning, demand elasticity. Strategy and hierarchical planning of public transport system. Line network planning, concept of offer. Integrated periodic timetable. Planning process of long-distance and regional transport. Optimised number of rolling-stock, circulation plan of rolling-stock, rolling-stock strategy. Public service liability for various segments. Harmony of particular long-term plans. Controlled competition. Case studies.     | KZ   | 3 |
| 17PZL  | <b>Carriage and Forwarding</b><br>Carriage, forwarding, economy, transport, supply, storage, warehouses, goods, passengers, insurance, distribution, customs.  | Z,ZK | 3 |
| 17RIP  | <b>Project Management</b><br>Project, influences, pressures and influences. Entrepreneurial plan and capital decision making. Marketing, break-even point assessment. Project management and his characters. Organizational structures in project management. Feasibility study. Capital and operational costs assessment. Process of choosing optimal variant. Cost Benefit Analysis. Models of project financing. Life cycle of project. Financial anal. of capital projects. Project risks.                         | KZ   | 2 |
| 17TDL  | <b>Transport Technology and Logistics</b><br>Basic terms in transport technology and logistics. Particular steps of transport planning. Quantification of carriage relations. Line planning. Timetabling. Planning in passenger and freight transport. Organisation of traffic in each transport means. Technological factors from the point of view of operator and client. Organisation of public city transport. Logistic technologies and their application using various transport means.                         | Z,ZK | 3 |
| 17TGA  | <b>Graph Theory and its Applications in Transport</b><br>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.  | Z,ZK | 4 |
| 17X31  | Project 1  | Z    | 2 |
| 17X32  | Project 2  | Z    | 2 |
| 17X33  | Project 3  | Z    | 2 |
| 17Y1AF | <b>Alternative Forms of Transportation Project Financing</b><br>There will be specified such forms of financing in transportation, where the public sector body perform the final debtor, i. e. debtor 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 project.  | KZ   | 2 |
| 17Y1BB | <b>Banks and Banking</b><br>Banks and banking system. Balance sheet, income statement, bank's capital and its functions. Banking risks. Banking products. Interest types, pay-off and loan securing, financial loan products. Banking deposit products. Banking payment-clearing products. Financial intermediation, open-end and closed-end funds, collective investment schemes. Central bank and its role. Bank regulation and supervision. International banking.  | KZ   | 2 |
| 17Y1DZ | <b>Transported Commodities Cognization</b><br>Useful features. Quality. Testing. Standardization. Features relevant for the transport. Packing. Stress. Protection of goods and damage prevention during the carriage. Optimization of the choice and effective transport means utility.   | KZ   | 2 |
| 17Y1EV | <b>Public Sector Economy</b><br>Economic and financial theory of public sector, public choice theory, externalities, 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.   | KZ   | 2 |
| 17Y1LL | <b>Logistics of Passenger and Freight Air Transport</b><br>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.  | KZ   | 2 |
| 17Y1ND | <b>Maritime Transportation</b><br>History and importance of the maritime transportation, theoretical discipline in maritime transportation, seafaring vessels, maritime ports and their utilization, inland logistic centre and maritime ports, transport corridors and link by maritime, river and rail transport I and II, global maritime corridors, logistics of maritime transportation, maritime transportation and smart containers, ITS in maritime transport.   | KZ   | 2 |
| 18KIAD | <b>Kinematics and Dynamics</b><br>Motion along a line, motion along a curve. Kinematics of rigid plane, kinematics of rigid body. Point mass kinematics, system of point masses. Point mass dynamics and system of point masses, equation of motion. Method of Newton. Principle of D'Alembert. Free and forced vibration with one degree of freedom. Viscous damping. Impact theory. Introduction to the solution of vibration with multiple degrees of freedom.  | Z,ZK | 2 |
| 18MRI1 | <b>Materials 1</b><br>Crystal structure. Basics of thermodynamics of metals and their alloys. Balanced binary diagrams. Alloys of iron with carbon. Deterioration of solid solutions. Heating processing of steel and cast irons. Physical features. Mechanical features. Dephctostopic testing. Corosion.   | Z,ZK | 3 |
| 18MRI2 | <b>Materials 2</b><br>Fundamental concepts, notions. The main materials groups. Semiconductors. Polymers. Special types of steel. Properties and application of the composite materials.   | KZ   | 2 |
| 18PZP  | <b>Elasticity and Strength</b><br>Tension and compression. Bending of beam. Shear stress during bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joint of structure. Analysis of deflection curve of beam. Torsion of circle cross section. Combined loading. Stability of compressed bar and buckling. Beam on elastic foundation. Strength analysis.  | Z,ZK | 3 |
| 18ST   | <b>Statics</b><br>General system of forces. Calculation of reactions of mass objects and compound systems. Assessment of internal forces on statically determinate beam and simple framework. Principle of virtual works. Kinematic method for calculation of reactions of statically determinate systems. Determination of axial forces in truss construction, method of joints and method of sections. Geometry of cross sections. Plane fiber polygons and catenary cables.   | Z,ZK | 3 |
| 18TTED | <b>Creation of Technical Documentation</b><br>Technical standards, international standardization, types of technical drawings, representation of technical objects, technical diagrams and charts, dimensional and geometrical accuracy, arrangement of drawing sheets, types of schemes and their creation.   | KZ   | 2 |
| 18X31  | Project 1  | Z    | 2 |



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| 18X32   | Project 2                                    | Z    | 2 |
| 18X33   | Project 3                                    | Z    | 2 |
| 18Y1AM  | Anatomy, Mobility and Safety of Man          | KZ   | 2 |
| Survey of tissues. Anatomical structure and growth of bones. Articular joint. Remodelling of bone tissue. Anatomical structure of muscles. Blood circulation and nervous system. Structure and biomechanics of muscular-skeletal system. Injury of human organs and musculo-skeletal system during traffic accidents. Mobility of ill and injured man and his treatment. Human joint prostheses. Protective means and traffic safety regulations.           |  |      |   |
| 18Y1D1  | Dynamics of Routes and Vehicles 1            | KZ   | 2 |
| Theory and analysis of vibration of multimass systems. Dynamical model of vehicle and interaction with transport structure. Assessment of structure vibration and allowable criteria. Vibroisolation and absorbers of dynamical effects. Methods of experimental dynamics. FEM in structure dynamics.   |  |      |   |
| 18Y1EV  | Experimental Methods and Numerical Modelling | KZ   | 2 |
| Physical properties measured in structural mechanics and dynamics. Principles of strain gauge measurement. Theory of photoelasticity, experimental methods in structural dynamics. Basic principles of numerical methods in structural mechanics and dynamics. Finite element method in statics and dynamics. Geometry development, discretization to elements, types of structural elements. Boundary conditions. Material models. Solution of problems.   |  |      |   |
| 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.   |  |      |   |
| 18Y1P1  | Design of Structures 1                       | KZ   | 2 |
| Deformations of beam elements, virtual work. Strength method. Frame analysis by strength method. Deformation method. Frame analysis by deformation method. Simple planar grid. Beam on elastic Winkler's foundation. Calculation of beam on elastic foundation. Basics of the mathematical elasticity. Wall as a structural element. Plate as a structural member. Statical function of shells. Examples of calculations.                                   |  |      |   |
| 18Y1SN  | Statically Nondetermined Structures          | KZ   | 2 |
| Deformations of the beam element, virtual work. Strength method. Frame analysis by strength method. Deformation method. Frame analysis by deformation method. Simple planar grid. Beam on elastic Winkler's foundation. Calculation beam on elastic foundation. Basement of the mathematical elasticity. Calculation of walls. Calculation of plates. Cylindrical shells. Examples of calculations.   |  |      |   |
| 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. |  |      |   |
| 18Y1ZD  | Basics of Two-Dimensional Design             | KZ   | 2 |
| The comprehensive teaching method includes primary creative principles and the introduction to the logic of free shapes in the plane. The "step-by-step" procedure passing from simple relationships to more complex ones. The topics are closed by two-dimensional variations on basic conceptual elements and other tasks of the creative character.  |  |      |   |
| 18Y1ZT  | Basics of Three-Dimensional Design           | KZ   | 2 |
| The design tasks focus first on the three-dimensional design in defined space. The next step is the synthesis of the internal space with three-dimensional elements and correct shape modelling.  |  |      |   |
| 20SSA   | Systems Analysis                             | Z,ZK | 3 |
| Systems identification. Typical tasks of systems analysis: on the interface, routes in system, decomposition and integration, on systems feedback. Capacity tasks, process analysis. Task about behaviour, aim behaviour, the genetic code, architecture and identity of systems. Fundamentals of technical cybernetics, stability and reliability of systems.  |  |      |   |
| 20UIS   | Introduction to ITS                          | Z,ZK | 3 |
| Intelligent Transport Systems (ITS), their objectives and vision. ITS in the world, in Europe and in the Czech Republic. Architecture of ITS and the role of standardization. Information and navigation systems. ITS in road, rail and combine transport. Design of ITS, organization, preparation and implementation of the project. Current projects in the Czech Republic.  |  |      |   |
| 20X31   | Project 1                                    | Z    | 2 |
| 20X32   | Project 2                                    | Z    | 2 |
| 20X33   | Project 3                                    | Z    | 2 |
| 20Y1GI  | Geographical Information Systems             | KZ   | 2 |
| Introduction to geographical information systems, creating real-world model, data models, storage of geographical data, methods of data entry, digitization, geographical coordinate systems, map projections, raster and vector representation, spatial algorithms and operations, and general transport roles in GIS.   |  |      |   |
| 20Y1IC  | Human Machine Interaction                    | KZ   | 2 |
| Interaction of human-system. Methods and procedures for detecting decrease in attention. Used software and hardware tools. Bio-feedback, EEG measurements.  |  |      |   |
| 20Y1K   | Cybernetics                                  | KZ   | 2 |
| Fundamentals of information theory, dynamic systems, the principle of feedback, logical systems. Finite automata as a special case of dynamical systems. Relations between languages and automata.  |  |      |   |
| 20Y1NS  | Neural Networks                              | KZ   | 2 |
| The basic structure and function of human brain and its main functional blocks and building elements - neurons. Models of neurons, modelling their networks and the basic paradigms of artificial neural networks.  |  |      |   |
| 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).   |  |      |   |
| 20Y1PO  | Weather, Air Quality and Transportation      | 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.  |  |      |   |
| 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.  |  |      |   |
| 20Y1TD  | Telematics Databases                         | KZ   | 2 |
| Issue of telematics databases, work with OpenStreetMap layer, use of Linux OS and PostgreSQL with PostGIS extension, real traffic data.   |  |      |   |
| 20Y1TE  | Technology of Electronic Systems             | KZ   | 2 |
| Characteristics of the technological process, the relation of the design, construction and technology. General scheme of technological process. Principles and characteristics of basic electronic elements. Basic technology of integrated circuits. Synthesis of integrated circuits. Higher levels of technology components. Measurement, diagnostics, reliability. Operational aspects of electronic systems.   |  |      |   |
| 21X31   | Project 1                                    | Z    | 2 |

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| 21X32  | Project 2  | Z  | 2 |
| 21X33  | Project 3  | Z  | 2 |
| 21Y1L  | <b>Airports - Design and Operation</b><br>Introductory conditions for development of planning of runway systems and terminal facilities. Road construction, approximate analysis of RWY distance. Investment planning - operator activities. Certification of international airports - standard checking. Unexpected events and their handling.  | KZ | 2 |
| 21Y1LC | <b>Human Factor</b><br>Human performance & limitations, ability & competence, accident statistics, flight safety, basics of flight physiology, individuals & environment, breathing & circulation, sensory system, health & hygiene, health preservation, intoxication, incapacitation, basics of flight psychology, human information processing, memory & learning, theory & model of human error, biorhythms & sleep, stress, fatigue, working methods.                                 | KZ | 2 |
| 21Y1LM | <b>Aviation Meteorology</b><br>Structure of atmosphere. Vertical stratification. Pressures QNH, QFE, QFF, QME. Instability. Atmospheric fronts. Atmospheric precipitation, origin & categorisation. Turbulence. Forces producing wind. Cyclone and anticyclone. Gradient wind. Geostrophical and geocyclostrophical wind. Visibilities in air transport. Dangerous meteorological aspects. Meteorological maps. Climatology. Circulation. Intertropical front. Meteorological information. | KZ | 2 |
| 21Y1LR | <b>Radio Technology in Aviation</b><br>Electric signals and the wave spectrum. Analog and digital modulations. Noises. Filters. Resonance circuits. Electromagnetic field. Electromagnetic wave propagation. Wave ranges in aviation, radiation and reception of electromagnetic field. Antennas in aviation, receivers and transmitters.  | KZ | 2 |
| 21Y1PU | <b>Aircraft Maintenance Technology</b><br>Basics of aircraft maintenance technology, legislation, aircraft release into operation, safety, equipment.  | KZ | 2 |
| 21Y1RL | <b>Air Traffic Control</b><br>Air traffic services and their distribution. Organization of air traffic, flow and capacity management. Airspace management. System support for aircraft flying through space. Flight plan, form, content. Separation of aircraft. Reports of air traffic services, form, content. Harmonization and integration of ATC. CFMU and its subsystems. Flexible use of airspace - FUA. RVSM, RNP. New trends in the area of ATC.                                  | KZ | 2 |
| 21Y1ZT | <b>ATM Systems</b><br>The course introduces classical and modern facilities, systems and technologies designed for ATS. Student obtains knowledge of technical principles and solutions of communication, navigation and surveillance systems used in aviation.  | KZ | 2 |
| 21ZLD  | <b>Introduction to Air Transport</b><br>Air transport as a component of complex transport system. International status of civil aviation. International organizations in Europe and worldwide. Characteristics of air transport. Commercial air transport. Technical operations of aeroplanes.   | KZ | 2 |
| 22UN   | <b>Traffic Accidents Introduction</b><br>Traffic accident as a physical process, systematic submission, vehicle x human x infrastructure interaction, accidents statistics, aircraft accidents, accidents on railways, accidents on waterways, road traffic accidents, other aspects, accidental prevention.   | Z  | 2 |
| 22X31  | Project 1  | Z  | 2 |
| 22X32  | Project 2  | Z  | 2 |
| 22X33  | Project 3  | Z  | 2 |
| 23X31  | Project 1  | Z  | 2 |
| 23X32  | Project 2  | Z  | 2 |
| 23X33  | Project 3  | Z  | 2 |

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

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