

# Study plan

## Name of study plan: BD nav.prez.13/14

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch: prof. Ing. Jan Kovanda, CSc.

Program of study: Technology in Transportation and Telecommunications

Type of study: Follow-up master full-time

Required credits: 120

Elective courses credits: 0

Sum of credits in the plan: 120

Note on the plan:

Name of the block: Semestrální projekt

Minimal number of credits of the block: 19

The role of the block: ZP

Code of the group: XN BD 1.-4. 13/14

Name of the group: Projekt a dipl.práce BD 1.-4.sem. 13/14

Requirement credits in the group: In this group you have to gain 19 credits

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

Credits in the group: 19

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 |
|--------|---|------------|---------|-------|----------|------|
| 23DPBD | <b>Diploma Thesis (for the Field BD)</b>  | KZ         | 14      | 0+14  | L        | ZP   |
| 20XN1  | <b>Master Project 1</b><br>Jiří Růžička, Patrik Horažďovský, Vladimír Faltus, Petr Bureš, Milan Sliacky, Martin Langr   | Z          | 2       | 0P+2C | Z        | ZP   |
| 18XN1  | <b>Master Project 1</b><br>Petr Zlámal, Petr Koudelka, Tomáš Fíla   | Z          | 2       | 0P+2C | Z        | ZP   |
| 17XN1  | <b>Master Project 1</b><br>Václav Baroch, Edvard Březina, Michal Drábek, Alexandra Dvořáčková, Veronika Faifrová, Tomáš Horák, Vít Janoš, Milan Kříž, Olga Mertlová, .....              | Z          | 2       | 0P+2C | Z        | ZP   |
| 11XN1  | <b>Master Project 1</b><br>Magdalena Hykšová Ivan Nagy  | Z          | 2       | 0P+2C | Z        | ZP   |
| 15XN1  | <b>Master Project 1</b><br>Jan Feit, Eva Rezlerová  | Z          | 2       | 0P+2C | Z        | ZP   |
| 14XN1  | <b>Master Project 1</b><br>Jana Kalíková, Jan Krčál, Martin Šrotýř, Zdeněk Lokaj, Tomáš Zelinka, Ota Hajzler Jana Kalíková (Gar.)   | Z          | 2       | 0P+2C | Z        | ZP   |
| 12XN1  | <b>Master Project 1</b><br>Zuzana Čarská, Jiří Čarský, Josef Filip, Jan Gallia, Martin Höfler, Tomáš Honc, Lukáš Hrdina, Petr Chmela, Martin Jacura, .....                              | Z          | 2       | 0P+2C | Z        | ZP   |
| 22XN1  | <b>Master Project 1</b><br>Michal Frydryn, Karel Kocián, Tomáš Mičunek, Luboš Nouzovský, Zdeněk Svatý   | Z          | 2       | 0P+2C | Z        | ZP   |
| 23XN1  | <b>Master Project 1</b>   | Z          | 2       | 0P+2C | Z        | ZP   |
| 21XN1  | <b>Master Project 1</b>   | Z          | 2       | 0P+2C | Z        | ZP   |
| 16XN1  | <b>Master Project 1</b><br>Adam Orlický, Josef Mík, Dmitry Rozhdestvenskiy, Přemysl Toman   | Z          | 2       | 0P+2C | Z        | ZP   |
| 23XN2  | <b>Master Project 2</b>   | Z          | 2       | 0P+2C | L        | ZP   |
| 22XN2  | <b>Master Project 2</b><br>Michal Frydryn, Karel Kocián, Luboš Nouzovský, Zdeněk Svatý  | Z          | 2       | 0P+2C | L        | ZP   |
| 21XN2  | <b>Master Project 2</b><br>Peter Vittek, Lenka Hanáková, Vladimír Socha, Jakub Kraus, Stanislav Pleninger, Jakub Hospodka, Andrej Lališ, Slobodan Stojić, Markéta Šedivá Kařková, ..... | Z          | 2       | 0P+2C | L        | ZP   |
| 20XN2  | <b>Master Project 2</b>   | Z          | 2       | 0P+2C | L        | ZP   |

|       |   |   |   |       |   |    |
|-------|---|---|---|-------|---|----|
| 16XN2 | <b>Master Project 2</b><br><i>Adam Orlický, Josef Mík</i>   | Z | 2 | 0P+2C | L | ZP |
| 15XN2 | <b>Master Project 2</b><br><i>Eva Rezlerová</i>   | Z | 2 | 0P+2C | L | ZP |
| 14XN2 | <b>Master Project 2</b><br><i>Jana Kalíková, Jan Krčál, Martin Šrotýř, Zdeněk Lokaj, Tomáš Zelinka, Ota Hajzler</i>   | Z | 2 | 0P+2C | L | ZP |
| 12XN2 | <b>Master Project 2</b><br><i>Zuzana Čarská, Jiří Čarský, Josef Filip, Jan Gallia, Martin Höfler, Tomáš Honc, Lukáš Hrdina, Petr Chmela, Martin Jacura, .....</i>                 | Z | 2 | 0P+2C | L | ZP |
| 11XN2 | <b>Master Project 2</b><br><i>Ivan Nagy</i>   | Z | 2 | 0P+2C | L | ZP |
| 18XN2 | <b>Master Project 2</b>   | Z | 2 | 0P+2C | L | ZP |
| 17XN2 | <b>Master Project 2</b><br><i>Václav Baroch, Edvard Březina, Michal Drábek, Tomáš Horák, Vít Janoš, Milan Kříž, Olga Mertlová, Zdeněk Michl, Denisa Mocková, .....</i>            | Z | 2 | 0P+2C | L | ZP |
| 14XN3 | <b>Master Project 3</b><br><i>Jana Kalíková</i>   | Z | 1 | 0P+4C | Z | ZP |
| 15XN3 | <b>Master Project 3</b><br><i>Jan Feit, Eva Rezlerová</i>   | Z | 1 | 0P+4C | Z | ZP |
| 16XN3 | <b>Master Project 3</b><br><i>Adam Orlický, Josef Mík</i>   | Z | 1 | 0P+4C | Z | ZP |
| 23XN3 | <b>Master Project 3</b>   | Z | 1 | 0P+4C | Z | ZP |
| 17XN3 | <b>Master Project 3</b><br><i>Václav Baroch, Edvard Březina, Michal Drábek, Alexandra Dvořáčková, Veronika Faifrová, Tomáš Horák, Vít Janoš, Milan Kříž, Olga Mertlová, .....</i> | Z | 1 | 0P+4C | Z | ZP |
| 11XN3 | <b>Master Project 3</b>   | Z | 1 | 0P+4C | Z | ZP |
| 20XN3 | <b>Master Project 3</b><br><i>Milan Sliacky</i>   | Z | 1 | 0P+4C | Z | ZP |
| 21XN3 | <b>Master Project 3</b>   | Z | 1 | 0P+4C | Z | ZP |
| 22XN3 | <b>Master Project 3</b><br><i>Michal Frydřín, Karel Kocián, Tomáš Mičunek, Luboš Nouzovský, Zdeněk Svatý</i>  | Z | 1 | 0P+4C | Z | ZP |
| 12XN3 | <b>Master Project 3</b><br><i>Zuzana Čarská, Jiří Čarský, Josef Filip, Jan Gallia, Martin Höfler, Tomáš Honc, Lukáš Hrdina, Petr Chmela, Martin Jacura, .....</i>                 | Z | 1 | 0P+4C | Z | ZP |
| 18XN3 | <b>Master Project 3</b><br><i>Daniel Kytýř</i>  | Z | 1 | 0P+4C | Z | ZP |

**Characteristics of the courses of this group of Study Plan: Code=XN BD 1.-4. 13/14 Name=Projekt a dipl.práce BD 1.-4.sem. 13/14**

|        |                                   |    |    |
|--------|-----------------------------------|----|----|
| 23DPBD | Diploma Thesis (for the Field BD) | KZ | 14 |
| 20XN1  | Master Project 1                  | Z  | 2  |
| 18XN1  | Master Project 1                  | Z  | 2  |
| 17XN1  | Master Project 1                  | Z  | 2  |
| 11XN1  | Master Project 1                  | Z  | 2  |
| 15XN1  | Master Project 1                  | Z  | 2  |
| 14XN1  | Master Project 1                  | Z  | 2  |
| 12XN1  | Master Project 1                  | Z  | 2  |
| 22XN1  | Master Project 1                  | Z  | 2  |
| 23XN1  | Master Project 1                  | Z  | 2  |
| 21XN1  | Master Project 1                  | Z  | 2  |
| 16XN1  | Master Project 1                  | Z  | 2  |
| 23XN2  | Master Project 2                  | Z  | 2  |
| 22XN2  | Master Project 2                  | Z  | 2  |
| 21XN2  | Master Project 2                  | Z  | 2  |
| 20XN2  | Master Project 2                  | Z  | 2  |
| 16XN2  | Master Project 2                  | Z  | 2  |
| 15XN2  | Master Project 2                  | Z  | 2  |
| 14XN2  | Master Project 2                  | Z  | 2  |
| 12XN2  | Master Project 2                  | Z  | 2  |
| 11XN2  | Master Project 2                  | Z  | 2  |
| 18XN2  | Master Project 2                  | Z  | 2  |
| 17XN2  | Master Project 2                  | Z  | 2  |
| 14XN3  | Master Project 3                  | Z  | 1  |
| 15XN3  | Master Project 3                  | Z  | 1  |
| 16XN3  | Master Project 3                  | Z  | 1  |
| 23XN3  | Master Project 3                  | Z  | 1  |
| 17XN3  | Master Project 3                  | Z  | 1  |
| 11XN3  | Master Project 3                  | Z  | 1  |
| 20XN3  | Master Project 3                  | Z  | 1  |
| 21XN3  | Master Project 3                  | Z  | 1  |

|       |                  |   |   |
|-------|------------------|---|---|
| 22XN3 | Master Project 3 | Z | 1 |
| 12XN3 | Master Project 3 | Z | 1 |
| 18XN3 | Master Project 3 | Z | 1 |

Name of the block: Compulsory courses

Minimal number of credits of the block: 85

The role of the block: Z

Code of the group: 1.S.NPBD 13/14

Name of the group: 1.sem.nav.prez.BD 13/14

Requirement credits in the group: In this group you have to gain 26 credits

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

Credits in the group: 26

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 |
|--------|--|------------|---------|-----------|----------|------|
| 18AMC  | <b>Anatomy and human mobility</b>  | ZK         | 3       | 2+0       | Z        | z    |
| 20BSD  | <b>Safety and Reliability in Transportation</b>  | KZ         | 2       | 2+0       | Z        | z    |
| 15J2A1 | <b>Language - English 1</b><br><i>Jan Feit, Eva Režlerová, Klára Lancová, Lenka Monková, Marie Michlová, Jitka Heřmanová, Dana Boušová, Barbora Horáčková, Peter Morpuss, ..... Jitka Heřmanová (Gar.)</i> | Z          | 2       | OP+2C+10B | Z        | z    |
| 11MAG  | <b>Algorithms</b>  | KZ         | 4       | 2+2       | Z        | z    |
| 11OV   | <b>Operational Research</b>  | ZK         | 2       | 2+0       | Z        | z    |
| 14SBD  | <b>Transportation safety and software</b>  | Z          | 2       | 2+0       | Z        | z    |
| 14SI   | <b>System Engineering</b>  | Z,ZK       | 4       | 2+1       | Z        | z    |
| 20TSS  | <b>Telematic Systems and Services</b>  | Z,ZK       | 3       | 2+1       | Z        | z    |
| 23ZP   | <b>Basics of Law</b>   | ZK         | 4       | 2+0       | Z        | z    |

Characteristics of the courses of this group of Study Plan: Code=1.S.NPBD 13/14 Name=1.sem.nav.prez.BD 13/14

|        |  |      |   |
|--------|--|------|---|
| 18AMC  | Anatomy and human mobility<br>Medical science system. Life and its character. Human body topography. Anatomical nomenclature. Human body tissue list. Muscle structure. Joints. The structure and mechanics of the muscular and skeleton system. Dysfunction and damage of the human body after an accident. The mobility, therapy and rehabilitation of the injured. Sources of human security in transport. Security aids. | ZK   | 3 |
| 20BSD  | Safety and Reliability in Transportation<br>The content of subject is basic notion, predicative diagnostics, safety in the traffic vehicles, safety infrastructure, human in the transportation and traffic systems, security of information in transportation and application of safety systems in the traffic and the transportation, etc.   | KZ   | 2 |
| 15J2A1 | Language - English 1<br>Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of English and practical application, formal and technical registers and their use, language of management.         | Z    | 2 |
| 11MAG  | Algorithms<br>Fundamentals of discrete and numerical algorithms and numerical methods. Practical excersises on selected algorithms, error analysis of numerical algorithms, comparison of possible variants of a numerical algorithm.  | KZ   | 4 |
| 11OV   | Operational Research<br>Definition of linear programming optimization problem, application of linear programming on economical and technical problems, traffic problems - both conventional and with constraints. Geometrical interpretation of linear programming problems, simplex method, duality principle.  | ZK   | 2 |
| 14SBD  | Transportation safety and software<br>The course is focused on application of software which are being used as an engineering aid during the vehicle design, traffic modeling and GIS applications. Theoretical background to the software is provided.  | Z    | 2 |
| 14SI   | System Engineering<br>Standard analysis methods and synthesis (projecting) of objects with system identification from the methodology standpoint.  | Z,ZK | 4 |
| 20TSS  | Telematic Systems and Services<br>Telematic theory, telematic architecture, FRAME, cooperative systems - technologies, principles and aplications, European electronic toll service, traffic information systems, e-call, automated vehicle systems, European railway traffic management system.   | Z,ZK | 3 |
| 23ZP   | Basics of Law<br>Basic orientation in the Czech legal system. The course is primarily intended to provide students with orientation in fundamentals of the Czech Republic' legal system and in various forms of law, including adoption of the basic principles of European Community law. The course consists of selected chapters from the public and private law and European law.  | ZK   | 4 |

Code of the group: 2.S.NPBD 13/14

Name of the group: 2.sem.nav.prez.BD 13/14

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

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

Credits in the group: 22

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 |
|--------|--|------------|---------|-----------|----------|------|
| 23BAND | <b>Safety aspects of vehicle design</b>  | ZK         | 2       | 2+0       | L        | Z    |
| 20IDFS | <b>Identification Systems</b><br><i>Petr Bureš Petr Bureš</i>  | Z          | 2       | 2P+0C     | L        | Z    |
| 20ITS  | <b>Intelligent Transport Systems</b>   | ZK         | 3       | 2+0       | L        | Z    |
| 15JBA2 | <b>Language - English 2</b><br><i>Jan Feit, Eva Rezlerová, Lenka Monková, Marie Michlová, Jitka Heřmanová, Dana Boušová, Barbora Horáčková, Peter Morpuss, Markéta Olehlová, .....</i> | Z          | 2       | 0P+2C+10B | L        | Z    |
| 23MAR  | <b>Risk Analysis and Management</b><br><i>Lenka Brehovská Lenka Brehovská</i>  | Z,ZK       | 3       | 2P+1C+10B | L        | Z    |
| 20SAO  | <b>Sensors and controls</b>  | KZ         | 1       | 2+0       | L        | Z    |
| 11THRO | <b>Queuing Theory</b><br><i>Šárka Voráčová Šárka Voráčová Šárka Voráčová (Gar.)</i>  | ZK         | 2       | 2P+0C+8B  | L        | Z    |
| 23TDM  | <b>Continuum Thermodynamics and Fundamentals of Meteorology</b>  | Z,ZK       | 3       | 2+2       | Z        | Z    |
| 23TP   | <b>Criminal Law in IT and Transportation</b>   | KZ         | 2       | 2+0       | L        | Z    |
| 11VSM  | <b>Selected Statistical Methods</b>  | ZK         | 2       | 2+0       | L        | Z    |

Characteristics of the courses of this group of Study Plan: Code=2.S.NPBD 13/14 Name=2.sem.nav.prez.BD 13/14

|        |  |      |   |
|--------|--|------|---|
| 23BAND | Safety aspects of vehicle design<br>Design of transportation vehicle according to its usage and function, concerning the safety aspects beginning the design concept. Marketing and user demands. Vehicle dynamics. Propulsion systems. Design process, functional design and vehicle structure. Evaluation of variant concepts. Design phases. Reliability, technological aspects etc.  | ZK   | 2 |
| 20IDFS | Identification Systems<br>Basic identification systems, its technologies (barcodes, RFID, biometrics), their features, usage, security and standards. Applications of identification systems, e. g. identification of vehicles, cargo, devices and processes. Identifier as foundation of traffic telematics standardization.  | Z    | 2 |
| 20ITS  | Intelligent Transport Systems<br>Categorization of ITS, the ITS system architecture, sophisticated methods for urban traffic management, ITS for public transport, ITS for parking systems, road line traffic management, automated detection of excesses, intelligent highways, processing and modelling of traffic quantities, queuing theory and shock waves, ITS for road tunnels, tunnel risk analysis systems, the use of modern decision-making systems in ITS.   | ZK   | 3 |
| 15JBA2 | Language - English 2<br>Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of English and practical application, formal and technical registers and their use, language of management.   | Z    | 2 |
| 23MAR  | Risk Analysis and Management<br>Concept of risks and terms. Risk sources, definition of hazard, impacts and risks. Methods for identification, analysis, assessment and management of risks. Risk engineering targets and good engineering practice. Methods, tools and techniques for risk engineering. System of systems risk. Application of strategic and system approach for benefit of security and development. Territorial, emergency and crisis planning. Human factor - its role.                        | Z,ZK | 3 |
| 20SAO  | Sensors and controls<br>System functions development of sensors. Principles, technological and construction of electric, non - electric and magnetic data and electromagnetic waves. Elements for rotating and sliding movement. Pneumatic and hydraulic elements in solid phase.  | KZ   | 1 |
| 11THRO | Queuing Theory<br>Discrete event process, definition, random distribution, and probability. Basic processes, process of revitalisation. Markov process, Markov models, Kendall classification, model M/M/1, models M/M/n. Non-markovian models, model M/C/n, models G/G/n. Models with continuous flow. Service net, examples of Petri net. Computer simulation.   | ZK   | 2 |
| 23TDM  | Continuum Thermodynamics and Fundamentals of Meteorology<br>Basic division and fluid properties. Fluid mechanics and the theory of physical similarity. Euler equation of hydrostatics. Basic equations of one-dimensional fluid flow. Stationary flow of incompressible fluid losses. The basic equation for multidimensional flow. Aerodynamics of bodies. Basic laws of thermodynamics. Equations of state. Ideal gas. Reversible and irreversible state changes typical of an ideal gas. Real gases and vapor. | Z,ZK | 3 |
| 23TP   | Criminal Law in IT and Transportation<br>Introduction of criminal law into legal order, conception of culpability and criminal delict, consequence of other legal standards. international treaty and criminal law, investigation of crime, specific indicia of criminal court cases, practical examples.  | KZ   | 2 |
| 11VSM  | Selected Statistical Methods<br>Probability. Accident and fortuity.  | ZK   | 2 |

Code of the group: 3.S.NPBD 13/14

Name of the group: 3.sem.nav.prez.BD 13/14

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 8 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 |
|--------|--|------------|---------|-----------|----------|------|
| 12BA   | <b>Road Safety Audit</b><br>Josef Kocourek, Tomáš Padělek, Karel Kocián  | KZ         | 2       | 2P+0C     | Z        | z    |
| 15DPS  | <b>Transportation Psychology</b>   | Z          | 2       | 2+0       | Z        | z    |
| 15JBA3 | <b>Language - English 3</b><br>Jan Feit, Eva Rezlerová, Klára Lancová, Lenka Monková, Marie Michlová, Jitka Heřmanová, Dana Boušová, Barbora Horáčková, Peter Morpuss, ..... | Z          | 2       | 0P+2C+10B | Z        | z    |
| 23KRIO | <b>Crisis Management for Engineering Branches</b><br>Lenka Brehovská   | KZ         | 3       | 2P+0C     | Z        | z    |
| 22PSIN | <b>Prevention of Road Traffic Accidents</b>  | Z          | 4       | 1+1       | Z        | z    |
| 11STS  | <b>Stochastic Systems</b><br>Sárka Jozová, Ivan Nagy, Pavla Pecherková, Evžen Uglíckich  | Z,ZK       | 4       | 2P+2C+14B | Z        | z    |
| 22TZN  | <b>Technical Expertise</b>   | KZ         | 2       | 2+1       | Z        | z    |
| 18TGK  | <b>Technology of structures in transportation</b>  | KZ         | 4       | 2+0       | Z        | z    |

**Characteristics of the courses of this group of Study Plan: Code=3.S.NPBD 13/14 Name=3.sem.nav.prez.BD 13/14**

|        |  |      |   |   |  |  |
|--------|--|------|---|---|--|--|
| 12BA   | Road Safety Audit                          | KZ   | 2 | Schedules of applications of safety assessments during the process of preparations, and of the particular realization of the road network that should minimize traffic accident risks for all those who take part in road traffic. Road safety survey. Application of European Directive 2008/96/EC on road safety infrastructure management.   |  |  |
| 15DPS  | Transportation Psychology                  | Z    | 2 | Subject of psychology and its basic concepts. Information intake, decision-making and behaviour. Performance. Engineering psychology and vehicle construction. Psychological aspects of travel route and traffic conditions, accidents and traffic incidents. Selection and training of the staff. Work and leisure. Age as a factor in transport operation.  |  |  |
| 15JBA3 | Language - English 3                       | Z    | 2 | Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of English and practical application, formal and technical registers and their use, language of management.  |  |  |
| 23KRIO | Crisis Management for Engineering Branches | KZ   | 3 | Human system. Assets, terms, concept and safety management aims. Causes and consequences of disasters. Safety management. Crisis management-its aims, demands, roles, principles, specifics and comparidon with the EU and NATO. Organisational, personal, legislative, finance, material and technical provision. The IZS role. Planning. Protection of public and critical infrastructure. Problem solving.   |  |  |
| 22PSIN | Prevention of Road Traffic Accidents       | Z    | 4 | Basic definitions, types of source materials, methods of analysis, influence of road, factors of accidents, vehicle faults etc.   |  |  |
| 11STS  | Stochastic Systems                         | Z,ZK | 4 | The subject deals with the problems of mathematical modelling of dynamical systems, estimation od these models and their utilization for prediction. The results are illustrated on practical transportation tasks. Mathematical theory roots from probability and mathematical statistics and they use the methods of the Bayesian probabilistic approach.   |  |  |
| 22TZN  | Technical Expertise                        | KZ   | 2 | Historical evolution of sworn forensic engineering, forensic activity, current legislature in the Czech Republic, different disciplines, notion of forensic, forensic legislation, basic forensic acts, expert role in the obtaining proofs, forensic methodology. Notion of the evidence, general principles of evidence obtaining, metrology, protocol, evidences collection, site inspection, forensic report, elements. Finding, expert testimony / report. Appraisal and its role in the forensic. |  |  |
| 18TGK  | Technology of structures in transportation | KZ   | 4 | Analysis of product design, focused on transportation technology. Functional evaluation, materials, technology analysis. Fitting and space analysis. Reliability, manipulation and control, manufacturing and maintenance. Technological indexes. Volba optimálních technologií. Selection of optimal manufacturing technology.   |  |  |

Code of the group: 4.S.NPBD 14/15

Name of the group: 4.sem.nav.prez.BD 14/15

Requirement credits in the group: In this group you have to gain 14 credits

Requirement courses in the group: In this group you have to complete 6 courses

Credits in the group: 14

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 |
|--------|---|------------|---------|-----------|----------|------|
| 23BDP  | <b>Vehicles Safety</b>  | KZ         | 2       | 2+0       | Z        | z    |
| 12BPU  | <b>Safety of Transfer Points</b>  | Z          | 2       | 2+0       | L        | z    |
| 15JBA4 | <b>Language - English 4</b><br>Jan Feit, Eva Rezlerová, Lenka Monková, Marie Michlová, Jitka Heřmanová, Dana Boušová, Barbora Horáčková, Peter Morpuss, Markéta Olehlová, ..... | ZK         | 2       | 0P+2C+10B | L        | z    |
| 23PDY  | <b>Practical Vehicle Dynamics</b>   | Z          | 2       | 0+2       | L        | z    |
| 20SIBS | <b>Reliability Engineering and Safety of Systems</b>  | ZK         | 3       | 2+0       | L        | z    |
| 23TPT  | <b>Creation of Legal and Technical Regulations</b>  | ZK         | 3       | 2+0       | L        | z    |

**Characteristics of the courses of this group of Study Plan: Code=4.S.NPBD 14/15 Name=4.sem.nav.prez.BD 14/15**

|       |                 |    |   |  |  |  |
|-------|-----------------|----|---|--|--|--|
| 23BDP | Vehicles Safety | KZ | 2 | Passive, active and integrated safety. Safety and assistance sytems. Injury biomechanics and restraint systems. Vehicle-human interaction in emergency situations. |  |  |
|-------|-----------------|----|---|--|--|--|

|        |  |    |   |
|--------|--|----|---|
| 12BPU  | Safety of Transfer Points<br>Design of areas with frequent pedestrian cumulation and movement. Interaction with other transportation vehicles. Optimization of platform placement etc.   | Z  | 2 |
| 15JBA4 | Language - English 4<br>Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of English and practical application, formal and technical registers and their use, language of management. | ZK | 2 |
| 23PDY  | Practical Vehicle Dynamics<br>Theory of vehicle dynamics. Practical demonstrations of transportation vehicles behavior in different situations. Excursion: air simulator, simulator of air-traffic control, train testing ground. Course of sportive and safety driving and heavy vehicle dynamics example.  | Z  | 2 |
| 20SIBS | Reliability Engineering and Safety of Systems<br>Basic theory of reliability and safety with special regard to information and automation equipment used in transportation safety systems. Various aspects of reliability and safety systems analysis and synthesis. Problems of human subject - artificial systems.   | ZK | 3 |
| 23TPT  | Creation of Legal and Technical Regulations<br>Creation of legislation, structure of the bills of law, legal process, compatibility with the EC law, the creation of technical standards and their publication, ÚNMZ (Czech Office for standards, metrology and testing) in Czech Republic, organizations CEN, CENELEC and ETSI, the notification process.   | ZK | 3 |

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 8

The role of the block: PV

Code of the group: Y2-NPBD 13/14

Name of the group: PVP nav.prez.BD 13/14

Requirement credits in the group: In this group you have to gain 8 credits

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

Credits in the group: 8

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 |
|--------|---|------------|---------|-------|----------|------|
| 23Y2AE | <b>Acoustics and Electroacoustics in Transportation</b>   | KZ         | 2       | 2+0   | Z        | PV   |
| 12Y2BM | <b>Safety on The Local Roads</b>  | KZ         | 2       | 2P+0C | Z        | PV   |
| 14Y2C1 | <b>CATIA I</b>  | KZ         | 2       | 2P+0C | L        | PV   |
| 14Y2C2 | <b>CATIA II</b>   | KZ         | 2       | 2P+0C | Z        | PV   |
| 14Y2CS | <b>Sensitivity of Systems</b>   | KZ         | 2       | 2P+0C | L        | PV   |
| 15Y2DN | <b>Transportation Psychology in German Speaking Countries</b>   | KZ         | 2       | 2P+0C | L        | PV   |
| 18Y2D2 | <b>Dynamics of Transport Routes and Vehicles 2</b>  | KZ         | 2       | 2+0   | L        | PV   |
| 17Y2FM | <b>Financing in Urban Mass Transportation</b>   | KZ         | 2       | 2P+0C | Z        | PV   |
| 11Y2FX | <b>Functions of Complex Variable</b>  | KZ         | 2       | 2P+0C | Z        | PV   |
| 18Y2FZ | <b>Physical Basis of Materials' Properties</b><br>Jaroslav Valach   | KZ         | 2       | 2P+0C | L        | PV   |
| 15Y2HS | <b>Road Transport History</b><br>Zuzana Čarská  | KZ         | 2       | 2P+0C | L        | PV   |
| 16Y2HP | <b>Vehicle Hygiene</b><br>Jiří First  | KZ         | 2       | 2P+0C | L        | PV   |
| 12Y2IS | <b>Urban Networks</b>   | KZ         | 2       | 2P+0C | Z        | PV   |
| 14Y2JM | <b>One-Chip Controllers</b>   | KZ         | 2       | 2P+0C | Z        | PV   |
| 17Y2KI | <b>Capital Investment in Transportation and Telecommunications</b>  | KZ         | 2       | 2+0   | L        | PV   |
| 16Y2KV | <b>Car Body Design</b><br>Josef Mik, Jiří First   | KZ         | 2       | 2P+0C | L        | PV   |
| 12Y2KS | <b>Rail Transport in Settlements and Regions</b><br>Miroslav Veliš  | KZ         | 2       | 2P+0C | Z        | PV   |
| 12Y2KE | <b>Landscape Ecology</b><br>Kristýna Neubergová   | KZ         | 2       | 2P+0C | Z        | PV   |
| 21Y2LS | <b>Air Traffic Services</b><br>Jiří Šála, Marek Štumper   | KZ         | 2       | 2P+0C | L        | PV   |
| 11Y2LG | <b>Logics of Engineer's Judgement</b>   | KZ         | 2       | 2P+0C | L        | PV   |
| 15Y2MS | <b>Sociology for Managers</b><br>Jan Feit, Eva Rezlerová  | KZ         | 2       | 2P+0C | Z        | PV   |
| 21Y2MK | <b>Marketing of Air Transport</b>   | KZ         | 2       | 2+0   | L        | PV   |
| 18Y2MP | <b>Finite Element Method And Its Application</b><br>Ondřej Jiroušek   | KZ         | 2       | 2P+0C | L        | PV   |
| 16Y2MK | <b>Quality Methods for Vehicles</b><br>Přemysl Toman, Jaroslav Machan   | KZ         | 2       | 2P+0C | L        | PV   |

|        |   |    |   |       |   |    |
|--------|---|----|---|-------|---|----|
| 12Y2MD | <b>Methods of Traffic Regulation and Prediction</b><br><i>Zuzana Čarská</i>                       | KZ | 2 | 2P+0C | L | PV |
| 17Y2MS | <b>Microsimulation of Railway Operation</b>   | KZ | 2 | 2P+0C | Z | PV |
| 21Y2MS | <b>Aerospace Engineering Simulation and Modelling</b>   | KZ | 2 | 2P+0C | Z | PV |
| 12Y2MZ | <b>Modernization of Railway Lines and Stations</b><br><i>Miroslav Veliš</i>                       | KZ | 2 | 2P+0C | L | PV |
| 12Y2MH | <b>Measurement and Modeling of Traffic Noise</b>  | KZ | 2 | 2P+0C | L | PV |
| 21Y2NR | <b>Navigation and Flight Control Systems</b>  | KZ | 2 | 2+0   | L | PV |
| 23Y2NE | <b>Design of Electronic Equipments</b>  | KZ | 2 | 2+0   | L | PV |
| 23Y2NS | <b>Nonlinear Systems</b>  | KZ | 2 | 2+0   | L | PV |
| 17Y2NU | <b>Cost and Benefits of Transport Systems</b>   | KZ | 2 | 2+0   | L | PV |
| 14Y2OP | <b>Object Oriented Programming in Transport</b>   | KZ | 2 | 2P+0C | L | PV |
| 15Y2OZ | <b>Health Protection in Transportation and EU</b><br><i>Jan Feit, Eva Rezlerová, Petr Musil</i>   | KZ | 2 | 2P+0C | Z | PV |
| 15Y2OF | <b>Specialised French for Transportation and Telecommunications</b>                               | KZ | 2 | 2P+0C | Z | PV |
| 15Y2PT | <b>Food in Transportation</b><br><i>Jan Feit, Eva Rezlerová, Petr Musil</i>                       | KZ | 2 | 2P+0C | L | PV |
| 16Y2PG | <b>Computer Graphics and Virtual Reality</b>  | KZ | 2 | 2P+0C | Z | PV |
| 22Y2PS | <b>Traffic Accidents Computer Simulation and Analysis</b><br><i>Michal Frydryn, Tomáš Mičunek</i> | KZ | 2 | 2P+0C | L | PV |
| 15Y2PS | <b>Practical Spanish for Transportation, Management and Business</b>                              | KZ | 2 | 2+0   | Z | PV |
| 20Y2PR | <b>Time Series Prediction</b><br><i>Emil Pelikán</i>  | KZ | 2 | 2P+0C | L | PV |
| 14Y2PI | <b>Process Information Systems in Transportation</b>  | KZ | 2 | 2P+0C | Z | PV |
| 14Y2PJ | <b>C++ Programming Language</b><br><i>Vít Fábera</i>  | KZ | 2 | 2P+0C | L | PV |
| 14Y2PH | <b>CAD Interface Programming</b>  | KZ | 2 | 2P+0C | L | PV |
| 11Y2PM | <b>Programming in MATLAB</b>  | KZ | 2 | 2P+0C | L | PV |
| 21Y2PL | <b>Operational Aspects of Aerodromes</b><br><i>Viktor Sýkora</i>                                  | KZ | 2 | 2P+0C | Z | PV |
| 21Y2PP | <b>Law and Operation in Air Transport</b><br><i>Marie Hauerová</i>                                | KZ | 2 | 2P+0C | L | PV |
| 15Y2PU | <b>Publications and Their Creation</b>  | KZ | 2 | 2P+0C | Z | PV |
| 17Y2PR | <b>Carriage Processes</b>   | KZ | 2 | 2+0   | Z | PV |
| 17Y2PS | <b>Case Studies in Transportation</b>   | KZ | 2 | 2P+0C | Z | PV |
| 12Y2RD | <b>Realization of Transport Buildings</b><br><i>Martin Höfler</i>                                 | KZ | 2 | 2P+0C | L | PV |
| 17Y2RS | <b>Regional Transport - Mobility of Small Towns</b>   | KZ | 2 | 2+0   | Z | PV |
| 15Y2SP | <b>Seminar on Political Philosophy</b><br><i>Jan Feit, Eva Rezlerová, Marek Tomeček</i>           | KZ | 2 | 2P+0C | Z | PV |
| 16Y2ST | <b>Special Technologies in Transport and Telecommunications</b><br><i>Jiří Dunovský</i>           | KZ | 2 | 2P+0C | L | PV |
| 18Y2SD | <b>Reliability and Diagnostics, Experimental Methods</b><br><i>Daniel Kytýř, Stanislav Hračov</i> | KZ | 2 | 2P+0C | Z | PV |
| 15Y2SR | <b>Stylistics and Rhetorics</b>   | KZ | 2 | 2P+0C | Z | PV |
| 17Y2SG | <b>Systematic Creating of Railway Timetables</b>  | KZ | 2 | 2+0   | Z | PV |
| 17Y2SK | <b>Urban and Regional Rail Transport System</b><br><i>Jiří Pospíšil</i>                           | KZ | 2 | 2P+0C | L | PV |
| 15Y2TS | <b>Technician and Contemporary Society</b><br><i>Jan Feit, Eva Rezlerová</i>                      | KZ | 2 | 2P+0C | L | PV |
| 17Y2TP | <b>Technological Prognoses in Transportation and Telecommunication</b>                            | KZ | 2 | 2+0   | L | PV |
| 20Y2TE | <b>Technology of Electronic Systems</b>   | KZ | 2 | 2P+0C | Z | PV |
| 14Y2TU | <b>Telecommunications Systems and Multimedia</b>  | KZ | 2 | 2P+0C | Z | PV |
| 16Y2TT | <b>Transportation and Building Technology and Equipment</b>                                       | KZ | 2 | 2P+0C | Z | PV |
| 21Y2TL | <b>Development Trends of Aircraft Construction</b>  | KZ | 2 | 2+0   | Z | PV |
| 12Y2UD | <b>Sustainable Transportation</b><br><i>Kristýna Neubergová</i>                                   | KZ | 2 | 2P+0C | L | PV |
| 14Y2UI | <b>Artificial Intelligence</b>  | KZ | 2 | 2P+0C | Z | PV |
| 20Y2UA | <b>Artificial Neural Networks, Realization and Applications</b><br><i>Mirko Novák</i>             | KZ | 2 | 2P+0C | Z | PV |
| 23Y2VZ | <b>Leadership and Human Resource Development</b>  | KZ | 2 | 2P+0C | L | PV |
| 21Y2VA | <b>Selected Parts of Aerodynamics</b>   | KZ | 2 | 2+0   | Z | PV |

|        |  |    |   |       |   |    |
|--------|--|----|---|-------|---|----|
| 23Y2VS | <b>Negotiation and Cooperation</b>   | KZ | 2 | 2+0   | Z | PV |
| 12Y2VT | <b>High Speed Railways</b><br><i>Lukáš Týfa</i>                            | KZ | 2 | 2P+0C | Z | PV |
| 18Y2VC | <b>Computational Mechanics in Transportation</b><br><i>Ondřej Jiroušek</i> | KZ | 2 | 2P+0C | L | PV |
| 12Y2ZK | <b>Traffic Calming</b><br><i>Zuzana Čarská</i>                             | KZ | 2 | 2P+0C | Z | PV |
| 23Y2ZP | <b>Basis of Communication for Practice</b>                                 | KZ | 2 | 2+0   | L | PV |
| 18Y2UB | <b>Accident Biomechanics and Safety</b><br><i>Jitka Jirová</i>             | KZ | 2 | 2P+0C | L | PV |
| 17Y2RZ | <b>Control of Transport Processes</b><br><i>Edvard Březina</i>             | KZ | 2 | 2P+0C | Z | PV |

**Characteristics of the courses of this group of Study Plan: Code=Y2-NPBD 13/14 Name=PVP nav.prez.BD 13/14**

|        |  |    |   |  |  |  |
|--------|--|----|---|--|--|--|
| 23Y2AE | <b>Acoustics and Electroacoustics in Transportation</b><br>Basic acoustic quantities, properties of acoustic signals. Basic equations in acoustics, method of equivalent circuits. Acoustic impedance, damping. Acoustic actuators, loudspeakers. Acoustic sensors, microphones. Fundamentals of acoustic signal processing. Acoustics of closed spaces. Fundamentals of acoustics in solids. Acoustic problems in transport and their solutions.  | KZ | 2 |  |  |  |
| 12Y2BM | <b>Safety on The Local Roads</b><br>Classification of road accidents rates, social losses. Collision points, diagrams. Tools and methods for safer road transportation. Crossroads from the point of view of safety. Psychological right of way. Roundabouts. Pedestrian transport, cyclists. Traffic lights coordination. Transport control and regulation.   | KZ | 2 |  |  |  |
| 14Y2C1 | <b>CATIA I</b><br>Fundamentals of working with CATIA, making basic parts and bodies. Making 2D sketches, geometric structure, parametric linking, making adaptive models from 2D sketches. Import and export of made parts and bodies. Making assemble and visualization.  | KZ | 2 |  |  |  |
| 14Y2C2 | <b>CATIA II</b><br>Extension of basic course. Modeling compound bodies. Possibility of enumeration, communications with other systems. Surface x solid bodies. Kinematic mechanism. Project making and project cooperation. Outputs of projects.   | KZ | 2 |  |  |  |
| 14Y2CS | <b>Sensitivity of Systems</b><br>Design of systems with defined reliability. The impact of changing parameters and subsystems within a system. System sensitivity computing, definition of sensitivity functions and matrices and their usability in system design.  | KZ | 2 |  |  |  |
| 15Y2DN | <b>Transportation Psychology in German Speaking Countries</b><br>Introduction to larger view of the traffic problems with regard to the work with texts (physics for drivers, abusing alcohol during driving, exhaustion, getting of driving licence, children in traffic, traffic accident, traffic psychology in the internet etc.).   | KZ | 2 |  |  |  |
| 18Y2D2 | <b>Dynamics of Transport Routes and Vehicles 2</b><br>Analysis of forces in the vehicle and transport routes and their influence on the stress and strain components of the vehicle structure or behavior of traffic routes. Creation of dynamic models of vehicles and transport routes. Vibration of systems with a finite number of degrees of freedom. Methods of constant stiffness and constant compliance. Dynamic calculations of structural systems. Criteria for the admissibility of oscillation.       | KZ | 2 |  |  |  |
| 17Y2FM | <b>Financing in Urban Mass Transportation</b><br>UMT history and development in Prague and other cities in the world. Building and operation of public tram, bus, and trolleybus networks. Underground building and operation. Other UMT types. UMT development in small towns. Particularities of investment and operation financing of individual UMT types. Historic and present models of UMT financing. Transport inspection and blind passengers. Tourism & UMT. UMT typology & choice of optimum financing. | KZ | 2 |  |  |  |
| 11Y2FX | <b>Functions of Complex Variable</b><br>Derivation of complex function, holomorphic function, complex exponential series, integration, Cauchy theorem. Taylor series, Laurent series of complex variable function. Basics of Laplace and Z-transformation.   | KZ | 2 |  |  |  |
| 18Y2FZ | <b>Physical Basis of Materials' Properties</b><br>On the basis of internal structure and nature of interaction elastic material behavior and its maximum strength is explained. The model is further developed by considering different types of defects, loads and environment for explanation of failure mechanisms - the level of real strength determined by internal defects, and brittle fracture, fatigue and creep. Failures are discussed as a challenge posed to design of novel materials.              | KZ | 2 |  |  |  |
| 15Y2HS | <b>Road Transport History</b><br>Roads and road traffic in the Ancient Age, corridors of main medieval pathways. Development of road traffic in the modern period, acceleration of road transport development during 1st part of 20th century. Development of road layout, geometric and construction layers. Beginning of modern road civil engineering. Development of road travelling in modern period. History of road interconnections, bridges and traffic control, development of road signs.               | KZ | 2 |  |  |  |
| 16Y2HP | <b>Vehicle Hygiene</b><br>Emissions and ergonomics of vehicles and the influence on man and nature. National and international law related to the hygiene. Noise and vibrations - sources, creation, propagation, physical values, ways of measuring, prevention, elimination. Exhausts - creation, measurement, reduction, non-regular fuels and drives. Ergonomics - sitting, standing, control, operational reach. Condition - heating, ventilation, air-conditioning, filtration, tiredness.                   | KZ | 2 |  |  |  |
| 12Y2IS | <b>Urban Networks</b><br>The importance and the position of UN as public and technical infrastructure / utilities, methodology of the UN master planning, of UN design, UN coordination, UN installation and UN operation (basic technical standards of UN, trenchless technologies for UN).   | KZ | 2 |  |  |  |
| 14Y2JM | <b>One-Chip Controllers</b><br>One-chip controllers architecture, embedded peripherals (counters, timers, converters, ports) and their utilisation. Practical tasks are programmed with the aid of AVR chips.  | KZ | 2 |  |  |  |
| 17Y2KI | <b>Capital Investment in Transportation and Telecommunications</b><br>Financial market, investment decision making - long term goals and investment strategies, long term financing.   | KZ | 2 |  |  |  |
| 16Y2KV | <b>Car Body Design</b><br>Personal cars body, high-load car body, bus car body, and motorcycle as a construction set. Principles of design, production, testing and operation. Materials used for car body construction. Active and passive safety parts. Ergonomics, HMI, view out of the vehicle, operational extent, view behind the car. Conditioning tools, signaling function. Aerodynamics of the car body. Design and artistic design principles. Practical training.                                      | KZ | 2 |  |  |  |
| 12Y2KS | <b>Rail Transport in Settlements and Regions</b><br>Modernization and development of railway infrastructure in Czech Republic. Arrangement of railway networks and junctions. Suburban railway services. Network configuration and operation of metro systems. Network configuration and operation of tram systems. Special thematic lectures (rail transport in selected countries / regions).  | KZ | 2 |  |  |  |



|   |  |    |   |
|---|--|----|---|
| 12Y2KE  | Landscape Ecology  | KZ | 2 |
| Landscape ecology. Landscape - definition, types, evolution. Landscape systems. Anthropogenic impacts on landscape. Methods using for evaluating landscape. Fractal geometry and its potential applications in landscape ecology. Landscape planning.   |  |    |   |
| 21Y2LS  | Air Traffic Services   | KZ | 2 |
| Airspace structure in Czech Republic and other countries. Introduction and description of ATS units in Czech Republic. Practical examples of TWR, APP a ACC control. Procedural and radar control. Incidents caused or partially caused by ATS. History of ATS and czech airspace.  |  |    |   |
| 11Y2LG  | Logics of Engineer's Judgement                               | KZ | 2 |
| Logical structure of engineer's judgement, its propositional and predicative logical base. Solutions of logical tasks through the methods of truthfulness and semantic analysis charts. Venn's diagram method. Logical basis for network design for the solution of technical tasks.  |  |    |   |
| 15Y2MS  | Sociology for Managers                                       | KZ | 2 |
| Sociological approach to a corporation. Corporation and its organization. Corporation and its running - human role and communication. Corporation, its culture and social system. Human's work position in free market economy. Corporate directorship, work groups, adaptation, strife, different roles and positions in corporation.  |  |    |   |
| 21Y2MK  | Marketing of Air Transport                                   | KZ | 2 |
| Definition, purpose, evolution, stages and types of marketing. Marketing in air transportation. Marketing research. Market segmentation. Airlines marketing strategies. Airline Products. Yield management and revenues. Air transport market sales.  |  |    |   |
| 18Y2MP  | Finite Element Method And Its Application                    | KZ | 2 |
| Basic mathematical formulation of the Finite Element Method. Direct Stiffness Method used in structural mechanics. Evaluation of stiffness matrices for the basic elements using variational principles. Element formulation (bar and beam elements, CST, LST, quadrilateral, tetrahedral and brick elements). Natural coordinates, natural shape functions and isoparametric representation. Numerical integration. Introduction to dynamics. FEM programming. |  |    |   |
| 16Y2MK  | Quality Methods for Vehicles                                 | KZ | 2 |
| Quality management methods list, customer data acquisition and analysis of customer requirements, QFD, DFM, DFA, DFS. FMEA (Failure mode effect analysis). Elements of parallel (team) design.  |  |    |   |
| 12Y2MD  | Methods of Traffic Regulation and Prediction                 | KZ | 2 |
| Basic ways of traffic prognosis, traffic prognosis for large area (calculation of future traffic volumes, calculation of future traffic volumes between areas (analogical and synthetic methods, modal split, traffic distribution to road network). Shock wave in traffic flow. Service levels and their traffic volumes. Acceleration noise.  |  |    |   |
| 17Y2MS  | Microsimulation of Railway Operation                         | KZ | 2 |
| Introduction to the characteristics of simulation tools, creation of a simulation model of railway infrastructure, verification of a specific operational concept on the given infrastructure, adaptation of the infrastructure model and modification to the infrastructure to allow the implementation of the proposed operational concept. Stability tests and evaluations. Evaluation of sensitivity of the operational concept to delays.                  |  |    |   |
| 21Y2MS  | Aerospace Engineering Simulation and Modelling               | KZ | 2 |
| The course is designed as a set of exemplary tasks and problems based on practical aviation issues. The university degree mathematic skills and software applications usage will be necessary for successful figuring out. Both simple tasks, where students create own model themselves (e.g. in Matlab), and more complicated problems where professional developed tools will be applied.  |  |    |   |
| 12Y2MZ  | Modernization of Railway Lines and Stations                  | KZ | 2 |
| Line speed increasing. AGC and AGTC Agreement. AGC and AGTC railway network. Principles of modernization (conceptual papers, definitions of basic concepts, individual principles). Track geometrical characteristics on modernized railway lines. Superstructure and substructure on upgraded lines. Designing of railway stations. Bridges and tunnels. Development and realization of projects. Technical description of the tranzit corridors.              |  |    |   |
| 12Y2MH  | Measurement and Modeling of Traffic Noise                    | KZ | 2 |
| Theoretical introduction to noise from traffic. Noise from rail transport. Noise from road traffic. Measurement and calculation of noise from rail traffic. Measurement and calculation of noise from road traffic. Modelling of traffic noise in the CADNA A.  |  |    |   |
| 21Y2NR  | Navigation and Flight Control Systems                        | KZ | 2 |
| Navigation (ANP/RNP), area navigation, FMS, FMC, A/P, A/T, FD, MCDCU, GPWS.   |  |    |   |
| 23Y2NE  | Design of Electronic Equipments                              | KZ | 2 |
| Characteristics and realization of semiconductor electronic components, basic electronic devices division. Sources, input and output elements, process elements. Realization of basic circuits - amplifiers, data converters. Analog electronic systems, analog computing. Switching elements, logic circuits, FPGA implementation. Single chip microcomputers and microcontrollers. Design (ORCAD), construction of electronic devices.                        |  |    |   |
| 23Y2NS  | Nonlinear Systems  | KZ | 2 |
| Model development and parameter identification of nonlinear, time-varying and periodic systems. Analyses of continuous and discrete non-linear systems. Solution presentations of several non-linear models and non-linear differential equations using the MATLAB software. Linearization, stability of nonlinear systems, stability and instability theorems. Nonlinear phenomena -multiple equilibria, limit cycles, bifurcations, chaos.                    |  |    |   |
| 17Y2NU  | Cost and Benefits of Transport Systems                       | KZ | 2 |
| Transport systems and their history, externalities and their internalization, public goods, transport funding, assessment of transport constructions and systems by the methods CBA, MCA, CA, transport taxation, influence of transport constructions on public budgets, relation of transport and economic growth, importance of transport in area, spatial economy.  |  |    |   |
| 14Y2OP  | Object Oriented Programming in Transport                     | KZ | 2 |
| Classes, objects, encapsulation, inheritance, polymorphism, templates, retying, streams, events, repository, collections, virtual methods and classes. Examples will be derived from microscopic simulation systems, discrete event simulation, cellulár simulations and virtual life simulations.  |  |    |   |
| 15Y2OZ  | Health Protection in Transportation and EU                   | KZ | 2 |
| Health protection in transportation in CR in the past and present. Conditions before 1989 and after, current legislature, future prospects. Harmonisation of legislation with other EU members. Fundamental principles of health protection and support in selected EU countries.   |  |    |   |
| 15Y2OF  | Specialised French for Transportation and Telecommunications | KZ | 2 |
| Basic transportation (public transport, railway, air, road and ship transport) and telecommunications terminology. Special focus on independent speaking and writing skills.  |  |    |   |
| 15Y2PT  | Food in Transportation                                       | KZ | 2 |
| The nutrition policy. Interaction transportation and foodstuffs. The health risks. Hygienic safeguard. The practical examples from the Czech Republic and from the world. The issues of dining cars, work trains and other railroad equipment. Legislation.   |  |    |   |
| 16Y2PG  | Computer Graphics and Virtual Reality                        | KZ | 2 |
| Principles of creation and processing of bitmap and vector 2D graphics, 3D virtual scenes and algorithms used for their computerized processing. Adopting skills of work with professional and freeware tools for creation and processing of 2D, 3D and interactive graphics, and basics of programming language VRML and graphic libraries (OpenGL).   |  |    |   |
| 22Y2PS  | Traffic Accidents Computer Simulation and Analysis           | KZ | 2 |
| Vehicle dynamics simulation, multi body systems and vehicle active safety systems, vehicle slipping, external influence on virtual model, crash tests evaluation, single-track vehicle, vehicle passangers, pedestrian, traffic accident simulation and analysis.   |  |    |   |

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| 15Y2PS  | Practical Spanish for Transportation, Management and Business   | KZ | 2 |
| Development of communication skills, training of correct written expression of formal character, basic technical vocabulary, cultural specifics of the Spanish speaking countries. Terminology of transport and commerce, business letter.  |   |    |   |
| 20Y2PR  | Time Series Prediction  | KZ | 2 |
| Basic methods of quantitative forecasting, causal models, time series. Model performance evaluation, describing statistics, MAE, MAPE, RMSE, entropy measures, naive models. Basic theory of the linear prediction models, covariance and correlation coefficients, smoothing methods, regression methods, Box-Jenkins methodology, statistical tests, genetics algorithms.   |   |    |   |
| 14Y2PI  | Process Information Systems in Transportation                   | KZ | 2 |
| Introduction and detailed usage of transport information systems, e.g. EFC, ePurse and transport check-in systems for public transport with focus on architecture of this system and SOA (Service Oriented Architecture). Information systems implementation and operations description in the Czech Republic (technical and process) included lectures and visits.   |   |    |   |
| 14Y2PJ  | C++ Programming Language  | KZ | 2 |
| Principles of object-oriented programming and C++ programming language. Basic concepts, such as - classes, objects, constructors, destructors, inheritance, virtual methods, exceptions, streams, overloading, ADT.   |   |    |   |
| 14Y2PH  | CAD Interface Programming                                       | KZ | 2 |
| Introduction to CAD interface programming techniques with the help of LIST and VBA programming languages. Possibilities of proper objects (commands), dialogues, interfaces, and applications creation in CAD systems. Programming of cooperation with other applications (databases, spread-sheets).   |   |    |   |
| 11Y2PM  | Programming in MATLAB   | KZ | 2 |
| To explain the principle of modelling and simulation, description of Matlab environment and its settings, optimization and program code debugging, data fitting and designing GUI in Matlab.  |   |    |   |
| 21Y2PL  | Operational Aspects of Aerodromes                               | KZ | 2 |
| Operational aspects of aerodromes. Location of aerodrome and orientation of runways. Requirements for apron. Capacity of airports runways and terminals. Operation under winter conditions. Firefighting units. Protection against unlawful interference. Local transport connection. Environmental protection.   |   |    |   |
| 21Y2PP  | Law and Operation in Air Transport                              | KZ | 2 |
| Development of aviation law. International conventions on civil aviation. International organisations and including of the Czech Republic in these organisations. EU legislation and civil aviation. Execution of state administration and state supervision in matters of civil aviation, in accordance with Act No. 49/1997 Col. Facilitation. Responsibilities of air carriers for passengers, luggage and cargo. The safe transport of dangerous goods. |   |    |   |
| 15Y2PU  | Publications and Their Creation                                 | KZ | 2 |
| Scientific texts types. Footnotes and references. Exploration of facts. Quotations. Formal document layout. Working with information databases. Typographic principles. Typographic editors - MS Word, Tex/LaTeX. Practical creation of simple scientific documents.  |   |    |   |
| 17Y2PR  | Carriage Processes  | KZ | 2 |
| Carrier's commercial liability. Ordering and contracting of carriage. Intergovernmental conventions on international carriage. Contract on passenger carriage. Contract on freight carriage. Forwarding contract. Liability and rights based on carrying contract. Contractual carrying conditions. Guarantee of carrying contract by more operators. Internationally accepted commercial terms (INCOTERMS). Tariff and calculation of prices.              |   |    |   |
| 17Y2PS  | Case Studies in Transportation                                  | KZ | 2 |
| Simulation expert discussions on the topics - the impact of transport on the environment and the economy, energy, construction of transport infrastructure etc. The students will each lesson presented one current and the real issue, which solutions will have to think of each other. Each of them will be represent another role (public authorities, investors, carrier representative interest groups, residents, etc.).                             |   |    |   |
| 12Y2RD  | Realization of Transport Buildings                              | KZ | 2 |
| In the first part acquainting students with preliminary to project. Preliminary to realization. Execution of a project.   |   |    |   |
| 17Y2RS  | Regional Transport - Mobility of Small Towns                    | KZ | 2 |
| Basic terms, networks of railway and bus lines, alternative forms of regional transport, influence in regional transport in vicinity of big cities, solutions of passenger and freight transport in regions, activities related to regional transport, passenger transport safety in regions.   |   |    |   |
| 15Y2SP  | Seminar on Political Philosophy                                 | KZ | 2 |
| Interpreting of philosophical texts, view of society, state and their system of government.   |   |    |   |
| 16Y2ST  | Special Technologies in Transport and Telecommunications        | KZ | 2 |
| Micro, nano and special technologies, electric arc and its applications, plasma technologies, dipping, beam technologies, electron beams technology in reduction and mending of vehicles, laser and laser technologies, soldering, gluing, ultrasound, diffusion, friction and explosion technologies, micro stoves, gas.   |   |    |   |
| 18Y2SD  | Reliability and Diagnostics, Experimental Methods               | KZ | 2 |
| Reliability theory. Ultimate limit state and serviceability. Diagnosis of components and systems. Defects in materials and products. Experimental observation of the variables and mechanical phenomena. Model similarity. Non-destructive testing of materials and structures. Optical methods. Strain gauges. Experimental determination of residual stresses. Measurement errors. Evaluation experiments.  |   |    |   |
| 15Y2SR  | Stylistics and Rhetorics  | KZ | 2 |
| Basic skills of oral and written expression as a means of human communication. Basic information about speech, articulation, oral and written language. Teaching to speak well-vocal organs, voice training. Language semantics, language syntactic and the pragmatic aspect. Creative thought and its oral and written expression. Practice - cultivating the skills of speech.  |   |    |   |
| 17Y2SG  | Systematic Creating of Railway Timetables                       | KZ | 2 |
| Timetable samples. Capacity allocation, technological intervals in railway operation. Rules and regulations of train paths, running times, time adds and supplements. Rolling stock and crew circulation planning. Rules of train-diagramm creating. Train-diagramm construction in case of more service-levels on the line.  |   |    |   |
| 17Y2SK  | Urban and Regional Rail Transport System                        | KZ | 2 |
| Factors influencing transport demand, modal-split, traffic flows distribution on public transit network. Line network optimization and configuration. Timetable designing and evaluation accenting integrated periodic timetable. Rolling stock circulation, staff and crew services optimization and their order to rosters. Framework legislation, non-barrier effects and preference of public transport. Marketing.                                     |   |    |   |
| 15Y2TS  | Technician and Contemporary Society                             | KZ | 2 |
| Why to take off a hat in a room and open a door for a lady? Are there simple solutions? Science vs belief. Do we need to know or is it enough to turn on a PC? It must be true - it's on the Internet and in newspapers! What are the sights for? Interest in public affairs - a hangover from the past?  |   |    |   |
| 17Y2TP  | Technological Prognoses in Transportation and Telecommunication | KZ | 2 |
| The students will be analysing both the general forecasting studies (NASA, CIA) and forecasting in the segment of transport and telecommunications.   |   |    |   |
| 20Y2TE  | Technology of Electronic Systems                                | KZ | 2 |
| Principle technologies for an effective operation of electronically controlled systems. Maintaining, measuring, optimization of safety and reliability of complex systems. Semiconductor technologies, printed circuits, assembly operations, interconnection and repairs technologies users and operators.   |   |    |   |
| 14Y2TU  | Telecommunications Systems and Multimedia                       | KZ | 2 |
| New trends in telecommunications namely applied in transport solutions, identification and quantification of telecommunications networks and services performance based on redundant architecture, provisioning of guaranteed service quality, two generations of the handover principles.  |   |    |   |

|   |  |    |   |
|---|--|----|---|
| 16Y2TT  | Transportation and Building Technology and Equipment     | KZ | 2 |
| Transportation and building technology and equipment. Transport of solid and mass material, soil and rock above all. Highway and underground constructions. Transport surface vehicles, description and construction features, delivered mass calculation, economy of operation. Technics and technology of underground constructions. Terrestrial vehicles operation management methodology (ultrasound, laser, GPS, total stations).                          |  |    |   |
| 21Y2TL  | Development Trends of Aircraft Construction              | KZ | 2 |
| Historical and nowadays trends. Future scenarios. Space industry. Economy.  |  |    |   |
| 12Y2UD  | Sustainable Transportation                               | KZ | 2 |
| Sustainable development, definition, history, legal framework. Sustainable development indicators. Sustainable transportation, definition, history, legal framework. Practical application of sustainable development theory, case study.   |  |    |   |
| 14Y2UI  | Artificial Intelligence                                  | KZ | 2 |
| History of artificial intelligence, knowledge, its representation including frames, state space search, constraints, genetic algorithms, machine learning.  |  |    |   |
| 20Y2UA  | Artificial Neural Networks, Realization and Applications | KZ | 2 |
| History of neural networks. Basic principles. Comparing the structure of a natural and an artificial neuron. Neural classifiers, predictors, compressors, expanders and other specialised functional blocs and systems. Modelling of neurons. Grossberg's equations. Learning principles. Layered and Hopfield's nets.  |  |    |   |
| 23Y2VZ  | Leadership and Human Resource Development                | KZ | 2 |
| Introduction to the study of human resources, human resources management, corporate goals, strategies, cultural and ethical aspects. Team management, communication in teams, strategy and planning in human resources, ethics and corporate culture, cross-cultural differences. The labor code. Introduction into protocols.  |  |    |   |
| 21Y2VA  | Selected Parts of Aerodynamics                           | KZ | 2 |
| Real gases physical properties, atmosphere. Fundamentals of fluid dynamics. External and internal aerodynamics in aircraft applications. Wing sections, wings, airfoil cascades, lift, drag. Polar, ideal incompressible and compressible flows. Viscous flows. Boundary layer, stability, turbulence. Reynolds, Strouhal and Mach Numbers. Flows aircraft aerodynamics and light dynamics. Static and dynamic stability. Anoeurability. Aircraft performances. |  |    |   |
| 23Y2VS  | Negotiation and Cooperation                              | KZ | 2 |
| Negotiation principles. Negotiation sense, base, essence. Business and crisis negotiation differences. The "Win-Win" principle. Specification. Credibility. Negotiation behavior principles. Negotiation and command. Team variability. Formal and informal team roles.   |  |    |   |
| 12Y2VT  | High Speed Railways                                      | KZ | 2 |
| High speed rail (HSR) transport characteristics and position in transportation system. HSR vehicles types and characteristics and control-command and signalling system. HSR system interoperability. Non-adhesion HSR systems. City traffic service by HSR. HSR operating points. HSR worldwide network. HSR routing and traffic conception. Specifics of HSR track construction and geometrical characteristics.  |  |    |   |
| 18Y2VC  | Computational Mechanics in Transportation                | KZ | 2 |
| Principle of virtual work and variational principles in FEM. Bar shaped, planar and three - dimensional structures in FEM. FEM in statics and in dynamics of transportation systems. Elastic, elastoplastic and viscoelastic material. FEM in problems of biomechanics. Numerical analysis of structural parts with programme ANSYS on instances.   |  |    |   |
| 12Y2ZK  | Traffic Calming  | KZ | 2 |
| Principles of traffic calming. Solution of road network organization. Urban road layouts. Psychological and physical obstacles (measures of traffic calming) and their combinations. Traffic calming measures in crossroads. Pedestrian zones. Residential streets and zones.   |  |    |   |
| 23Y2ZP  | Basis of Communication for Practice                      | KZ | 2 |
| Course is oriented to the communication in pair, as well as in a small team. Also on personality - human, which through the own experiences and feet back recognise it's strong and weak, opportunity and theats affect the results of communication. Offer the base of personal SWOT analyse and aplications, with respectation principles of ethics and culture, fully focused on environment, in which the communication is on.                              |  |    |   |
| 18Y2UB  | Accident Biomechanics and Safety                         | KZ | 2 |
| Anatomy of Man. Biomechanics of musculo-skeletal system. Medical diagnostic methods - X-ray, CT, MRI, US. Dynamics and causes of traumatic events. Pedestrian injuries. Injury accidents in road, rail and air traffic. Analysis of physical processes in terms of injury biomechanics. Principles of treatment and rehabilitation. Safety equipment and precautions to reduce the consequences of traffic accidens.  |  |    |   |
| 17Y2RZ  | Control of Transport Processes                           | KZ | 2 |
| Theoretical bases, transport system, decomposition, factors influencing control, quality diagnosis, methods of control, systems for decision making support, risk of decision making, telematics.   |  |    |   |

Name of the block: Jazyky

Minimal number of credits of the block: 8

The role of the block: J

Code of the group: JZ-N-11/12

Name of the group: Jazyk nav.1.- 4.sem. 11/12

Requirement credits in the group: In this group you have to gain 8 credits

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

Credits in the group: 8

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 |
|--------|---|------------|---------|-----------|----------|------|
| 15J2F1 | <b>Language - French 1</b><br>Jan Feit, Eva Rezlerová, Irena Veselková  | Z          | 2       | 0P+2C     | Z        | J    |
| 15JBF2 | <b>Language - French 2</b><br>Jan Feit, Eva Rezlerová, Irena Veselková  | Z          | 2       | 0P+2C+10B | L        | J    |
| 15JBF3 | <b>Language - French 3</b><br>Jan Feit, Eva Rezlerová, Irena Veselková  | Z          | 2       | 0P+2C     | Z        | J    |
| 15JBF4 | <b>Language - French 4</b><br>Jan Feit, Eva Rezlerová, Irena Veselková  | ZK         | 2       | 0P+2C+10B | L        | J    |

|        |  |    |   |           |   |   |
|--------|--|----|---|-----------|---|---|
| 15J2N1 | <b>Language - German 1</b><br><i>Jan Feit, Eva Rezlerová, Jana Štikarová, Alexej Kusák, Petra Mračková Vavroušová</i>                              | Z  | 2 | 0P+2C     | Z | J |
| 15JBN2 | <b>Language - German 2</b><br><i>Jan Feit, Eva Rezlerová, Jana Štikarová</i>   | Z  | 2 | 0P+2C+10B | L | J |
| 15JBN3 | <b>Language - German 3</b><br><i>Jan Feit, Eva Rezlerová, Jana Štikarová, Alexej Kusák, Petra Mračková Vavroušová Alexej Kusák (Gar.)</i>          | Z  | 2 | 0P+2C     | Z | J |
| 15JBN4 | <b>Language - German 4</b><br><i>Jan Feit, Eva Rezlerová, Jana Štikarová</i>   | ZK | 2 | 0P+2C+10B | L | J |
| 15J2R1 | <b>Language - Russian 1</b><br><i>Jan Feit, Eva Rezlerová, Marie Michlová</i>  | Z  | 2 | 0P+2C     | Z | J |
| 15JBR2 | <b>Language - Russian 2</b><br><i>Jan Feit, Eva Rezlerová, Marie Michlová</i>  | Z  | 2 | 0P+2C+10B | L | J |
| 15JBR3 | <b>Language - Russian 3</b><br><i>Jan Feit, Eva Rezlerová, Marie Michlová</i>  | Z  | 2 | 0P+2C     | Z | J |
| 15JBR4 | <b>Language - Russian 4</b><br><i>Jan Feit, Eva Rezlerová, Marie Michlová</i>  | ZK | 2 | 0P+2C+10B | L | J |
| 15J2S1 | <b>Language - Spanish 1</b><br><i>Jan Feit, Eva Rezlerová, Petra Mračková Vavroušová, Nina Hricsina Puškinová Petra Mračková Vavroušová (Gar.)</i> | Z  | 2 | 0P+2C     | Z | J |
| 15JBS2 | <b>Language - Spanish 2</b><br><i>Jan Feit, Eva Rezlerová, Nina Hricsina Puškinová</i>   | Z  | 2 | 0P+2C+10B | L | J |
| 15JBS3 | <b>Language - Spanish 3</b><br><i>Jan Feit, Eva Rezlerová, Nina Hricsina Puškinová</i>   | Z  | 2 | 0P+2C     | Z | J |
| 15JBS4 | <b>Language - Spanish 4</b><br><i>Jan Feit, Eva Rezlerová, Nina Hricsina Puškinová</i>   | ZK | 2 | 0P+2C+10B | L | J |

**Characteristics of the courses of this group of Study Plan: Code=JZ-N-11/12 Name=Jazyk nav.1.- 4.sem. 11/12**

|        |  |    |   |  |  |  |
|--------|--|----|---|--|--|--|
| 15J2F1 | Language - French 1<br>Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of foreign language and practical application, formal and technical registers and their use, language of management.                         | Z  | 2 |  |  |  |
| 15JBF2 | Language - French 2<br>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.  | Z  | 2 |  |  |  |
| 15JBF3 | Language - French 3<br>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.  | Z  | 2 |  |  |  |
| 15JBF4 | Language - French 4<br>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.  | ZK | 2 |  |  |  |
| 15J2N1 | Language - German 1<br>Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of foreign language and practical application, formal and technical registers and their use, language of management.                         | Z  | 2 |  |  |  |
| 15JBN2 | Language - German 2<br>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.  | Z  | 2 |  |  |  |
| 15JBN3 | Language - German 3<br>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.  | Z  | 2 |  |  |  |
| 15JBN4 | Language - German 4<br>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.  | ZK | 2 |  |  |  |
| 15J2R1 | Language - Russian 1<br>Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of foreign language and practical application, formal and technical registers and their use, language of management.                        | Z  | 2 |  |  |  |
| 15JBR2 | Language - Russian 2<br>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. | Z  | 2 |  |  |  |
| 15JBR3 | Language - Russian 3<br>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. | Z  | 2 |  |  |  |

|  |                      |    |   |
|--|----------------------|----|---|
| 15JBR4   | Language - Russian 4 | ZK | 2 |
| 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. |                      |    |   |
| 15J2S1   | Language - Spanish 1 | Z  | 2 |
| Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of foreign language and practical application, formal and technical registers and their use, language of management.                        |                      |    |   |
| 15JBS2   | Language - Spanish 2 | Z  | 2 |
| 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. |                      |    |   |
| 15JBS3   | Language - Spanish 3 | Z  | 2 |
| 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. |                      |    |   |
| 15JBS4   | Language - Spanish 4 | ZK | 2 |
| Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation. |                      |    |   |

### List of courses of this pass:

| Code  | Name of the course             | Completion | Credits |
|---|--------------------------------|------------|---------|
| 11MAG   | Algorithms                     | KZ         | 4       |
| Fundamentals of discrete and numerical algorithms and numerical methods. Practical excersises on selected algorithms, error analysis of numerical algorithms, comparison of possible variants of a numerical algorithm.   |                                |            |         |
| 11OV  | Operational Research           | ZK         | 2       |
| Definition of linear programming optimization problem, application of linear programming on economical and technical problems, traffic problems - both conventional and with constraints. Geometrical interpretation of linear programming problems, simplex method, duality principle.   |                                |            |         |
| 11STS   | Stochastic Systems             | Z,ZK       | 4       |
| The subject deals with the problems of mathematical modelling of dynamical systems, estimation od these models and their utilization for prediction. The results are illustrated on practical transportation tasks. Mathematical theory roots from probability and mathematical statistics and they use the methods of the Bayesian probabilistic approach. |                                |            |         |
| 11THRO  | Queuing Theory                 | ZK         | 2       |
| Discrete event process, definition, random distribution, and probability. Basic processes, process of revitalisation. Markov process, Markov models, Kendall classification, model M/M/1, models M/M/n. Non-markovian models, model M/C/n, models G/G/n. Models with continuous flow. Service net, examples of Petri net. Computer simulation.              |                                |            |         |
| 11VSM   | Selected Statistical Methods   | ZK         | 2       |
| Probability. Accident and fortuity.   |                                |            |         |
| 11XN1   | Master Project 1               | Z          | 2       |
| 11XN2   | Master Project 2               | Z          | 2       |
| 11XN3   | Master Project 3               | Z          | 1       |
| 11Y2FX  | Functions of Complex Variable  | KZ         | 2       |
| Derivation of complex function, holomorphic function, complex exponential series, integration, Cauchy theorem. Taylor series, Laurent series of complex variable function. Basics of Laplace and Z-transformation.  |                                |            |         |
| 11Y2LG  | Logics of Engineer's Judgement | KZ         | 2       |
| Logical structure of engineer's judgement, its propositional and predicative logical base. Solutions of logical tasks through the methods of truthfulness and semantic analysis charts. Venn's diagram method. Logical basis for network design for the solution of technical tasks.  |                                |            |         |
| 11Y2PM  | Programming in MATLAB          | KZ         | 2       |
| To explain the principle of modelling and simulation, description of Matlab environment and its settings, optimization and program code debugging, data fitting and designing GUI in Matlab.  |                                |            |         |
| 12BA  | Road Safety Audit              | KZ         | 2       |
| Schedules of applications of safety assessments during the process of preparations, and of the particular realization of the road network that should minimize traffic accident risks for all those who take part in road traffic. Road safety survey. Application of European Directive 2008/96/EC on road safety infrastructure management.               |                                |            |         |
| 12BPU   | Safety of Transfer Points      | Z          | 2       |
| Design of areas with frequent pedestrian cumulation and movement. Interaction with other transportation vehicles. Optimization of platform placement etc.   |                                |            |         |
| 12XN1   | Master Project 1               | Z          | 2       |
| 12XN2   | Master Project 2               | Z          | 2       |
| 12XN3   | Master Project 3               | Z          | 1       |
| 12Y2BM  | Safety on The Local Roads      | KZ         | 2       |
| Classification of road accidents rates, social loses. Collision points, diagrams. Tools and methods for safer road transportation. Crossroads from the point of view of safety. Psychological right of way. Roundabouts. Pedestrian transport, cyclists. Traffic lights coordination. Transport control and regulation.                                     |                                |            |         |
| 12Y2IS  | Urban Networks                 | KZ         | 2       |
| The importance and the position of UN as public and technical infrastructure / utilities, methodology of the UN master planning, of UN design, UN coordination, UN installation and UN operation (basic technical standards of UN, trenchless technologies for UN).   |                                |            |         |

|  |   |      |   |
|--|---|------|---|
| 12Y2KE   | Landscape Ecology                             | KZ   | 2 |
| Landscape ecology. Landscape - definition, types, evolution. Landscape systems. Anthropogenic impacts on landscape. Methods using for evaluating landscape. Fractal geometry and its potential applications in landscape ecology. Landscape planning.  |   |      |   |
| 12Y2KS   | Rail Transport in Settlements and Regions     | KZ   | 2 |
| Modernization and development of railway infrastructure in Czech Republic. Arrangement of railway networks and junctions. Suburban railway services. Network configuration and operation of metro systems. Network configuration and operation of tram systems. Special thematic lectures (rail transport in selected countries / regions).  |   |      |   |
| 12Y2MD   | Methods of Traffic Regulation and Prediction  | KZ   | 2 |
| Basic ways of traffic prognosis, traffic prognosis for large area (calculation of future traffic volumes, calculation of future traffic volumes between areas (analogical and synthetic methods, modal split, traffic distribution to road network). Shock wave in traffic flow. Service levels and their traffic volumes. Acceleration noise.   |   |      |   |
| 12Y2MH   | Measurement and Modeling of Traffic Noise     | KZ   | 2 |
| Theoretical introduction to noise from traffic. Noise from rail transport. Noise from road traffic. Measurement and calculation of noise from rail traffic. Measurement and calculation of noise from road traffic. Modelling of traffic noise in the CADNA A.   |   |      |   |
| 12Y2MZ   | Modernization of Railway Lines and Stations   | KZ   | 2 |
| Line speed increasing. AGC and AGTC Agreement. AGC and AGTC railway network. Principles of modernization (conceptual papers, definitions of basic concepts, individual principles). Track geometrical characteristics on modernized railway lines. Superstructure and substructure on upgraded lines. Designing of railway stations. Bridges and tunnels. Development and realization of projects. Technical description of the transit corridors. |   |      |   |
| 12Y2RD   | Realization of Transport Buildings            | KZ   | 2 |
| In the first part acquainting students with preliminary to project. Preliminary to realization. Execution of a project.  |   |      |   |
| 12Y2UD   | Sustainable Transportation                    | KZ   | 2 |
| Sustainable development, definition, history, legal framework. Sustainable development indicators. Sustainable transportation, definition, history, legal framework. Practical application of sustainable development theory, case study.  |   |      |   |
| 12Y2VT   | High Speed Railways                           | KZ   | 2 |
| High speed rail (HSR) transport characteristics and position in transportation system. HSR vehicles types and characteristics and control-command and signalling system. HSR system interoperability. Non-adhesion HSR systems. City traffic service by HSR. HSR operating points. HSR worldwide network. HSR routing and traffic conception. Specifics of HSR track construction and geometrical characteristics.                                 |   |      |   |
| 12Y2ZK   | Traffic Calming                               | KZ   | 2 |
| Principles of traffic calming. Solution of road network organization. Urban road layouts. Psychological and physical obstacles (measures of traffic calming) and their combinations. Traffic calming measures in crossroads. Pedestrian zones. Residential streets and zones.  |   |      |   |
| 14SBD  | Transportation safety and software            | Z    | 2 |
| The course is focused on application of software which are being used as an engineering aid during the vehicle design, traffic modeling and GIS applications. Theoretical background to the software is provided.  |   |      |   |
| 14SI   | System Engineering                            | Z,ZK | 4 |
| Standard analysis methods and synthesis (projecting) of objects with system identification from the methodology standpoint.  |   |      |   |
| 14XN1  | Master Project 1                              | Z    | 2 |
| 14XN2  | Master Project 2                              | Z    | 2 |
| 14XN3  | Master Project 3                              | Z    | 1 |
| 14Y2C1   | CATIA I                                       | KZ   | 2 |
| Fundamentals of working with CATIA, making basic parts and bodies. Making 2D sketches, geometric structure, parametric linking, making adaptive models from 2D sketches. Import and export of made parts and bodies. Making assemble and visualization.  |   |      |   |
| 14Y2C2   | CATIA II                                      | KZ   | 2 |
| Extension of basic course. Modeling compound bodies. Possibility of enumeration, communications with other systems. Surface x solid bodies. Kinematic mechanism. Project making and project cooperation. Outputs of projects.  |   |      |   |
| 14Y2CS   | Sensitivity of Systems                        | KZ   | 2 |
| Design of systems with defined reliability. The impact of changing parameters and subsystems within a system. System sensitivity computing, definition of sensitivity functions and matrices and their usability in system design.   |   |      |   |
| 14Y2JM   | One-Chip Controllers                          | KZ   | 2 |
| One-chip controllers architecture, embedded peripherals (counters, timers, converters, ports) and their utilisation. Practical tasks are programmed with the aid of AVR chips.   |   |      |   |
| 14Y2OP   | Object Oriented Programming in Transport      | KZ   | 2 |
| Classes, objects, encapsulation, inheritance, polymorphism, templates, retyping, streams, events, repository, collections, virtual methods and classes. Examples will be derived from microscopic simulation systems, discrete event simulation, cellular simulations and virtual life simulations.  |   |      |   |
| 14Y2PH   | CAD Interface Programming                     | KZ   | 2 |
| Introduction to CAD interface programming techniques with the help of LIST and VBA programming languages. Possibilities of proper objects (commands), dialogues, interfaces, and applications creation in CAD systems. Programming of cooperation with other applications (databases, spread-sheets).  |   |      |   |
| 14Y2PI   | Process Information Systems in Transportation | KZ   | 2 |
| Introduction and detailed usage of transport information systems, e.g. EFC, ePurse and transport check-in systems for public transport with focus on architecture of this system and SOA (Service Oriented Architecture). Information systems implementation and operations description in the Czech Republic (technical and process) included lectures and visits.  |   |      |   |
| 14Y2PJ   | C++ Programming Language                      | KZ   | 2 |
| Principles of object-oriented programming and C++ programming language. Basic concepts, such as - classes, objects, constructors, destructors, inheritance, virtual methods, exceptions, streams, overloading, ADT.  |   |      |   |
| 14Y2TU   | Telecommunications Systems and Multimedia     | KZ   | 2 |
| New trends in telecommunications namely applied in transport solutions, identification and quantification of telecommunications networks and services performance based on redundant architecture, provisioning of guaranteed service quality, two generations of the handover principles.   |   |      |   |
| 14Y2UI   | Artificial Intelligence                       | KZ   | 2 |
| History of artificial intelligence, knowledge, its representation including frames, state space search, constraints, genetic algorithms, machine learning.   |   |      |   |
| 15DPS  | Transportation Psychology                     | Z    | 2 |
| Subject of psychology and its basic concepts. Information intake, decision-making and behaviour. Performance. Engineering psychology and vehicle construction. Psychological aspects of travel route and traffic conditions, accidents and traffic incidents. Selection and training of the staff. Work and leisure. Age as a factor in transport operation.   |   |      |   |



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|---|---|----|---|
| 15JBS3  | Language - Spanish 3  | Z  | 2 |
| 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.  |   |    |   |
| 15JBS4  | Language - Spanish 4  | ZK | 2 |
| 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.  |   |    |   |
| 15XN1   | Master Project 1  | Z  | 2 |
| 15XN2   | Master Project 2  | Z  | 2 |
| 15XN3   | Master Project 3  | Z  | 1 |
| 15Y2DN  | Transportation Psychology in German Speaking Countries        | KZ | 2 |
| Introduction to larger view of the traffic problems with regard to the work with texts (physics for drivers, abusing alcohol during driving, exhaustion, getting of driving licence, children in traffic, traffic accident, traffic psychology in the internet etc.).   |   |    |   |
| 15Y2HS  | Road Transport History  | KZ | 2 |
| Roads and road traffic in the Ancient Age, corridors of main medieval pathways. Development of road traffic in the modern period, acceleration of road transport development during 1st part of 20th century. Development of road layout, geometric and construction layers. Beginning of modern road civil engineering. Development of road travelling in modern period. History of road interconnections, bridges and traffic control, development of road signs. |   |    |   |
| 15Y2MS  | Sociology for Managers  | KZ | 2 |
| Sociological approach to a corporation. Corporation and its organization. Corporation and its running - human role and communication. Corporation, its culture and social system. Human's work position in free market economy. Corporate directorship, work groups, adaptation, strife, different roles and positions in corporation.  |   |    |   |
| 15Y2OF  | Specialised French for Transportation and Telecommunications  | KZ | 2 |
| Basic transportation (public transport, railway, air, road and ship transport) and telecommunications terminology. Special focus on independent speaking and writing skills.  |   |    |   |
| 15Y2OZ  | Health Protection in Transportation and EU                    | KZ | 2 |
| Health protection in transportation in CR in the past and present. Conditions before 1989 and after, current legislature, future prospects. Harmonisation of legislation with other EU members. Fundamental principles of health protection and support in selected EU countries.   |   |    |   |
| 15Y2PS  | Practical Spanish for Transportation, Management and Business | KZ | 2 |
| Development of communication skills, training of correct written expression of formal character, basic technical vocabulary, cultural specifics of the Spanish speaking countries. Terminology of transport and commerce, business letter.  |   |    |   |
| 15Y2PT  | Food in Transportation  | KZ | 2 |
| The nutrition policy. Interaction transportation and foodstuffs. The health risks. Hygienic safeguard. The practical examples from the Czech Republic and from the world. The issues of dining cars, work trains and other railroad equipment. Legislation.   |   |    |   |
| 15Y2PU  | Publications and Their Creation                               | KZ | 2 |
| Scientific texts types. Footnotes and references. Exploration of facts. Quotations. Formal document layout. Working with information databases. Typographic principles. Typographic editors - MS Word, Tex/LaTeX. Practical creation of simple scientific documents.  |   |    |   |
| 15Y2SP  | Seminar on Political Philosophy                               | KZ | 2 |
| Interpreting of philosophical texts, view of society, state and their system of government.   |   |    |   |
| 15Y2SR  | Stylistics and Rhetorics                                      | KZ | 2 |
| Basic skills of oral and written expression as a means of human communication. Basic information about speech, articulation, oral and written language. Teaching to speak well-vocal organs, voice training. Language semantics, language syntactic and the pragmatic aspect. Creative thought and its oral and written expression. Practice - cultivating the skills of speech.  |   |    |   |
| 15Y2TS  | Technician and Contemporary Society                           | KZ | 2 |
| Why to take off a hat in a room and open a door for a lady? Are there simple solutions? Science vs belief. Do we need to know or is it enough to turn on a PC? It must be true - it's on the Internet and in newspapers! What are the sights for? Interest in public affairs - a hangover from the past?  |   |    |   |
| 16XN1   | Master Project 1  | Z  | 2 |
| 16XN2   | Master Project 2  | Z  | 2 |
| 16XN3   | Master Project 3  | Z  | 1 |
| 16Y2HP  | Vehicle Hygiene   | KZ | 2 |
| Emissions and ergonomoy of vehicles and the influence on man and nature. National and international law related to the hygiene. Noise and vibrations - sources, creation, propagation, physical values, ways of measuring, prevention, elimination. Exhausts - creation, measurement, reduction, non-regular fuels and drives. Ergonomoy - sitting, standing, control, operational reach. Condition - heating, ventilation, air-conditioning, filtration, tiredom.  |   |    |   |
| 16Y2KV  | Car Body Design   | KZ | 2 |
| Personal cars body, high-load car body, bus car body, and motorcycle as a construction set. Principles of design, production, testing and operation. Materials used for car body construction. Active and passive safety parts. Ergonomics, HMI, view out of the vehicle, operational extent, view behind the car. Conditioning tools, signaling function. Aerodynamics of the car body. Design and artistic design principles. Practical training.                 |   |    |   |
| 16Y2MK  | Quality Methods for Vehicles                                  | KZ | 2 |
| Quality management methods list, customer data acquisition and analysis of customer requirements, QFD, DFM, DFA, DFS. FMEA (Failure mode effect analysis). Elements of parallel (team) design.  |   |    |   |
| 16Y2PG  | Computer Graphics and Virtual Reality                         | KZ | 2 |
| Principles of creation and processing of bitmap and vector 2D graphics, 3D virtual scenes and algorithms used for their computerized processing. Adopting skills of work with professional and freeware tools for creation and processing of 2D, 3D and interactive graphics, and basics of programming language VRML and graphic libraries (OpenGL).   |   |    |   |
| 16Y2ST  | Special Technologies in Transport and Telecommunications      | KZ | 2 |
| Micro, nano and special technologies, electric arc and its applications, plasma technologies, dipping, beam technologies, electron beams technology in roduction and mending of vehicles, laser and laser technologies, soldering, gluing, ultrasound, diffusion, friction and explosion technologies, micro stoves, gas.   |   |    |   |
| 16Y2TT  | Transportation and Building Technology and Equipment          | KZ | 2 |
| Transportation and building technology and equipment. Transport of solid and mass material, soil and rock above all. Highway and underground constructions. Transport surface vehicles, description and construction features, delivered mass calculation, economy of operation. Technics and technology of underground constructions. Terrestrial vehicles operation management methodology (ultrasound, laser, GPS, total stations).                              |   |    |   |
| 17XN1   | Master Project 1  | Z  | 2 |
| 17XN2   | Master Project 2  | Z  | 2 |
| 17XN3   | Master Project 3  | Z  | 1 |



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|--------|---|----|---|
| 17Y2FM | <b>Financing in Urban Mass Transportation</b><br>UMT history and development in Prague and other cities in the world. Building and operation of public tram, bus, and trolleybus networks. Underground building and operation. Other UMT types. UMT development in small towns. Particularities of investment and operation financing of individual UMT types. Historic and present models of UMT financing. Transport inspection and blind passengers. Tourism & UMT. UMT typology & choice of optimum financing.  | KZ | 2 |
| 17Y2KI | <b>Capital Investment in Transportation and Telecommunications</b><br>Financial market, investment decision making - long term goals and investment strategies, long term financing.  | KZ | 2 |
| 17Y2MS | <b>Microsimulation of Railway Operation</b><br>Introduction to the characteristics of simulation tools, creation of a simulation model of railway infrastructure, verification of a specific operational concept on the given infrastructure, adaptation of the infrastructure model and modification to the infrastructure to allow the implementation of the proposed operational concept. Stability tests and evaluations. Evaluation of sensitivity of the operational concept to delays.                       | KZ | 2 |
| 17Y2NU | <b>Cost and Benefits of Transport Systems</b><br>Transport systems and their history, externalities and their internalization, public goods, transport funding, assessment of transport constructions and systems by the methods CBA, MCA, CA, transport taxation, influence of transport constructions on public budgets, relation of transport and economic growth, importance of transport in area, spatial economy.   | KZ | 2 |
| 17Y2PR | <b>Carriage Processes</b><br>Carrier's commercial liability. Ordering and contracting of carriage. Intergovernmental conventions on international carriage. Contract on passenger carriage. Contract on freight carriage. Forwarding contract. Liability and rights based on carrying contract. Contractual carrying conditions. Guarantee of carrying contract by more operators. Internationally accepted commercial terms (INCOTERMS). Tariff and calculation of prices.   | KZ | 2 |
| 17Y2PS | <b>Case Studies in Transportation</b><br>Simulation expert discussions on the topics - the impact of transport on the environment and the economy, energy, construction of transport infrastructure etc. The students will each lesson presented one current and the real issue, which solutions will have to think of each other. Each of them will be represent another role (public authorities, investors, carrier representative interest groups, residents, etc.).  | KZ | 2 |
| 17Y2RS | <b>Regional Transport - Mobility of Small Towns</b><br>Basic terms, networks of railway and bus lines, alternative forms of regional transport, influence in regional transport in vicinity of big cities, solutions of passenger and freight transport in regions, activities related to regional transport, passenger transport safety in regions.  | KZ | 2 |
| 17Y2RZ | <b>Control of Transport Processes</b><br>Theoretical bases, transport system, decomposition, factors influencing control, quality diagnosis, methods of control, systems for decision making support, risk of decision making, telematics.  | KZ | 2 |
| 17Y2SG | <b>Systematic Creating of Railway Timetables</b><br>Timetable samples. Capacity allocation, technological intervals in railway operation. Rules and regulations of train paths, running times, time adds and supplements. Rolling stock and crew circulation planning. Rules of train-diagramm creating. Train-diagramm construction in case of more service-levels on the line.  | KZ | 2 |
| 17Y2SK | <b>Urban and Regional Rail Transport System</b><br>Factors influencing transport demand, modal-split, traffic flows distribution on public transit network. Line network optimization and configuration. Timetable designing and evaluation accenting integrated periodic timetable. Rolling stock circulation, staff and crew services optimization and their order to rosters. Framework legislation, non-barrier effects and preference of public transport. Marketing.  | KZ | 2 |
| 17Y2TP | <b>Technological Prognoses in Transportation and Telecommunication</b><br>The students will be analysing both the general forecasting studies (NASA, CIA) and forecasting in the segment of transport and telecommunications.   | KZ | 2 |
| 18AMC  | <b>Anatomy and human mobility</b><br>Medical science system. Life and its character. Human body topography. Anatomical nomenclature. Human body tissue list. Muscle structure. Joints. The structure and mechanics of the muscular and skeleton system. Dysfunction and damage of the human body after an accident. The mobility, therapy and rehabilitation of the injured. Sources of human security in transport. Security aids.   | ZK | 3 |
| 18T GK | <b>Technology of structures in transportation</b><br>Analysis of product design, focused on transportation technology. Functional evaluation, materials, technology analysis. Fitting and space analysis. Reliability, manipulation and control, manufacturing and maintenance. Technological indexes. Volba optimálních technologií. Selection of optimal manufacturing technology.  | KZ | 4 |
| 18XN1  | <b>Master Project 1</b>   | Z  | 2 |
| 18XN2  | <b>Master Project 2</b>   | Z  | 2 |
| 18XN3  | <b>Master Project 3</b>   | Z  | 1 |
| 18Y2D2 | <b>Dynamics of Transport Routes and Vehicles 2</b><br>Analysis of forces in the vehicle and transport routes and their influence on the stress and strain components of the vehicle structure or behavior of traffic routes. Creation of dynamic models of vehicles and transport routes. Vibration of systems with a finite number of degrees of freedom. Methods of constant stiffness and constant compliance. Dynamic calculations of structural systems. Criteria for the admissibility of oscillation.        | KZ | 2 |
| 18Y2FZ | <b>Physical Basis of Materials' Properties</b><br>On the basis of internal structure and nature of interaction elastic material behavior and its maximum strength is explained. The model is further developed by considering different types of defects, loads and environment for explanation of failure mechanisms - the level of real strength determined by internal defects, and brittle fracture, fatigue and creep. Failures are discussed as a challenge posed to design of novel materials.               | KZ | 2 |
| 18Y2MP | <b>Finite Element Method And Its Application</b><br>Basic mathematical formulation of the Finite Element Method. Direct Stiffness Method used in structural mechanics. Evaluation of stiffness matrices for the basic elements using variational principles. Element formulation (bar and beam elements, CST, LST, quadrilateral, tetrahedral and brick elements). Natural coordinates, natural shape functions and isoparametric representation. Numerical integration. Introduction to dynamics. FEM programming. | KZ | 2 |
| 18Y2SD | <b>Reliability and Diagnostics, Experimental Methods</b><br>Reliability theory. Ultimate limit state and serviceability. Diagnosis of components and systems. Defects in materials and products. Experimental observation of the variables and mechanical phenomena. Model similarity. Non-destructive testing of materials and structures. Optical methods. Strain gauges. Experimental determination of residual stresses. Measurement errors. Evaluation experiments.  | KZ | 2 |
| 18Y2UB | <b>Accident Biomechanics and Safety</b><br>Anatomy of Man. Biomechanics of musculo-skeletal system. Medical diagnostic methods - X-ray, CT, MRI, US. Dynamics and causes of traumatic events. Pedestrian injuries. Injury accidents in road, rail and air traffic. Analysis of physical processes in terms of injury biomechanics. Principles of treatment and rehabilitation. Safety equipment and precautions to reduce the consequences of traffic accidents.  | KZ | 2 |
| 18Y2VC | <b>Computational Mechanics in Transportation</b><br>Principle of virtual work and variational principles in FEM. Bar shaped, planar and three - dimensional structures in FEM. FEM in statics and in dynamics of transportation systems. Elastic, elastoplastic and viscoelastic material. FEM in problems of biomechanics. Numerical analysis of structural parts with programme ANSYS on instances.   | KZ | 2 |

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|---|---|------|---|
| 20BSD   | <b>Safety and Reliability in Transportation</b>                 | KZ   | 2 |
| The content of subject is basic notion, predicative diagnostics, safety in the traffic vehicles, safety infrastructure, human in the transportation and traffic systems, security of information in transportation and application of safety systems in the traffic and the transportation, etc.  |   |      |   |
| 20IDFS  | <b>Identification Systems</b>                                   | Z    | 2 |
| Basic identification systems, its technologies (barcodes, RFID, biometrics), their features, usage, security and standards. Applications of identification systems, e. g. identification of vehicles, cargo, devices and processes. Identifier as foundation of traffic telematics standardization.   |   |      |   |
| 20ITS   | <b>Intelligent Transport Systems</b>                            | ZK   | 3 |
| Categorization of ITS, the ITS system architecture, sophisticated methods for urban traffic management, ITS for public transport, ITS for parking systems, road line traffic management, automated detection of excesses, intelligent highways, processing and modelling of traffic quantities, queuing theory and shock waves, ITS for road tunnels, tunnel risk analysis systems, the use of modern decision-making systems in ITS.   |   |      |   |
| 20SAO   | <b>Sensors and controls</b>                                     | KZ   | 1 |
| System functions development of sensors. Principles, technological and construction of electric, non - electric and magnetic data and electromagnetic waves. Elements for rotating and sliding movement. Pneumatic and hydraulic elements in solid phase.   |   |      |   |
| 20SIBS  | <b>Reliability Engineering and Safety of Systems</b>            | ZK   | 3 |
| Basic theory of reliability and safety with special regard to information and automation equipment used in transportation safety systems. Various aspects of reliability and safety systems analysis and synthesis. Problems of human subject - artificial systems.   |   |      |   |
| 20TSS   | <b>Telematic Systems and Services</b>                           | Z,ZK | 3 |
| Telematic theory, telematic architecture, FRAME, cooperative systems - technologies, principles and applications, European electronic toll service, traffic information systems, e-call, automated vehicle systems, European railway traffic management system.   |   |      |   |
| 20XN1   | <b>Master Project 1</b>   | Z    | 2 |
| 20XN2   | <b>Master Project 2</b>   | Z    | 2 |
| 20XN3   | <b>Master Project 3</b>   | Z    | 1 |
| 20Y2PR  | <b>Time Series Prediction</b>                                   | KZ   | 2 |
| Basic methods of quantitative forecasting, causal models, time series. Model performance evaluation, describing statistics, MAE, MAPE, RMSE, entropy measures, naive models. Basic theory of the linear prediction models, covariance and correlation coefficients, smoothing methods, regression methods, Box-Jenkins methodology, statistical tests, genetics algorithms.   |   |      |   |
| 20Y2TE  | <b>Technology of Electronic Systems</b>                         | KZ   | 2 |
| Principle technologies for an effective operation of electronically controlled systems. Maintaining, measuring, optimization of safety and reliability of complex systems. Semiconductor technologies, printed circuits, assembly operations, interconnection and repairs technologies users and operators.   |   |      |   |
| 20Y2UA  | <b>Artificial Neural Networks, Realization and Applications</b> | KZ   | 2 |
| History of neural networks. Basic principles. Comparing the structure of a natural and an artificial neuron. Neural classifiers, predictors, compressors, expanders and other specialised functional blocs and systems. Modelling of neurons. Grossberg's equations. Learning principles. Layered and Hopfield's nets.  |   |      |   |
| 21XN1   | <b>Master Project 1</b>   | Z    | 2 |
| 21XN2   | <b>Master Project 2</b>   | Z    | 2 |
| 21XN3   | <b>Master Project 3</b>   | Z    | 1 |
| 21Y2LS  | <b>Air Traffic Services</b>                                     | KZ   | 2 |
| Airspace structure in Czech Republic and other countries. Introduction and description of ATS units in Czech Republic. Practical examples of TWR, APP a ACC control. Procedural and radar control. Incidents caused or partially caused by ATS. History of ATS and czech airspace.  |   |      |   |
| 21Y2MK  | <b>Marketing of Air Transport</b>                               | KZ   | 2 |
| Definition, purpose, evolution, stages and types of marketing. Marketing in air transportation. Marketing research. Market segmentation. Airlines marketing strategies. Airline Products. Yield management and revenues. Air transport market sales.  |   |      |   |
| 21Y2MS  | <b>Aerospace Engineering Simulation and Modelling</b>           | KZ   | 2 |
| The course is designed as a set of exemplary tasks and problems based on practical aviation issues. The university degree mathematic skills and software applications usage will be necessary for successful figuring out. Both simple tasks, where students create own model themselves (e.g. in Matlab), and more complicated problems where professional developed tools will be applied.  |   |      |   |
| 21Y2NR  | <b>Navigation and Flight Control Systems</b>                    | KZ   | 2 |
| Navigation (ANP/RNP), area navigation, FMS, FMC, A/P, A/T, FD, MCDU, GPWS.  |   |      |   |
| 21Y2PL  | <b>Operational Aspects of Aerodromes</b>                        | KZ   | 2 |
| Operational aspects of aerodromes. Location of aerodrome and orientation of runways. Requirements for apron. Capacity of airports runways and terminals. Operation under winter conditions. Firefighting units. Protection against unlawful interference. Local transport connection. Environmental protection.   |   |      |   |
| 21Y2PP  | <b>Law and Operation in Air Transport</b>                       | KZ   | 2 |
| Development of aviation law. International conventions on civil aviation. International organisations and including of the Czech Republic in these organisations. EU legislation and civil aviation. Execution of state administration and state supervision in matters of civil aviation, in accordance with Act No. 49/1997 Col. Facilitation. Responsibilities of air carriers for passengers, luggage and cargo. The safe transport of dangerous goods.   |   |      |   |
| 21Y2TL  | <b>Development Trends of Aircraft Construction</b>              | KZ   | 2 |
| Historical and nowadays trends. Future scenarios. Space industry. Economy.  |   |      |   |
| 21Y2VA  | <b>Selected Parts of Aerodynamics</b>                           | KZ   | 2 |
| Real gases physical properties, atmosphere. Fundamentals of fluid dynamics. External and internal aerodynamics in aircraft applications. Wing sections, wings, airfoil cascades, lift, drag. Polar, ideal incompressible and compressible flows. Viscous flows. Boundary layer, stability, turbulence. Reynolds, Strouhal and Mach Numbers. Flows aircraft aerodynamics and light dynamics. Static and dynamic stability. Anoeurability. Aircraft performances.   |   |      |   |
| 22PSIN  | <b>Prevention of Road Traffic Accidents</b>                     | Z    | 4 |
| Basic definitions, types of source materials, methods of analysis, influence of road, factors of accidents, vehicle faults etc.   |   |      |   |
| 22TZN   | <b>Technical Expertise</b>                                      | KZ   | 2 |
| Historical evolution of sworn forensic engineering, forensic activity, current legislature in the Czech Republic, different disciplines, notion of forensic, forensic legislation, basic forensic acts, expert role in the obtaining proofs, forensic methodology. Notion of the evidence, general principles of evidence obtaining, metrology, protocol, evidences collection, site inspection, forensic report, elements. Finding, expert testimony / report. Appraisal and its role in the forensic. |   |      |   |
| 22XN1   | <b>Master Project 1</b>   | Z    | 2 |
| 22XN2   | <b>Master Project 2</b>   | Z    | 2 |
| 22XN3   | <b>Master Project 3</b>   | Z    | 1 |

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|---|--|------|----|
| 22Y2PS  | Traffic Accidents Computer Simulation and Analysis       | KZ   | 2  |
| Vehicle dynamics simulation, multi body systems and vehicle active safety systems, vehicle slipping, external influence on virtual model, crash tests evaluation, single-track vehicle, vehicle passengers, pedestrian, traffic accident simulation and analysis.   |  |      |    |
| 23BAND  | Safety aspects of vehicle design                         | ZK   | 2  |
| Design of transportation vehicle according to its usage and function, concerning the safety aspects beginning the design concept. Marketing and user demands. Vehicle dynamics. Propulsion systems. Design process, functional design and vehicle structure. Evaluation of variant concepts. Design phases. Reliability, technological aspects etc.   |  |      |    |
| 23BDP   | Vehicles Safety  | KZ   | 2  |
| Passive, active and integrated safety. Safety and assistance systems. Injury biomechanics and restraint systems. Vehicle-human interaction in emergency situations.   |  |      |    |
| 23DPBD  | Diploma Thesis (for the Field BD)                        | KZ   | 14 |
| 23KRIO  | Crisis Management for Engineering Branches               | KZ   | 3  |
| Human system. Assets, terms, concept and safety management aims. Causes and consequences of disasters. Safety management. Crisis management-its aims, demands, roles, principles, specifics and comparison with the EU and NATO. Organisational, personal, legislative, finance, material and technical provision. The IZS role. Planning. Protection of public and critical infrastructure. Problem solving.   |  |      |    |
| 23MAR   | Risk Analysis and Management                             | Z,ZK | 3  |
| Concept of risks and terms. Risk sources, definition of hazard, impacts and risks. Methods for identification, analysis, assessment and management of risks. Risk engineering targets and good engineering practice. Methods, tools and techniques for risk engineering. System of systems risk. Application of strategic and system approach for benefit of security and development. Territorial, emergency and crisis planning. Human factor - its role. |  |      |    |
| 23PDY   | Practical Vehicle Dynamics                               | Z    | 2  |
| Theory of vehicle dynamics. Practical demonstrations of transportation vehicles behavior in different situations. Excursion: air simulator, simulator of air-traffic control, train testing ground. Course of sportive and safety driving and heavy vehicle dynamics example.   |  |      |    |
| 23TDM   | Continuum Thermodynamics and Fundamentals of Meteorology | Z,ZK | 3  |
| Basic division and fluid properties. Fluid mechanics and the theory of physical similarity. Euler equation of hydrostatics. Basic equations of one-dimensional fluid flow. Stationary flow of incompressible fluid losses. The basic equation for multidimensional flow. Aerodynamics of bodies. Basic laws of thermodynamics. Equations of state. Ideal gas. Reversible and irreversible state changes typical of an ideal gas. Real gases and vapor.      |  |      |    |
| 23TP  | Criminal Law in IT and Transportation                    | KZ   | 2  |
| Introduction of criminal law into legal order, conception of culpability and criminal delict, consequence of other legal standards. international treaty and criminal law, investigation of crime, specific indicia of criminal court cases, practical examples.  |  |      |    |
| 23TPT   | Creation of Legal and Technical Regulations              | ZK   | 3  |
| Creation of legislation, structure of the bills of law, legal process, compatibility with the EC law, the creation of technical standards and their publication, ÚNMZ (Czech Office for standards, metrology and testing) in Czech Republic, organizations CEN, CENELEC and ETSI, the notification process.   |  |      |    |
| 23XN1   | Master Project 1   | Z    | 2  |
| 23XN2   | Master Project 2   | Z    | 2  |
| 23XN3   | Master Project 3   | Z    | 1  |
| 23Y2AE  | Acoustics and Electroacoustics in Transportation         | KZ   | 2  |
| Basic acoustic quantities, properties of acoustic signals. Basic equations in acoustics, method of equivalent circuits. Acoustic impedance, damping. Acoustic actuators, loudspeakers. Acoustic sensors, microphones. Fundamentals of acoustic signal processing. Acoustics of closed spaces. Fundamentals of acoustics in solids. Acoustic problems in transport and their solutions.  |  |      |    |
| 23Y2NE  | Design of Electronic Equipments                          | KZ   | 2  |
| Characteristics and realization of semiconductor electronic components, basic electronic devices division. Sources, input and output elements, process elements. Realization of basic circuits - amplifiers, data converters. Analog electronic systems, analog computing. Switching elements, logic circuits, FPGA implementation. Single chip microcomputers and microcontrollers. Design (ORCAD), construction of electronic devices.                    |  |      |    |
| 23Y2NS  | Nonlinear Systems  | KZ   | 2  |
| Model development and parameter identification of nonlinear, time-varying and periodic systems. Analyses of continuous and discrete non-linear systems. Solution presentations of several non-linear models and non-linear differential equations using the MATLAB software. Linearization, stability of nonlinear systems, stability and instability theorems. Nonlinear phenomena -multiple equilibria, limit cycles, bifurcations, chaos.                |  |      |    |
| 23Y2VS  | Negotiation and Cooperation                              | KZ   | 2  |
| Negotiation principles. Negotiation sense, base, essence. Business and crisis negotiation differences. The "Win-Win" principle. Specification. Credibility. Negotiation behavior principles. Negotiation and command. Team variability. Formal and informal team roles.   |  |      |    |
| 23Y2VZ  | Leadership and Human Resource Development                | KZ   | 2  |
| Introduction to the study of human resources, human resources management, corporate goals, strategies, cultural and ethical aspects. Team management, communication in teams, strategy and planning in human resources, ethics and corporate culture, cross-cultural differences. The labor code. Introduction into protocols.  |  |      |    |
| 23Y2ZP  | Basis of Communication for Practice                      | KZ   | 2  |
| Course is oriented to the communication in pair, as well as in a small team. Also on personality - human, which through the own experiences and feedback recognise it's strong and weak, opportunity and threats affect the results of communication. Offer the base of personal SWOT analyse and applications, with respectation principles of ethics and culture, fully focused on environment, in which the communication is on.                         |  |      |    |
| 23ZP  | Basics of Law  | ZK   | 4  |
| Basic orientation in the Czech legal system. The course is primarily intended to provide students with orientation in fundamentals of the Czech Republic' legal system and in various forms of law, including adoption of the basic principles of European Community law. The course consists of selected chapters from the public and private law and European law.  |  |      |    |

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