### Study plan

### Name of study plan: Bachelor TET-LOG Part-Time from 2025/26

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch:

Program of study: Technology in Transportation and Telecommunications

Type of study: Bachelor combined

Required credits: 90

Elective courses credits: 90 Sum of credits in the plan: 180

Note on the plan:

Name of the block: Compulsory courses Minimal number of credits of the block: 90

The role of the block: Z

Code of the group: 1S-BK-TET-24/25

Name of the group: 1st Sem. Bachelor Part-Time TET from 2024/25

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

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

Credits in the group: 30 Note on the group:

| NOTE OIL THE | <u> </u>   |            |         |           |          |      |
|--------------|--|------------|---------|-----------|----------|------|
| Code         | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)  | Completion | Credits | Scope     | Semester | Role |
| 11CAL1       | Calculus 1 Olga Vraštilová, Tomáš Tasák, Magdalena Hykšová, Bohumil Ková, Ond ej Navrátil <b>Bohumil Ková</b> Ond ej Navrátil (Gar.)   | Z,ZK       | 7       | 2P+4C+22E | s z      | Z    |
| 11LA         | Linear Algebra Lucie Kárná, Pavel Provinský, Martina Be vá ová Martina Be vá ová Martina Be vá ová (Gar.)  | Z,ZK       | 3       | 2P+1C+10E | B Z      | Z    |
| 12ZADK       | Introduction to Transportation Engineering  Dagmar Ko árková, Jana Štikarová   | Z,ZK       | 5       | 12B       | Z        | Z    |
| 18MTY        | Materials Science and Engineering Jaromír Kylar, Veronika Drechslerová, Jaromír Kylar, Nela Kr má ová, Jitka ezní ková, Jaroslav Valach, Vít Malinovský, Veronika Drechslerová, Jaromír Kylar Jaroslav Valach Jaroslav Valach (Gar.) | Z,ZK       | 3       | 2P+1C+10E | 3 Z      | Z    |
| 11GIE        | Geometry Pavel Provinský, Old ich Hykš, Šárka Vorá ová Old ich Hykš Old ich Hykš (Gar.)  | KZ         | 3       | 2P+2C+12E | Z Z      | Z    |
| 14ASD        | Algorithm and Data Structures Tomáš Brandejský, Michal Je ábek, Alena Kubá ová, Jan Procházka, Vít Fábera, Martin Fiala Vít Fábera Vít Fábera (Gar.)   | KZ         | 3       | 0P+2C+8E  | B Z      | Z    |
| 18TKK        | Technical Drawing and Designing Jitka ezní ková, Vít Malinovský, Jan Šleichrt, Martin Brumovský, Jan Mejst ík, Drahomír Schmidt, Lukáš Svoboda, Jan Vogl, Ji í Zeisek, Jan Šleichrt Jan Šleichrt (Gar.)                              | KZ         | 4       | 2P+2C+16E | 3 Z      | Z    |
| 16UDOP       | Introduction into Vehicles Zuzana Radová, Petr Bouchner  | Z          | 2       | 2P+0C+8E  | B Z      | Z    |

## Characteristics of the courses of this group of Study Plan: Code=1S-BK-TET-24/25 Name=1st Sem. Bachelor Part-Time TET from 2024/25

| 11CAL1  | Calculus 1   | Z,ZK | 7 |  |  |  |
|---|--|------|---|--|--|--|
| Sequence of real numbers and its limit. Basic properties of mappings. Function of one real variable, its limit and derivative. Indefinite integral, Newton integral, Riemann integral |  |      |   |  |  |  |
| Riemann integral. First-  | order differential equations, linear differential equations.   |      |   |  |  |  |
| 11LA  | Linear Algebra   | Z,ZK | 3 |  |  |  |
| Vector spaces (linear combinations, linear independence, dimension, basis, coordinates). Matrices and operations. Systems of linear equations and their solvability. Determinants a   |  |      |   |  |  |  |
| their applications. Scala   | their applications. Scalar product. Similarity of matrices (eigenvalues and eigenvectors). Quadratic forms and their classification. |      |   |  |  |  |
| 12ZADK  | Introduction to Transportation Engineering   | Z,ZK | 5 |  |  |  |

| 18MTY   | Materials Science and Engineering   | Z,ZK                | 3                  |  |  |
|---|---|---------------------|--------------------|--|--|
| Basic course of materia   | s science and engineering explains mechanical properties of structural materials based on their bonding forces and microstru    | icture. However th  | e main attention   |  |  |
| is paid to metals as the  | most important engineering materials, also other major classes of materials are presented, namely ceramics, polymers and        | composites. Atten   | ition is also paid |  |  |
| to degradation processe   | es in materials, to defectoscopy and to main mechanical tests.  |                     |                    |  |  |
| 11GIE   | Geometry  | KZ                  | 3                  |  |  |
| Differential geometry of  | curves - parameterization, the arc of the curve, torsion and curvature, Frenet's trihedron. Kinematics - a curve as a trajector | y of the motion, th | ie velocity, and   |  |  |
| acceleration of a particle  | e moving on a curved path.  |                     |                    |  |  |
| 14ASD   | Algorithm and Data Structures   | KZ                  | 3                  |  |  |
| Students will analyze pr  | oblems, design a theoretical solution to a given problem and write the resulting algorithm using flowcharts, practice reading a | lgorithms written i | using flowcharts,  |  |  |
| and use basic Boolean   | algebra to construct constraints in algorithms. Students will be introduced to the basics of the Python programming language    | - variable, branch  | ning, loops, they  |  |  |
| will learn to work with variables of basic data types (integer, floating point and string) and the list data structure in their programs. |   |                     |                    |  |  |
| 18TKK   | Technical Drawing and Designing   | KZ                  | 4                  |  |  |
| 16UDOP  | Introduction into Vehicles  | Z                   | 2                  |  |  |

Vehicles and transportation systems. Functionality and setup. Movement and drive principles. Engines and their characteristics. Rail, road, air and water transport. Alternative means

Code of the group: 2S-BK-TET-24/25

of transport. Lifting equipment and conveyors. Legislation.

Name of the group: 2nd Sem. Bachelor Part-Time TET from 2024/25

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

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

Credits in the group: 30 Note on the group:

| Note on the | <u> </u>  | ı          |         | т         | 1 1      |      |
|-------------|---|------------|---------|-----------|----------|------|
| Code        | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)                     | Completion | Credits | Scope     | Semester | Role |
| 11CAL2      | Calculus 2 Olga Vraštilová, Tomáš Tasák, Magdalena Hykšová, Ond ej Navrátil, Old ich Hykš Magdalena Hykšová Ond ej Navrátil (Gar.)  | Z,ZK       | 5       | 2P+3C+20E | B L      | Z    |
| 11STAT      | Statistics Pavel Provinský, Evženie Uglickich, Pavla Pecherková, Michal Matowicki, Natálie Blahitka, Ivan Nagy, Jana Kuklová <b>Pavla Pecherková</b> Evženie Uglickich (Gar.) | Z,ZK       | 4       | 2P+2C+12E | 3 L      | Z    |
| 12ZTS       | Railway Lines and Stations<br>Lukáš Týfa, Martin Jacura, Petr Šatra, Tomáš Javo ík, Ond ej Trešl Lukáš<br>Týfa (Gar.)   | Z,ZK       | 4       | 2P+2C+10E | B L      | Z    |
| 18SAT       | Structural Analysis Jaromír Kylar, Veronika Drechslerová, Nela Kr má ová, Jitka ezní ková, Jan Šleichrt, Daniel Kytý, Jan Vy ichl, Tomáš Doktor, Jan Falta Daniel Kytý (Gar.) | Z,ZK       | 4       | 2P+2C+14E | 3 L      | Z    |
| 20SYSA      | Systems Analysis Zuzana B linová, Ji í R ži ka, Patrik Horaž ovský, Petr Bureš Zuzana B linová (Gar.)   | Z,ZK       | 5       | 2P+2C+14E | B L      | Z    |
| 14PRG       | Programming Alena Kubá ová, Jan Procházka, Martin Fiala, Lukáš Svoboda, Jana Kaliková, Jan Kr ál <b>Jana Kaliková</b> Jana Kaliková (Gar.)                                    | KZ         | 2       | 0P+2C+8E  | L        | Z    |
| 17TEDK      | Transport Technology and Logistics Michal Drábek Michal Drábek (Gar.)   | KZ         | 4       | 12B       | L        | Z    |
| 21ZALD      | Basics of Air Transport  Jakub Hospodka, Tomáš Tlu ho, Ji í Volt, Peter Olexa, Jan Slezá ek, Jakub Trýb, Sébastien Lán. Bo Stloukal   | KZ         | 2       | 0P+2C+8E  | B L      | Z    |

# Characteristics of the courses of this group of Study Plan: Code=2S-BK-TET-24/25 Name=2nd Sem. Bachelor Part-Time TET from 2024/25

| 11CAL2                     | Calculus 2   | Z,ZK                | 5                  |
|----------------------------|--|---------------------|--------------------|
| Linear differential equat  | ions and their systems, differential calculus of functions of several real variables. Riemann integral in Rn. Line and surface in    | itegrals.           |                    |
| 11STAT                     | Statistics   | Z,ZK                | 4                  |
| Basics of probability De   | scriptive statistics Population and sample, limit theorem Point estimate, construction and properties Interval estimates Parar       | netric tests Nonpa  | rametric tests     |
| Regression and correla     | tion analysis  |                     |                    |
| 12ZTS                      | Railway Lines and Stations   | Z,ZK                | 4                  |
| Rail transport. Railway    | rack geometry parameters. Route layout of railway lines. Railway line construction - railway substructure and superstructure         | Spatial layout of r | ailway lines.      |
| Railway control systems    | s in relation to infrastructure. Operating and carriage points. Railway lines net and category. Traction in rail transport.          |                     |                    |
| 18SAT                      | Structural Analysis  | Z,ZK                | 4                  |
| General system of force    | es in plane and space. Calculation of reactions of bodies and structures. Assessment of internal forces on statically determin       | ate beams and sin   | nple girders.      |
| Principle of virtual work. | Kinematic method for calculation of reactions of statically determinate systems. Determination of axial forces in truss construction | ons. Cross-section  | al characteristics |
| of planar shapes. Fiber    | polygons and chains.   |                     |                    |
| 20SYSA                     | Systems Analysis   | Z,ZK                | 5                  |
| Introduction to system s   | ciences, system viewpoint, terminology, typical system analysis tasks, system identification, system interface and interface ta      | asks, processes, s  | ystem behaviour    |
| and its analysis, strong   | functions and processes, genetic code, system identity, system architecture. Tools for system analysis - Petri nets, decision        | tables, algorithms  | for structural     |
| tasks. Soft and hard sys   | stems, methods for soft system analysis.   |                     |                    |

14PRG Programming

KZ 2

The Course Programming builds on and fully extends the course 14ASD (Algorithmization and Data Structures). The knowledge of the Python programming language is expanded berry so that the posticional arrays are the posticional

here so that the participant gains skills and can apply them to solve various follow-up tasks. Main topics: lists, multidimensional arrays, sorting and searching, tuples, sets, dictionaries, working with date and time, regular expressions, functions and procedures, working with files (CSV, JSON, XML).

17TEDK

Transport Technology and Logistics

KZ

4

Basic terms in transport technology and logistics, particular steps of transport planning, line planning, timetabling, planning in pasanger and freight transport, organisation of traffic in each transport modus, technologic factors of the side of operator and client, organisation of city transport, logistic technologies and their aplication using various transport modus.

21ZALD Basics of Air Transport

History, definitions, terminology, basic rules. VFR/IFR. Basics of aerodynamics. Propulsion of aircraft. Aircraft design. Basics of navigation, radio navigation. Weight, balance, performance. Flight planning, optimization of speed and heights, minimum fuel. Limitations of operation, maintenance, service life of aircraft. Traffic management, ground handling, security. Air crew. Airlines and economics. Space technologies.

Code of the group: 3S-BK-TET-25/26

Name of the group: 3rd Sem. Bachelor Part-Time TET from 2025/26

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

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

Credits in the group: 30 Note on the group:

| NOTE OU THE | group.  |            |         |           |          |      |
|-------------|---|------------|---------|-----------|----------|------|
| Code        | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)   | Completion | Credits | Scope     | Semester | Role |
| 11FYZ       | Physics Old ich Hykš, Jana Kuklová, Pavel Demo, Zuzana Malá, Tomáš Vít Jana Kuklová Pavel Demo (Gar.)   | Z,ZK       | 5       | 2P+2C+18E | s z      | Z    |
| 12MDE       | Transport Models and Transport Excesses  Josef Kocourek, Tomáš Pad lek  | Z,ZK       | 3       | 2P+1C+8E  | B Z      | Z    |
| 11TGA       | Graph Theory and its Applications in Transport  Denisa Mocková, Dušan Teichmann Denisa Mocková Denisa Mocková (Gar.)  | Z,ZK       | 4       | 2P+2C+12E | B Z      | Z    |
| 18PZP       | Elasticity and Strength  Jitka ezni ková, Jan Šleichrt, Daniel Kytý, Jan Vy ichl, Tomáš Doktor, Josef  Jíra, Ond ej Jiroušek Ond ej Jiroušek (Gar.)   | Z,ZK       | 3       | 2P+1C+10E | z Z      | Z    |
| 20UITS      | Introduction to Intelligent Transport Systems Ji í R ži ka, Patrik Horaž ovský, Kristýna Navrátilová, Viktor Beneš, Eva Haj iarová, Martin Langr, Vladimír Faltus, Pavel Hrubeš <b>Martin Langr</b> | Z,ZK       | 7       | 3P+2C+20E | s z      | Z    |
| 12PPOK      | Designing Roads, Highways and Motorways  Josef Kocourek, Tomáš Pad lek, Polina Zayats, Petr Kumpošt Josef Kocourek (Gar.)   | KZ         | 3       | 1P+2C+10E | s z      | Z    |
| 14DATS      | Database Systems<br>Jana Kaliková, Jan Kr ál Jana Kaliková Jana Kaliková (Gar.)   | KZ         | 2       | 1P+1C+10E | B Z      | Z    |
| 15JZ1A      | Foreign Language - English 1  Markéta Vojanová, Dana Boušová, Marie Michlová, Marek Tome ek, Jan Feit, Markéta Musilová, Peter Morpuss, Lenka Monková, Jitka He manová,                             | Z          | 3       | 0P+4C+10E | s z      | Z    |

## Characteristics of the courses of this group of Study Plan: Code=3S-BK-TET-25/26 Name=3rd Sem. Bachelor Part-Time TET from 2025/26

| 11FYZ                 | Physics   | Z,ZK                   | 5                  |
|-----------------------|---|------------------------|--------------------|
| Kinematics, dynamic   | ss, Newton's laws, force fields, mechanics of continuum, thermodynamics, introduction to electrostatics and electric current.       |                        |                    |
| 12MDE                 | Transport Models and Transport Excesses   | Z,ZK                   | 3                  |
| Parameters of the tr  | affic flow and methods for their measurement. Models of the traffic flow, communications load, line and urban systems. Theory of    | of queues, shock w     | aves. Quality of   |
| transport and its ass | essment. Statistical characteristics of transport. Transport excesses, their analysis, the causes, identify and minimize the conse  | quences. Improving     | g of transport     |
| safety and fluency.   |   |                        |                    |
| 11TGA                 | Graph Theory and its Applications in Transport  | Z,ZK                   | 4                  |
| Basic terms of graph  | theory, paths in graphs, flows in networks, location problems, design problems on graphs, optimum routing, use of graphs in o       | ther scientific discip | olines.            |
| 18PZP                 | Elasticity and Strength   | Z,ZK                   | 3                  |
| Tension and compre    | ssion. Bending of beam. Shear stress in bending of beam. Design and analysis of cross section of beam. Design of riveted, bol       | ted and welded join    | its of structures. |
| Analysis of deflectio | n curve of beams. Torsion of circular cross sections. Combined loading. Stability.  |                        |                    |
| 20UITS                | Introduction to Intelligent Transport Systems   | Z,ZK                   | 7                  |
| Terminology and leg   | slative framework telematics systems and their architecture. Telematics systems in practice and their operation. Fundamentals of    | information and tele   | ecommunication     |
| systems for ITS. Prin | iciples and technical support measurement of traffic data, localization and navigation. Practical work with traffic data. Real exam | ples of possible ap    | plications of the  |
| principles of ITS.    |   |                        |                    |
| 12PPOK                | Designing Roads, Highways and Motorways   | KZ                     | 3                  |
| Definition, types, ow | nership, maintenance, management and categorization of roads and highways. Curve and transition curve. Sinuosity and stanc          | lard speed. Route in   | n rural areas.     |
| Range of vision for s | topping and overtaking. Road body - shapes and proportions, bottom and superstructure. Drainage and components of roads. \$         | Safety device. Cross   | sings, junctions   |
| intersections.        |   |                        |                    |
| 14DATS                | Database Systems  | KZ                     | 2                  |
| Basic concepts of da  | atabase systems, conceptual model, relational data model, the principles of normal forms, relational database design, security      | and integrity of data  | a, database        |
| queries, relational a | gebra, SQL language, client / server, multilayer architectures, distributed database systems. Access to data via the WWW.           |                        |                    |
| 15JZ1A                | Foreign Language - English 1  | Z                      | 3                  |
|                       |   |                        |                    |

Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary

stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric.

### List of courses of this pass:

|  | Name of the course   | Completion   | Credits   |
|--|--|--|---|
| 11CAL1   | Calculus 1   | Z,ZK   | 7   |
| Sequence of real r   | numbers and its limit. Basic properties of mappings. Function of one real variable, its limit and derivative. Indefinite integral, Newton integr<br>Riemann integral. First-order differential equations, linear differential equations.   | al, Riemann integr   | al, improper  |
| 11CAL2   | Calculus 2   | Z,ZK   | 5   |
|  | ar differential equations and their systems, differential calculus of functions of several real variables. Riemann integral in Rn. Line and s  | •  | 0   |
| 11FYZ  | Physics  | Z,ZK   | 5   |
| 111 12   | Kinematics, dynamics, Newton's laws, force fields, mechanics of continuum, thermodynamics, introduction to electrostatics and elect  | ,  | 3   |
| 11GIE  | Geometry   | KZ   | 3   |
|  | Geometry hetry of curves - parameterization, the arc of the curve, torsion and curvature, Frenet`s trihedron. Kinematics - a curve as a trajectory of  |  | _   |
| Differential geom  | acceleration of a particle moving on a curved path.  | the motion, the vi   | elocity, and  |
| 111 A  |  | Z,ZK   | 2   |
| 11LA   | Linear Algebra   | •  | 3   |
| vector spaces (iin   | lear combinations, linear independence, dimension, basis, coordinates). Matrices and operations. Systems of linear equations and their   | =  | ninants and   |
| 44074  | their applications. Scalar product. Similarity of matrices (eigenvalues and eigenvectors). Quadratic forms and their classification  |  | 4   |
| 11STAT   | Statistics   | Z,ZK   | 4   |
| Basics of probab   | pility Descriptive statistics Population and sample, limit theorem Point estimate, construction and properties Interval estimates Parametr   | ric tests Nonparan   | netric tests  |
|  | Regression and correlation analysis  |  |   |
| 11TGA  | Graph Theory and its Applications in Transport   | Z,ZK   | 4   |
|  | of graph theory, paths in graphs, flows in networks, location problems, design problems on graphs, optimum routing, use of graphs in o   |  | iplines.  |
| 12MDE  | Transport Models and Transport Excesses  | Z,ZK   | 3   |
| Parameters of the  | traffic flow and methods for their measurement. Models of the traffic flow, communications load, line and urban systems. Theory of qu  | eues, shock wave   | s. Quality of   |
| transport and its  | assessment. Statistical characteristics of transport. Transport excesses, their analysis, the causes, identify and minimize the consequences.  | ences. Improving o   | f transport   |
|  | safety and fluency.  |  |   |
| 12PPOK   | Designing Roads, Highways and Motorways  | KZ   | 3   |
| Definition, types,   | , ownership, maintenance, management and categorization of roads and highways. Curve and transition curve. Sinuosity and standard  | speed. Route in r  | ural areas.   |
| Range of vision fo   | or stopping and overtaking. Road body - shapes and proportions, bottom and superstructure. Drainage and components of roads. Safety<br>intersections.  | device. Crossing   | s, junctions,   |
| 12ZADK   | Introduction to Transportation Engineering   | Z,ZK   | 5   |
|  | Railway Lines and Stations   |  | 4   |
|  |  |  |   |
| 12ZTS  |  | Z,ZK   | -   |
|  | Railway track geometry parameters. Route layout of railway lines. Railway line construction - railway substructure and superstructure. S   | patial layout of rail  | -   |
| Rail transport. R  | Railway track geometry parameters. Route layout of railway lines. Railway line construction - railway substructure and superstructure. S<br>Railway control systems in relation to infrastructure. Operating and carriage points. Railway lines net and category. Traction in rail tr  | patial layout of rail ansport.   | way lines.  |
| Rail transport. F  | Railway track geometry parameters. Route layout of railway lines. Railway line construction - railway substructure and superstructure. So Railway control systems in relation to infrastructure. Operating and carriage points. Railway lines net and category. Traction in rail tracking the Algorithm and Data Structures  | patial layout of rail<br>ansport.<br>KZ  | way lines.  |
| Rail transport. F  14ASD  Students will analy  | Railway track geometry parameters. Route layout of railway lines. Railway line construction - railway substructure and superstructure. Some Railway control systems in relation to infrastructure. Operating and carriage points. Railway lines net and category. Traction in rail tracking algorithm and Data Structures  Very problems, design a theoretical solution to a given problem and write the resulting algorithm using flowcharts, practice reading algorithm.   | patial layout of rail<br>ansport.<br>KZ<br>thms written using  | way lines.  3 flowcharts,   |
| Rail transport. F  14ASD  Students will analy  | Railway track geometry parameters. Route layout of railway lines. Railway line construction - railway substructure and superstructure. So Railway control systems in relation to infrastructure. Operating and carriage points. Railway lines net and category. Traction in rail to Algorithm and Data Structures  yze problems, design a theoretical solution to a given problem and write the resulting algorithm using flowcharts, practice reading algoritolean algebra to construct constraints in algorithms. Students will be introduced to the basics of the Python programming language - variations.   | patial layout of rail<br>ansport.  KZ thms written using ariable, branching,   | way lines.  3 flowcharts,   |
| Rail transport. F  14ASD  Students will analyand use basic Boo   | Railway track geometry parameters. Route layout of railway lines. Railway line construction - railway substructure and superstructure. So Railway control systems in relation to infrastructure. Operating and carriage points. Railway lines net and category. Traction in rail track the substructures of the problem and bata Structures of the problems, design a theoretical solution to a given problem and write the resulting algorithm using flowcharts, practice reading algorithms algorithms to construct constraints in algorithms. Students will be introduced to the basics of the Python programming language - very will learn to work with variables of basic data types (integer, floating point and string) and the list data structure in their program.  | patial layout of rail<br>ansport.  KZ thms written using<br>ariable, branching,<br>ms.   | way lines.  3 flowcharts, loops, they   |
| Rail transport. F  14ASD Students will analyand use basic Boo 14DATS   | Railway track geometry parameters. Route layout of railway lines. Railway line construction - railway substructure and superstructure. So Railway control systems in relation to infrastructure. Operating and carriage points. Railway lines net and category. Traction in rail tracking and carriage points. Railway lines net and category. Traction in rail tracking algorithm and Data Structures  yze problems, design a theoretical solution to a given problem and write the resulting algorithm using flowcharts, practice reading algorithm algebra to construct constraints in algorithms. Students will be introduced to the basics of the Python programming language - vary will learn to work with variables of basic data types (integer, floating point and string) and the list data structure in their programming language.  Database Systems  | patial layout of rail<br>ansport.  KZ thms written using<br>ariable, branching,<br>ms.  KZ   | way lines.  3 flowcharts, loops, they   |
| Rail transport. F  14ASD Students will analyand use basic Boo 14DATS   | Railway track geometry parameters. Route layout of railway lines. Railway line construction - railway substructure and superstructure. So Railway control systems in relation to infrastructure. Operating and carriage points. Railway lines net and category. Traction in rail tracking allowing the relation to infrastructure. Operating and carriage points. Railway lines net and category. Traction in rail tracking allowing the resulting algorithm using flowcharts, practice reading algorithm obligation algebra to construct constraints in algorithms. Students will be introduced to the basics of the Python programming language - value will learn to work with variables of basic data types (integer, floating point and string) and the list data structure in their program algorithm of database systems, conceptual model, relational data model, the principles of normal forms, relational database design, security and   | patial layout of rail ansport.  KZ thms written using ariable, branching, ms.  KZ d integrity of data,   | way lines.  3 flowcharts, loops, they   |
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| Rail transport. F  14ASD Students will analy and use basic Boo  14DATS Basic concepts  14PRG   | Railway track geometry parameters. Route layout of railway lines. Railway line construction - railway substructure and superstructure. So Railway control systems in relation to infrastructure. Operating and carriage points. Railway lines net and category. Traction in rail tracking allowing the problems of the problems of the problems, design a theoretical solution to a given problem and write the resulting algorithm using flowcharts, practice reading algorithm algorithms. Students will be introduced to the basics of the Python programming language - variety will learn to work with variables of basic data types (integer, floating point and string) and the list data structure in their program and the list data structure in their program of database systems, conceptual model, relational data model, the principles of normal forms, relational database design, security and queries, relational algebra, SQL language, client / server, multilayer architectures, distributed database systems. Access to data via the programming and carriage points. Railway lines net and category. Traction in rail trail to programming and carriage points. Railway lines net and category. Traction in rail trail trail to programming and carriage points. Railway lines net and category. Traction in rail trail trail to programming and carriage points. Railway lines net and category. Traction in rail trail trail to programming and carriage points. Railway lines net and category. Traction in rail trail trail to programming and carriage points. Railway lines net and category. Traction in rail trail trail to programming and carriage points. Railway lines net and category. Traction in rail trail trail to programming and carriage points. Railway lines net and category. Traction in rail trail tr | patial layout of rail ansport.  KZ thms written using ariable, branching, ms.  KZ d integrity of data, he WWW.  KZ   | 3 flowcharts, loops, they 2 database 2  |
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| 20SYSA  | Systems Analysis   | Z,ZK               | 5              |  |  |
|---|--|--------------------|----------------|--|--|
| Introduction to system sciences, system viewpoint, terminology, typical system analysis tasks, system identification, system interface and interface tasks, processes, system beh |  |                    |                |  |  |
| and its analysis,   | and its analysis, strong functions and processes, genetic code, system identity, system architecture. Tools for system analysis - Petri nets, decision tables, algorithms for structure. |                    |                |  |  |
|   | tasks. Soft and hard systems, methods for soft system analysis.  |                    |                |  |  |
| 20UITS  | Introduction to Intelligent Transport Systems  | Z,ZK               | 7              |  |  |
| Terminology and le  | gislative framework telematics systems and their architecture. Telematics systems in practice and their operation. Fundamentals of infor   | mation and telecor | nmunication    |  |  |
| systems for ITS. Pr   | inciples and technical support measurement of traffic data, localization and navigation. Practical work with traffic data. Real examples   | of possible applic | ations of the  |  |  |
|   | principles of ITS.   |                    |                |  |  |
| 21ZALD  | Basics of Air Transport  | KZ                 | 2              |  |  |
| History, definitions,   | terminology, basic rules. VFR/IFR. Basics of aerodynamics. Propulsion of aircraft. Aircraft design. Basics of navigation, radio navigation.  | Weight, balance, p | erformance     |  |  |
| Flight planning, op   | timization of speed and heights, minimum fuel, Limitations of operation, maintenance, service life of aircraft, Traffic management, grou   | nd handling, secui | ritv. Air crev |  |  |

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