

# Study plan

## Name of study plan: KOMBI bak. studium od 15-16 (obor LED)

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: 60

Elective courses credits: 120

Sum of credits in the plan: 180

Note on the plan:

Name of the block: Compulsory courses

Minimal number of credits of the block: 60

The role of the block: Z

Code of the group: 1S K LOG LED 15-16 P

Name of the group: 1. sem. bak. KOMBI obory LOG, LED 15-16 povinné p edm ty

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

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

Credits in the group: 30

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
614AS	<b>Algorithm and Data Structures</b>	KZ	2	0+2	Z	z
611CAL1	<b>Calculus 1</b> Romana Zibnerová	Z,ZK	7	2P+4C+22B	Z	z
611GIE	<b>Geometry</b> Vít Malinovský	KZ	3	2P+2C+12B	Z	z
611LA	<b>Linear Algebra</b> Romana Zibnerová	Z,ZK	3	2P+1C+10B	Z	z
618MTY	<b>Materials Science and Engineering</b> Vít Malinovský	Z,ZK	3	2P+1C+10B	Z	z
620SYSA	<b>Systems Analysis</b>	Z,ZK	5	2P+2C+14B	L	z
618TED	<b>Technical Documentation</b> Vít Malinovský	KZ	2	1P+1C+8B	Z	z
616UDOP	<b>Introduction into Vehicles</b> Zuzana Radová	Z	2	2P+0C+8B	Z	z
612ZYDK	<b>Introduction to Transportation Engineering</b> Dagmar Ko árková	Z,ZK	3	6B	Z	z

### Characteristics of the courses of this group of Study Plan: Code=1S K LOG LED 15-16 P Name=1. sem. bak. KOMBI obory LOG, LED 15-16 povinné p edm ty

614AS	Algorithm and Data Structures	KZ	2	Students will be familiarized with selected basic and derived data structures, algorithms, their properties and their design procedure. Students will analyze problems, propose theoretical solutions to the set task and the resulting algorithm write by means of flowcharts, practice in reading algorithms recorded by means of the flowchart and use the basics of Boolean algebra with forming the conditions for the algorithms.
611CAL1	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. Geometric properties of n-dimensional Eukclidean space and Cartesian coordinate system. Geometric meaning of the differential of functions several real variables, differential calculus of functions of several real variables.
611GIE	Geometry	KZ	3	Orthographic and oblique projections, linear perspective. Topographic surfaces and their orthogonal projection. Differential geometry of curves - parameterization, arc of the curve, torsion and curvature, Frenet's trihedron. Kinematics - a curve as a trajectory of the motion, the velocity and acceleration of a particle moving on a curved path.
611LA	Linear Algebra	Z,ZK	3	Vector spaces (linear combinations, linear independence, dimension, basis, coordinates). Matrices and operations. Systems of linear equations and their solvability. Determinants and their applications. Scalar product. Similarity of matrices (eigenvalues and eigenvectors). Quadratic forms and their classification.

618MTY	Materials Science and Engineering	Z,ZK	3
Basic course of materials science and engineering explains mechanical properties of structural materials based on their bonding forces and microstructure. However the main attention is paid to metals as the most important engineering materials, also other major classes of materials are presented, namely ceramics, polymers and composites. Attention is also paid to degradation processes in materials, to defectoscopy and to main mechanical tests.			
620SYSA	Systems Analysis	Z,ZK	5
Introduction to system sciences, system viewpoint, terminology, typical system analysis tasks, system identification, system interface and interface tasks, processes, system behaviour and its analysis, strong functions and processes, genetic code, system identity, system architecture. Tools for system analysis - Petri nets, decision tables, algorithms for structural tasks. Soft and hard systems, methods for soft system analysis.			
618TED	Technical Documentation	KZ	2
Technical standards, international standardization, technical drawings, representation of technical objects, technical diagrams and charts, dimensional and geometrical accuracy, arrangement of drawing sheets.			
616UDOP	Introduction into Vehicles	Z	2
Vehicles and transportation systems. Functionality and setup. Movement and drive principles. Engines and their characteristics. Rail, road, air and water transport. Alternative means of transport. Lifting equipment and conveyors. Legislation.			
612ZYDK	Introduction to Transportation Engineering	Z,ZK	3
Role of transportation in land-use planning. Basic terms in transportation engineering. Traffic survey and traffic prognosis. Introduction to topic of roads, public mass transport. Negative impacts of transportation to environment and safety.			

Code of the group: 2S K LOG LED 15-16 P

Name of the group: 2. sem. bak. KOMBI obory LOG, LED 15-16 povinné p edm ty

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

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

Credits in the group: 30

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
611CAL2	Calculus 2	Z,ZK	5	2P+3C+20B	L	Z
611FY1	Physics 1	Z,ZK	4	2+2	L	Z
614PRG	Programming	KZ	2	0P+2C+8B	L	Z
618SAT	Structural Analysis	Z,ZK	4	2P+2C+14B	L	Z
611STAS	Statistics	Z,ZK	5	2+2	L	Z
617TEDK	Transport Technology and Logistics	KZ	4	12B	L	Z
621ZALD	Basics of Air Transport	KZ	2	0P+2C+8B	L	Z
612ZTS	Railway Lines and Stations	Z,ZK	4	2P+2C+10B	L	Z

Characteristics of the courses of this group of Study Plan: Code=2S K LOG LED 15-16 P Name=2. sem. bak. KOMBI obory LOG, LED 15-16 povinné p edm ty

611CAL2	Calculus 2	Z,ZK	5
Antiderivative, Newtonian integral, Riemannian integral of the function of one variable, improper Riemannian integral, Riemannian integral in $R^n$ . Parametric description of regular $k$ -dimensional surfaces in $R^n$ , Riemannian integral over regular surfaces. Line and surface integrals of the second type, Stokes theorems, ordinary differential equations of the first order, linear differential equations with constant coefficients and its systems.			
611FY1	Physics 1	Z,ZK	4
Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics, electric field, directed electric current.			
614PRG	Programming	KZ	2
Algorithm development, methods of structured programming, high-level programming languages, basics of C programming languages (types, variables, conditions, cycles, arrays, functions), programming techniques, complexity.			
618SAT	Structural Analysis	Z,ZK	4
General system of forces in plane and space. Calculation of reactions of bodies and structures. Assessment of internal forces on statically determinate beams and simple girders. Principle of virtual work. Kinematic method for calculation of reactions of statically determinate systems. Determination of axial forces in truss constructions. Cross-sectional characteristics of planar shapes. Fiber polygons and chains.			
611STAS	Statistics	Z,ZK	5
Definition of probability, random variable and its description, known distributions, random vector, function of random variable. Methods of point estimation. Testing of statistical hypothesis. Regression and correlation, linear regression, correlation coefficient, coefficient of determination, the general linear model, statistical inference in linear regression, analysis of variance, multiple regression, the use of matrices in regression.			
617TEDK	Transport Technology and Logistics	KZ	4
Basic terms in transport technology and logistics, particular steps of transport planning, line planning, timetabling, planning in passenger 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 application using various transport modus.			
621ZALD	Basics of Air Transport	KZ	2
History, definitions, terminology, basic rules. VFR/IFR. Basics of aerodynamics. Propulsion of aircraft. Aircraft design. Basics of navigation, radio navigation. Weight, balance, performance. Flight planning, optimization of speed and heights, minimum fuel. Limitations of operation, maintenance, service life of aircraft. Traffic management, ground handling, security. Air crew. Airlines and economics. Space technologies.			
612ZTS	Railway Lines and Stations	Z,ZK	4
Rail transport. Railway track geometry parameters. Route layout of railway lines. Railway line construction - railway substructure and superstructure. Spatial layout of railway lines. Railway control systems in relation to infrastructure. Operating and carriage points. Railway lines net and category. Traction in rail transport.			

## List of courses of this pass:

Code	Name of the course	Completion	Credits
611CAL1	Calculus 1 Sequence of real numbers and its limit. Basic properties of mappings. Function of one real variable, its limit and derivative. Geometric properties of n-dimensional Eukclidean space and Cartesian coordinate system. Geometric meaning of the differential of functions several real variables, differential calculus of functions of several real variables.	Z,ZK	7
611CAL2	Calculus 2 Antiderivative, Newtonian integral, Riemannian integral of the function of one variable, improper Riemannian integral, Riemannian integral in $R_n$ . Parametric description of regular k-dimensional surfaces in $R_n$ , Riemannian integral over regular surfaces. Line and surface integrals of the second type, Stokes theorems, ordinary differential equations of the first order, linear differential equations with constant coefficients and its systems.	Z,ZK	5
611FY1	Physics 1 Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics, electric field, directed electric current.	Z,ZK	4
611GIE	Geometry Orthographic and oblique projections, linear perspective. Topographic surfaces and their orthogonal projection. Differential geometry of curves - parameterization, arc of the curve, torsion and curvature, Frenet's trihedron. Kinematics - a curve as a trajectory of the motion, the velocity and acceleration of a particle moving on a curved path.	KZ	3
611LA	Linear Algebra Vector spaces (linear combinations, linear independence, dimension, basis, coordinates). Matrices and operations. Systems of linear equations and their solvability. Determinants and their applications. Scalar product. Similarity of matrices (eigenvalues and eigenvectors). Quadratic forms and their classification.	Z,ZK	3
611STAS	Statistics Definition of probability, random variable and its description, known distributions, random vector, function of random variable. Methods of point estimation. Testing of statistical hypothesis. Regression and correlation, linear regression, correlation coefficient, coefficient of determination, the general linear model, statistical inference in linear regression, analysis of variance, multiple regression, the use of matrices in regression.	Z,ZK	5
612ZTS	Railway Lines and Stations Rail transport. Railway track geometry parameters. Route layout of railway lines. Railway line construction - railway substructure and superstructure. Spatial layout of railway lines. Railway control systems in relation to infrastructure. Operating and carriage points. Railway lines net and category. Traction in rail transport.	Z,ZK	4
612ZYDK	Introduction to Transportation Engineering Role of transportation in land-use planning. Basic terms in transportation engineering. Traffic survey and traffic prognosis. Introduction to topic of roads, public mass transport. Negative impacts of transportation to environment and safety.	Z,ZK	3
614AS	Algorithm and Data Structures Students will be familiarized with selected basic and derived data structures, algorithms, their properties and their design procedure. Students will analyze problems, propose theoretical solutions to the set task and the resulting algorithm write by means of flowcharts, practice in reading algorithms recorded by means of the flowchart and use the basics of Boolean algebra with forming the conditions for the algorithms.	KZ	2
614PRG	Programming Algorithm development, methods of structured programming, high-level programming languages, basics of C programming languages (types, variables, conditions, cycles, arrays, functions), programming techniques, complexity.	KZ	2
616UDOP	Introduction into Vehicles Vehicles and transportation systems. Functionality and setup. Movement and drive principles. Engines and their characteristics. Rail, road, air and water transport. Alternative means of transport. Lifting equipment and conveyors. Legislation.	Z	2
617TEDK	Transport Technology and Logistics Basic terms in transport technology and logistics, particular steps of transport planning, line planning, timetabling, planning in passenger 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 application using various transport modus.	KZ	4
618MTY	Materials Science and Engineering Basic course of materials science and engineering explains mechanical properties of structural materials based on their bonding forces and microstructure. However the main attention is paid to metals as the most important engineering materials, also other major classes of materials are presented, namely ceramics, polymers and composites. Attention is also paid to degradation processes in materials, to defectoscopy and to main mechanical tests.	Z,ZK	3
618SAT	Structural Analysis General system of forces in plane and space. Calculation of reactions of bodies and structures. Assessment of internal forces on statically determinate beams and simple girders. Principle of virtual work. Kinematic method for calculation of reactions of statically determinate systems. Determination of axial forces in truss constructions. Cross-sectional characteristics of planar shapes. Fiber polygons and chains.	Z,ZK	4
618TED	Technical Documentation Technical standards, international standardization, technical drawings, representation of technical objects, technical diagrams and charts, dimensional and geometrical accuracy, arrangement of drawing sheets.	KZ	2
620SYSA	Systems Analysis Introduction to system sciences, system viewpoint, terminology, typical system analysis tasks, system identification, system interface and interface tasks, processes, system behaviour and its analysis, strong functions and processes, genetic code, system identity, system architecture. Tools for system analysis - Petri nets, decision tables, algorithms for structural tasks. Soft and hard systems, methods for soft system analysis.	Z,ZK	5
621ZALD	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.	KZ	2

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

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