Study plan

Name of study plan: 06 109 NSTI DLTT 2012 zaměření KV

Faculty/Institute/Others:
Department:
Branch of study guaranteed by the department: Welcome page
Garantor of the study branch:
Program of study: Welcome page
Type of study: unknown
Required credits: 432
Elective courses credits: -301
Sum of credits in the plan: 131
Note on the plan:

Name of the block: Compulsory courses in the program
Minimal number of credits of the block: 429
The role of the block: P

Code of the group: 12NS*1P-DLT-KV
Name of the group: 2012 NSTI 1.sem povinné DLTT - KV
Requirement credits in the group: In this group you have to gain 27 credits
Requirement courses in the group: In this group you have to complete 7 courses
Credits in the group: 27
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
2142008	**Microelectronics**	KZ	2	2P+0C+1L	*	P
2211131	**Powertrains of Motor Vehicles 1** ***Gabriela Achtenová***	Z,ZK	5	3P+2C	*	P
2213018	**Principles of Design - Rail Vehicles** *Josef Kolář* ***Josef Kolář*** *Josef Kolář (Gar.)*	Z	2	2P+0C	*	P

Characteristics of the courses of this group of Study Plan: Code=12NS*1P-DLT-KV Name=2012 NSTI 1.sem povinné DLTT - KV

2142008	Microelectronics	KZ	2
Basic characteristics of logic circuits and programmable logical systems, input and output circuits - voltage and current matching, D/A and A/D converters, coding, lines and protocols of communications, electronic and optoelectronic parts for microelectronics, microprocessor system applications.			
2211131	Powertrains of Motor Vehicles 1	Z,ZK	5
The subject clarifies the design and basic calculations of aggregates of mechanical powertrains of passenger cars, trucks and motorcycles.			
2213018	Principles of Design - Rail Vehicles	Z	2
Basic terminology and nomenclature of rail vehicles parts. Principles of railway vehicles components.			

Code of the group: 12NS*2P-DLT-KV
Name of the group: 2012 NSTI 2.sem povinné DLTT - KV
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 6 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
2311074	**Vibrations of Mechanical Systems** *Václav Bauma, Zbyněk Šika, Michael Valášek, Jan Zavřel* ***Václav Bauma*** *Václav Bauma (Gar.)*	ZK	4	3P+0C	*	P
2211132	**Powertrains of Motor Vehicles 2** *Gabriela Achtenová* ***Gabriela Achtenová*** *Gabriela Achtenová (Gar.)*	Z,ZK	5	3P+2C	*	P

2211050	**Internal Combustion Engines Fundamentals** *Vít Doleček, Libor Červenka, Jan Macek* ***Jan Macek*** *Jan Macek (Gar.)*	Z,ZK	6	4P+2C	*	P
2211054	**Theory of Vehicles** *Jiří Pakosta, Jan Kalivoda* ***Jan Kalivoda*** *Jan Kalivoda (Gar.)*	Z,ZK	6	4P+2C	*	P

Characteristics of the courses of this group of Study Plan: Code=12NS*2P-DLT-KV Name=2012 NSTI 2.sem povinné DLTT - KV

2311074	Vibrations of Mechanical Systems	ZK	4
2211132	Powertrains of Motor Vehicles 2	Z,ZK	5
The subject clarifies the design and basic calculations of automatic aggregates of powertrains of passenger cars, trucks and motorcycles. 1 - Hydrodynamic transmissions 2 - Single planetary sets (JPS) - introduction, graphical method 3 - JPS - kinematics, torques, efficiency 4 - JPS - calculation of JATCO 40 transmission 5 - Nested planetary gear sets (SPS) - graphical and analytical method 6 - Nested planetary gear set (SPS) - matrix method 7 - SPS - example calculation, conditions of assembly 8 - Planetary gearboxes - calculation of basic elements 9 - Variators (CVT) 10 - Powersplit transmissions, IVT 11 - Differential, behavior when driving in a curve, efficiency 12 - Differential with more degree of freedom 13 - Hydrostatic transmissions 14 - Powertrains of hybrid vehicles		
2211050	Internal Combustion Engines Fundamentals	Z,ZK	6
Fundamentals of internal combustion engines (ICE): principles of performance, combustion processes, flame types, formation of pollutants, gas exchange, super- and turbo-charging; description of tools for fuel injection, mixture formation, valve gears, combustion realization, exhaust aftertreatment, lubrication and cooling. Engine maps and testing			
2211054	Theory of Vehicles	Z,ZK	6
Description of theoretical sources for longitudinal, vertical and directional dynamics of vehicles. Detailed description of interactions between road (railway) and body. Especially from view point of transmission of longitudinal and lateral forces and stability.			

Code of the group: 12NS*3P-DLT-KV
Name of the group: 2012 NSTI 3.sem povinné DLTT - KV
Requirement credits in the group: In this group you have to gain 32 credits
Requirement courses in the group: In this group you have to complete 6 courses
Credits in the group: 32
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
2211146	**Drives of Railway Vehicles** *Josef Kolář* ***Josef Kolář*** *Josef Kolář (Gar.)*	Z,ZK	4	3P+1C	*	P
2211145	**Railway Rolling Stock Running Gears** *Tomáš Heptner* ***Tomáš Heptner*** *Tomáš Heptner (Gar.)*	Z,ZK	5	4P+1C	*	P
2311078	**Controlled Mechanical Systems** *Václav Bauma, Zbyněk Šika, Michael Valášek, Zdeněk Neusser, Pavel Steinbauer* ***Michael Valášek*** *Michael Valášek (Gar.)*	Z,ZK	4	3P+1C	*	P
2211058	**Computational Methods of Transport Machinery** *Jan Kalivoda, Ladislav Rus, Radek Tichánek, Michal Vašíček* ***Jan Kalivoda*** *Jan Kalivoda (Gar.)*	Z,ZK	5	3P+2C	*	P

Characteristics of the courses of this group of Study Plan: Code=12NS*3P-DLT-KV Name=2012 NSTI 3.sem povinné DLTT - KV

2211146	Drives of Railway Vehicles	Z,ZK	4
Basic design of drive concepts for railway vehicles and their influences on adhesion and driving properties			
2211145	Railway Rolling Stock Running Gears	Z,ZK	5
Concepts of rail vehicle running gears. Basic theory, concepts and design of related subsystems			
2311078	Controlled Mechanical Systems	Z,ZK	4
2211058	Computational Methods of Transport Machinery	Z,ZK	5
Methods for both analysis and synthesis of 3D mechanisms. Computation of elastic joining components. Effects of non-linearities. Development of both mechanical and mathematical models of vehicles. Basic usage of FEM. Local and global coordinate system, matrices of mass, stiffness and damping. Both explicit and implicit solver. Models of materials. Torsional vibration in combustion engines and transmissions, methods of computation. Measurement of torsional vibration. Engine valve train (both kinematics and dynamics). Engine balancing			

Code of the group: 12NS*4P-DLT-KV
Name of the group: 2012 NSTI 4.sem povinné DLTT - KV
Requirement credits in the group: In this group you have to gain at least 340 credits (at most 34)
Requirement courses in the group: In this group you have to complete 8 courses
Credits in the group: 340
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
2141126	**Rail Vehicles Electrical Equipment**	Z,ZK	2	2P+0C+1L	*	P
2211052	**Design of Railway Vehicles** *Josef Kolář, Tomáš Heptner* ***Josef Kolář*** *Josef Kolář (Gar.)*	ZK	4	4P+0C	*	P
2212020	**Accesories of Railway Vehicles** *Josef Kolář* ***Josef Kolář*** *Josef Kolář (Gar.)*	KZ	2	3P+0C	*	P

2383062	**Budget and Project Economic Assessment** *František Freiberg, Miroslav Žilka* ***František Freiberg*** *František Freiberg (Gar.)*	Z	2	1P+2C	*	P
2213012	**Manufacturing technology of Railway Vehicles** *Josef Kolář* ***Josef Kolář*** *Josef Kolář (Gar.)*	Z	2	2P+0C	*	P
2211043	**Computational Methods and Testing of Ralway Vehicles** *Tomáš Heptner, Ladislav Rus* ***Jan Kalivoda*** *Ladislav Rus (Gar.)*	Z,ZK	4	3P+1C	*	P

Characteristics of the courses of this group of Study Plan: Code=12NS*4P-DLT-KV Name=2012 NSTI 4.sem povinné DLTT - KV

2141126	Rail Vehicles Electrical Equipment	Z,ZK	2

Equation of motion and mechanical properties of electrical drive, losses and dimensioning of electrical drive, general properties and control of DC drives, general properties and control of drives with asynchronous and synchronous motors, using of semiconductor converters in electrical drives, choppers, inverters, frequency converters, thyristor rectifiers, feedback control of electrical drive, EMC of electrical drive

2211052	Design of Railway Vehicles	ZK	4

Basic concepts of railway vehicles design, design of railway vehicles body, chassis, underframe, running gear, auxiliary equipment, heating, ventilation and air conditioning plant.

2212020	Accesories of Railway Vehicles	KZ	2

Deepening the knowledge of designing accesories of Railway Vehiles and interiors of passager coach and dieselelectric oder electrics units, trams and subway cars.

2383062	Budget and Project Economic Assessment	Z	2

The goal of the course is to improve the knowledge gained within the basic bachelor's degree course Management and Economics of the Enterprise. The course focuses primarily on deepening of basic knowledge and skills in the creation and evaluation of the operational budget, proper preparation and evaluation of costing model for manufactured products and the economic evaluation of an investment project, as it corresponds to contemporary knowledge and the development of management methods and techniques. Students specify a simple fictional industrial or engineering company or its sub-section (preferably inspired by their practical experience, internships or training program in real company). The first student's task is to prepare a detailed plan and budget of a project (e.g. new product development, product or process innovation, etc.) focused on improvement of profitability, competitiveness or effectiveness of the company. The second task is cost calculation for chosen calculation unit. Last task within this course is the evaluation of economical effectiveness of the project described within the first task. The dynamic methods like Net Present Value (NPV), Internal Rate of Return (IRR) or Discounted Payback Period (DPP) are used for this evaluation. The quality of realization and presentation of the task's outputs together with the results of the test decides on granting / denial of credit.

2213012	Manufacturing technology of Railway Vehicles	Z	2

Getting to know the different stages of the production cycle of Rail Vehicles. Basic understanding of the technology of Rail Vehicles and their components.

2211043	Computational Methods and Testing of Ralway Vehicles	Z,ZK	4

Calculation of running stability of a railway vehicle. Optimization of damping and suspension of the vehicle. Calculation of stable areas of lateral oscillation. Construction of mathematical models of railway vehicles with multiple degrees of freedom excited by unevenness of the track of harmonic run. Non-linear parts of suspension and damping. Calculation of force-feedbacks and acceleration, on the bogie and the body of the vehicle, according to harmonic excitation. Random process theory considering the random excitation of railway vehicles. Calculation of correlation functions, cross-correlation functions and power spectral density. Construction of mathematical models of railway vehicles in 3D. Calculation of feedbacks of 3D models on random excitation. Mass-continuum oscillation. Bending oscillation of the body of the vehicle.

Name of the block: Compulsory elective courses
Minimal number of credits of the block: 3
The role of the block: PV

Code of the group: 12N**3Q--JV
Name of the group: 2012 N 3.sem povinná jazyková výuka
Requirement credits in the group: In this group you have to gain 2 credits
Requirement courses in the group: In this group you have to complete 1 course
Credits in the group: 2
Note on the group:

Code	Name of the course / Name of the group of courses ***(in case of groups of courses the list of codes of their members)*** *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
2043081	**English - Preparatory Course / FME** *Veronika Kratochvílová, Eliška Vítková, Ilona Šimice, Michaela Schusová, Hana Volejníková* ***Nina Procházková Ayyub***	Z	2	0P+2C	*	PV
2043086	**Czech - Preparatory Course** *Michaela Schusová, Hana Volejníková, Petr Laurich*	Z	2	0P+2C	*	PV
2043083	**French - Preparatory Course / FME** *Michaela Schusová, Dušana Jirovská* ***Michaela Schusová*** *Dušana Jirovská (Gar.)*	Z	2	0P+2C	*	PV
2043082	**German - Lower Intermediate Course** *Eliška Vítková, Michaela Schusová, Petr Laurich, Jaroslava Kommová* ***Jaroslava Kommová*** *Jaroslava Kommová (Gar.)*	Z	2	0P+2C	*	PV
2043085	**Russian - Preparatory Course / FME** *Michaela Schusová, Hana Volejníková, Dušana Jirovská* ***Eliška Vítková***	Z	2	0P+2C	*	PV
2043084	**Spanish - Preparatory Course / FME** *Michaela Schusová, Jaime Andrés Villagómez* ***Eliška Vítková***	Z	2	0P+2C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12N3Q--JV Name=2012 N 3.sem povinná jazyková výuka**

2043081	English - Preparatory Course / FME	Z	2

Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language. European level A1 - A2.

2043086	Czech - Preparatory Course	Z	2
Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2043083	French - Preparatory Course / FME	Z	2
Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2043082	German - Lower Intermediate Course	Z	2
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvement of professional language.			
2043085	Russian - Preparatory Course / FME	Z	2
Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2043084	Spanish - Preparatory Course / FME	Z	2
Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			

Code of the group: 12N**3Q--JZ
Name of the group: 2012 N 3.sem povinná jazyková zkouška
Requirement credits in the group: In this group you have to gain 1 credit
Requirement courses in the group: In this group you have to complete 1 course
Credits in the group: 1
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
2041081	**English - Master Exam** *Veronika Kratochvílová, Eliška Vítková, Ilona Šimice, Michaela Schusová, Hana Volejníková, Michele Le Blanc, Nina Procházková Ayyub* ***Nina Procházková Ayyub*** *Ilona Šimice (Gar.)*	ZK	1	0P+0C	*	PV
2041086	**Czech- Master Exam** *Michaela Schusová, Hana Volejníková, Petr Laurich*	ZK	1	0P+0C	*	PV
2041083	**French - Master Exam / FME** *Michaela Schusová, Dušana Jirovská* ***Dušana Jirovská*** *Dušana Jirovská (Gar.)*	ZK	1	0P+0C	*	PV
2041082	**German - Master Exam / FME** *Eliška Vítková, Michaela Schusová, Petr Laurich, Jaroslava Kommová* ***Jaroslava Kommová*** *Jaroslava Kommová (Gar.)*	ZK	1	0P+0C	*	PV
2041085	**Russian - Master Exam / FME** *Michaela Schusová, Hana Volejníková, Dušana Jirovská* ***Eliška Vítková***	ZK	1	0P+0C	*	PV
2041084	**Spanish - Master Exam / FME** *Michaela Schusová, Jaime Andrés Villagómez* ***Eliška Vítková*** *Jaime Andrés Villagómez (Gar.)*	ZK	1	0P+0C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12N3Q--JZ Name=2012 N 3.sem povinná jazyková zkouška**

2041081	English - Master Exam	ZK	1
Mapped to the level of Common European Framework of Reference: A2. Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2041086	Czech- Master Exam	ZK	1
2041083	French - Master Exam / FME	ZK	1
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvement of professional language.			
2041082	German - Master Exam / FME	ZK	1
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvement of professional language.			
2041085	Russian - Master Exam / FME	ZK	1
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvement of professional language.			
2041084	Spanish - Master Exam / FME	ZK	1
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvement of professional language.			

List of courses of this pass:

Code	Name of the course	Completion	Credits
2041081	English - Master Exam	ZK	1
Mapped to the level of Common European Framework of Reference: A2. Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2041082	German - Master Exam / FME	ZK	1
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvement of professional language.			
2041083	French - Master Exam / FME	ZK	1
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvement of professional language.			
2041084	Spanish - Master Exam / FME	ZK	1
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvement of professional language.			
2041085	Russian - Master Exam / FME	ZK	1
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvement of professional language.			
2041086	Czech- Master Exam	ZK	1
2043081	English - Preparatory Course / FME	Z	2
Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language. European level A1 - A2.			
2043082	German - Lower Intermediate Course	Z	2
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvement of professional language.			
2043083	French - Preparatory Course / FME	Z	2
Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2043084	Spanish - Preparatory Course / FME	Z	2
Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2043085	Russian - Preparatory Course / FME	Z	2
Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2043086	Czech - Preparatory Course	Z	2
Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2141126	Rail Vehicles Electrical Equipment	Z,ZK	2
Equation of motion and mechanical properties of electrical drive, losses and dimensioning of electrical drive, general properties and control of DC drives, general properties and control of drives with asynchronous and synchronous motors, using of semiconductor converters in electrical drives, choppers, inverters, frequency converters, thyristor rectifiers, feedback control of electrical drive, EMC of electrical drive			
2142008	Microelectronics	KZ	2
Basic characteristics of logic circuits and programmable logical systems, input and output circuits - voltage and current matching, D/A and A/D converters, coding, lines and protocols of communications, electronic and optoelectronic parts for microelectronics, microprocessor system applications.			
2211043	Computational Methods and Testing of Ralway Vehicles	Z,ZK	4
Calculation of running stability of a railway vehicle. Optimization of damping and suspension of the vehicle. Calculation of stable areas of lateral oscillation. Construction of mathematical models of railway vehicles with multiple degrees of freedom excited by unevenness of the track of harmonic run. Non-linear parts of suspension and damping. Calculation of force-feedbacks and acceleration, on the bogie and the body of the vehicle, according to harmonic excitation. Random process theory considering the random excitation of railway vehicles. Calculation of correlation functions, cross-correlation functions and power spectral density. Construction of mathematical models of railway vehicles in 3D. Calculation of feedbacks of 3D models on random excitation. Mass-continuum oscillation. Bending oscillation of the body of the vehicle.			
2211050	Internal Combustion Engines Fundamentals	Z,ZK	6
Fundamentals of internal combustion engines (ICE): principles of performance, combustion processes, flame types, formation of pollutants, gas exchange, super- and turbo-charging; description of tools for fuel injection, mixture formation, valve gears, combustion realization, exhaust aftertreatment, lubrication and cooling. Engine maps and testing			
2211052	Design of Railway Vehicles	ZK	4
Basic concepts of railway vehicles design, design of railway vehicles body, chassis, underframe, running gear, auxiliary equipment, heating, ventilation and air conditioning plant.			
2211054	Theory of Vehicles	Z,ZK	6
Description of theoretical sources for longitudinal, vertical and directional dynamics of vehicles. Detailed description of interactions between road (railway) and body. Especially from view point of transmission of longitudinal and lateral forces and stability.			
2211058	Computational Methods of Transport Machinery	Z,ZK	5
Methods for both analysis and synthesis of 3D mechanisms. Computation of elastic joining components. Effects of non-linearities. Development of both mechanical and mathematical models of vehicles. Basic usage of FEM. Local and global coordinate system, matrices of mass, stiffness and damping. Both explicit and implicit solver. Models of materials. Torsional vibration in combustion engines and transmissions, methods of computation. Measurement of torsional vibration. Engine valve train (both kinematics and dynamics). Engine balancing			
2211131	Powertrains of Motor Vehicles 1	Z,ZK	5
The subject clarifies the design and basic calculations of aggregates of mechanical powertrains of passenger cars, trucks and motorcycles.			

2211132	Powertrains of Motor Vehicles 2	Z,ZK	5
The subject clarifies the design and basic calculations of automatic aggregates of powertrains of passenger cars, trucks and motorcycles. 1 - Hydrodynamic transmissions 2 - Single planetary sets (JPS) - introduction, graphical method 3 - JPS - kinematics, torques, efficiency 4 - JPS - calculation of JATCO 40 transmission 5 - Nested planetary gear sets (SPS) - graphical and analytical method 6 - Nested planetary gear set (SPS) - matrix method 7 - SPS - example calculation, conditions of assembly 8 - Planetary gearboxes - calculation of basic elements 9 - Variators (CVT) 10 - Powersplit transmissions, IVT 11 - Differential, behavior when driving in a curve, efficiency 12 - Differential with more degree of freedom 13 - Hydrostatic transmissions 14 - Powertrains of hybrid vehicles			
2211145	Railway Rolling Stock Running Gears	Z,ZK	5
Concepts of rail vehicle running gears. Basic theory, concepts and design of related subsystems			
2211146	Drives of Railway Vehicles	Z,ZK	4
Basic design of drive concepts for railway vehicles and their influences on adhesion and driving properties			
2212020	Accesories of Railway Vehicles	KZ	2
Deepening the knowledge of designing accesories of Railway Vehiles and interiors of passager coach and dieselelectric oder electrics units, trams and subway cars.			
2213012	Manufacturing technology of Railway Vehicles	Z	2
Getting to know the different stages of the production cycle of Rail Vehicles. Basic understanding of the technology of Rail Vehicles and their components.			
2213018	Principles of Design - Rail Vehicles	Z	2
Basic terminology and nomenclature of rail vehicles parts. Principles of railway vehicles components.			
2311074	Vibrations of Mechanical Systems	ZK	4
2311078	Controlled Mechanical Systems	Z,ZK	4
2383062	Budget and Project Economic Assessment	Z	2
The goal of the course is to improve the knowledge gained within the basic bachelor's degree course Management and Economics of the Enterprise. The course focuses primarily on deepening of basic knowledge and skills in the creation and evaluation of the operational budget, proper preparation and evaluation of costing model for manufactured products and the economic evaluation of an investment project, as it corresponds to contemporary knowledge and the development of management methods and techniques. Students specify a simple fictional industrial or engineering company or its sub-section (preferably inspired by their practical experience, internships or training program in real company). The first student's task is to prepare a detailed plan and budget of a project (e.g. new product development, product or process innovation, etc.) focused on improvement of profitability, competitiveness or effectiveness of the company. The second task is cost calculation for chosen calculation unit. Last task within this course is the evaluation of economical effectiveness of the project described within the first task. The dynamic methods like Net Present Value (NPV), Internal Rate of Return (IRR) or Discounted Payback Period (DPP) are used for this evaluation. The quality of realization and presentation of the task's outputs together with the results of the test decides on granting / denial of credit.			

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