

Study plan

Name of study plan: 10 121 NSTI VSZ 2012 základ

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Production Machines and Equipment

Garantor of the study branch: doc. Ing. Vladimír Andrlík, CSc.

Program of study: Mechanical Engineering

Type of study: Follow-up master

Required credits: 137

Elective courses credits: -6

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: 128

The role of the block: P

Code of the group: 12NS*1P-VSZ

Name of the group: 2012 NSTI 1.sem povinné VSZ

Requirement credits in the group: In this group you have to gain 34 credits

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

Credits in the group: 34

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
2351158	Hydraulic and Pneumatic Systems Antonín Bubák, Tomáš Krannich Antonín Bubák Antonín Bubák (Gar.)	Z,ZK	4	2P+2L	*	P
2311075	Mechanics of Mechanisms Zdeněk Neusser, Michael Valášek, Zbyněk Šika, Václav Bauma, Jan Zavřel, Petr Beneš Michael Valášek Michael Valášek (Gar.)	ZK	4	3P+0C	*	P
2141093	Microelectronics Stanislava Papežová Stanislava Papežová Stanislava Papežová (Gar.)	Z,ZK	3	2P+1L	*	P
2353111	Project 1. Petr Kolář, Matěj Sulitka, Miroslav Ondráček Jan Koubek Petr Kolář (Gar.)	Z	5	5C	*	P
2351054	Production Machines and Equipment Tomáš Krannich, Jan Smolík, Vladimír Andrlík Jan Smolík (Gar.)	Z,ZK	5	3P+1L	*	P
2312017	Controlled mechanical systems I. Zdeněk Neusser, Michael Valášek, Zbyněk Šika, Václav Bauma, Ivo Bukovský, Pavel Steinbauer Michael Valášek Michael Valášek (Gar.)	KZ	3	3P+0C	*	P

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

2351158	Hydraulic and Pneumatic Systems	Z,ZK	4
Classification, principle and structure of hydraulic and pneumatic mechanisms (HPM). Transmission and conversion of energy. Design and function of hydraulic and pneumatic elements. Function of typical HPM. Proportional elements and their applications. Servomechanisms. Hydraulic and pneumatic drives. Assembly, operation and maintenance.			
2311075	Mechanics of Mechanisms	ZK	4
2141093	Microelectronics	Z,ZK	3
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.			
2353111	Project 1.	Z	5
Practicing of the design of machine parts with an emphasis on understanding geometric and dimensional tolerances and surface roughness.			
2351054	Production Machines and Equipment	Z,ZK	5
Manufacturing machines and equipment contains three basic parts. These are forming machines, machine tools and industrial robots and manipulators. Characteristics of machines and equipment for realization of discrete technological processes will be explained, technical parameters, basics of construction of production machines and equipment, construction of machine tools, TS design, automation of production machines and equipment, industrial manipulators and robots, their applications, single-purpose and modular machines, production lines. Examples of application of production machines and equipment.			
2312017	Controlled mechanical systems I.	KZ	3

Code of the group: 12NS*2P-VSZ

Name of the group: 2012 NSTI 2.sem povinné VSZ

Requirement credits in the group: In this group you have to gain 33 credits

Requirement courses in the group: In this group you have to complete 7 courses

Credits in the group: 33

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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
2311074	Vibrations of Mechanical Systems <i>Michael Valášek, Zbyněk Šíka, Václav Bauma, Jan Zavřel Michael Valášek Michael Valášek (Gar.)</i>	ZK	4	3P+0C	*	P
2353033	Measurement Methods for Production Machines and Equipment I.	Z	3	3L	*	P
2351084	Numerical Control of Production Machines and Equipment Control <i>Petr Konečný, Petr Vavruška Petr Vavruška Petr Vavruška (Gar.)</i>	Z,ZK	4	2P+2L	*	P
2351121	Drives of Production Machines - Servomechanisms I <i>Jan Machyl, Vojtěch Matyska, Jan Moravec Vojtěch Matyska Vojtěch Matyska (Gar.)</i>	Z,ZK	4	3P+1L	*	P
2353112	Project II <i>Petr Vavruška Petr Vavruška (Gar.)</i>	Z	5	5B	*	P

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

2311074	Vibrations of Mechanical Systems	ZK	4
2353033	Measurement Methods for Production Machines and Equipment I. Methodology of measuring in the field. Methodology of acquisition of scientific informations. Structure of the technical publications. Testing of the basic static and dynamic properties of the production machines and equipment. Comparison of the FEM computations of machines with experiments. Practical exercise of special methods in technical diagnostics. Application of numerical measuring systems.	Z	3
2351084	Numerical Control of Production Machines and Equipment Control Numerical controlled cutting machines, means of programming, coordinate systems, ISO code. NC program, its creating using CAD/CAM layers, postprocessors. Numerical control of forming machines, control data preparation. CNC inner structure, interaction of its parts, microprocessors in machine control. Real-time operating systems.	Z,ZK	4
2351121	Drives of Production Machines - Servomechanisms I Basis of continuous and discrete signal processing, frequency spectra, filter characteristics. Connection of operational amplifiers, counters and differential elements, AD and DA converters, demodulators. Acceleration, velocity, position sensors. Rotary and linear electric motors (DC, brushless).	Z,ZK	4
2353112	Project II The course is focused on the design of forming machines and on the design of the whole automated workplace. The design and design of the drives is designed with respect to a wide range of selected machine types. Depending on the product, the machine is designed first and then the entire workplace. The project has the character of a study and takes place in teams. The thesis is finally defended by all members	Z	5

Code of the group: 12NS*3P-VSZ

Name of the group: 2012 NSTI 3.sem povinné VSZ

Requirement credits in the group: In this group you have to gain 31 credits

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

Credits in the group: 31

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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
2351122	Servomechanisms of Production Machines <i>Vojtěch Matyska, Jan Moravec Jan Moravec Jan Moravec (Gar.)</i>	Z,ZK	4	3P+1L	*	P
2353113	Project III <i>Michal Fűrbacher</i>	Z	10	10B	*	P

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

2351122	Servomechanisms of Production Machines Common linear theory of electric, hydraulic and electro-hydraulic servo-drives. Positional, speed and power servomechanisms structures, principles, device arrangement, transfer functions of regulators. Static and dynamic properties, dynamic compliance. Communication between control system and servo-drive, trajectory control of NC machines, position measuring systems. Mechanical gearings in servo-drives, optimization, rigidity, accuracy.	Z,ZK	4
2353113	Project III	Z	10

Code of the group: 12NS*4P-VSZ

Name of the group: 2012 NSTI 4.sem povinné VSZ

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 7 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
2353998	Diploma Project Petr Kolář, Eduard Stach Petr Konečný Petr Kolář (Gar.)	Z	10	7C	*	P
2351123	Drives of Production Machines - Servomechanisms III. Jiří Švéda, Lukáš Novotný Vojtěch Matyska Lukáš Novotný (Gar.)	Z,ZK	4	3P+1L	*	P
2353890	Project IV. Miroslav Ondráček Miroslav Ondráček (Gar.)	Z	4	8C	*	P
2351087	Industrial Robots and Manipulators Vladimír Andrlík, Jiří Švéda Vladimír Andrlík (Gar.)	Z,ZK	3	2P+1L	*	P
2383062	Budget and Project Economic Assessment František Freiberg, Miroslav Žilka Miroslav Žilka František Freiberg (Gar.)	Z	2	1P+2C	*	P
2351086	Reliability and Diagnostics Michal Fůrbacher	Z,ZK	3	2P+1L	*	P

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

2353998	Diploma Project	Z	10	The course focuses on processing the final thesis within the scope of the assigned topic of the bachelor thesis. The student is acquainted with the general principles of the final thesis and during regular weekly consultations with the supervisor proceeds in the professional solution of the assigned problem and at the same time works on the actual text of the final thesis. In the course of the solution, the student completes a small oral presentation where the work in progress is presented.		
2351123	Drives of Production Machines - Servomechanisms III.	Z,ZK	4	Requirements on servomechanisms in the production machines, particularity of the electromagnetic and linear drives, principles of regulation. Methods of torque, velocity and position control. Types of regulating algorithms, inferior feedbacks, feedforwards. Path accuracy in the path control at the multiaxis production machines, starting control, interpolation errors, influence of nonlinearities. Multi mass system regulation, dynamic malleability of regulation. Communication between control system and drive. Mathematical models, experimental methods of servomechanism examinations.		
2353890	Project IV.	Z	4	Constructional and computational processing of real tasks of motion nodes and systems. A high level of creative thinking and innovative designs and practices are required. The tasks have a direct link to industrial practice and its needs. The second part is focused on the design of machine tool construction nodes (eg cradle, milling head, quill). The aim is to create a real construction node of a machine tool with all design calculations and drawing documentation in the form of a design drawing according to the entered parameters.		
2351087	Industrial Robots and Manipulators	Z,ZK	3	Construction of industrial robots and manipulators, kinematic structures, various types of driving units, moving units, end effectors.		
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.		
2351086	Reliability and Diagnostics	Z,ZK	3	Subject SD describes methods, practical case studies and measuring instruments used for machine tool diagnostics. Vibration measurements are the main topic discussed in the frame of the subject. Special care is taken to standards ISO and ČSN used for practical measurements.		

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 Eliška Vítková, Ilona Šimice, Zuzana Kalinová, Michaela Schusová, Veronika Kratochvílová, Hana Volejníková, Nina Procházková Ayyub Nina Procházková Ayyub	Z	2	0P+2C	*	PV
2043083	French - Preparatory Course / FME Eliška Vítková, Dušana Jirovská Eliška Vítková Eliška Vítková (Gar.)	Z	2	0P+2C	*	PV
2043082	German - Preparatory Course / FME Eliška Vítková, Petr Laurich, Jaroslava Kommová Jaroslava Kommová	Z	2	0P+2C	*	PV
2043085	Russian - Preparatory Course / FME Eliška Vítková, Hana Volejníková, Dušana Jirovská Eliška Vítková	Z	2	0P+2C	*	PV

2043086	Czech - Preparatory Course <i>Eliška Vítková, Petr Laurich, Jaroslava Kommová Jaroslava Kommová</i>	Z	2	0P+2C	*	PV
2043084	Spanish - Preparatory Course / FME <i>Eliška Vítková, Jaime Andrés Villagómez Jaime Andrés Villagómez</i>	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.						
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 - 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			
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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
2041081	English - Master Exam <i>Eva Pavlincová, Eliška Vítková, Ilona Šimice, Eva Končelíková, Zuzana Kalinová, Michaela Schusová, Veronika Kratochvílová, Hana Volejníková, Nina Procházková Ayyub Nina Procházková Ayyub</i>	ZK	1	0P+0C	*	PV
2041083	French - Master Exam / FME <i>Eliška Vítková, Dušana Jirovská Eliška Vítková Eliška Vítková (Gar.)</i>	ZK	1	0P+0C	*	PV
2041082	German - Master Exam / FME <i>Eliška Vítková, Petr Laurich, Jaroslava Kommová Jaroslava Kommová</i>	ZK	1	0P+0C	*	PV
2041085	Russian - Master Exam / FME <i>Eliška Vítková, Hana Volejníková, Dušana Jirovská, Petr Žitko Eliška Vítková</i>	ZK	1	0P+0C	*	PV
2041086	Czech- Master Exam <i>Eliška Vítková, Petr Laurich, Jaroslava Kommová Jaroslava Kommová</i>	ZK	1	0P+0C	*	PV
2041084	Spanish - Master Exam / FME <i>Eliška Vítková, Jaime Andrés Villagómez Jaime Andrés Villagómez</i>	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.						
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 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 comprehension 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 comprehension of simple texts. Improvement of professional language.						
2041086	Czech- Master Exam	ZK	1			
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 comprehension of simple texts. Improvement of professional language.						

Name of the block: Elective courses

Minimal number of credits of the block: 6

The role of the block: V

Code of the group: 12NS*1V-VSZ

Name of the group: 2012 NSTI 1.sem volitelné VSZ doporučené

Requirement credits in the group: In this group you have to gain 3 credits

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

Credits in the group: 3

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
2356024	CAD in Production Machine Design Miroslav Ondráček Tomáš Krannich Miroslav Ondráček (Gar.)	Z	3	3C	*	v

Characteristics of the courses of this group of Study Plan: Code=12NS*1V-VSZ Name=2012 NSTI 1.sem volitelné VSZ doporučené

2356024	CAD in Production Machine Design	Z	3
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Basics of modeling in Siemens NX. Sketching of basic 2D geometry and creation of 3D models. Creating rotating and non-rotating parts and generating 2D drawings (views, sections, dimensions, geometric tolerances). Creating assemblies and subassemblies and creating assembly drawings with positions, generating parts lists. Creating weldments and machined welds. Creating parametric models, using "Synchronous technology" and other special functions.

Code of the group: 12NS*2V-VSZ

Name of the group: 2012 NSTI 2.sem volitelné VSZ doporučené

Requirement credits in the group: In this group you have to gain 3 credits

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

Credits in the group: 3

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
2356025	Simulation Production Machine Antonín Bubák	Z	3	3L	*	v

Characteristics of the courses of this group of Study Plan: Code=12NS*2V-VSZ Name=2012 NSTI 2.sem volitelné VSZ doporučené

2356025	Simulation Production Machine	Z	3
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Learning outcomes of the course unit The subject is aimed at gaining information about fundamentals of modeling of parts and whole machines by finite element method, preparation of geometry for FEM model, creation of free and mapped mesh, definition of boundary conditions, calculations of properties of single bodies.

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 comprehension 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 comprehension 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 comprehension 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 comprehension 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 - 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.			

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
2141093	Microelectronics	Z,ZK	3
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.			
2311074	Vibrations of Mechanical Systems	ZK	4
2311075	Mechanics of Mechanisms	ZK	4
2312017	Controlled mechanical systems I.	KZ	3
2351054	Production Machines and Equipment	Z,ZK	5
Manufacturing machines and equipment contains three basic parts. These are forming machines, machine tools and industrial robots and manipulators. Characteristics of machines and equipment for realization of discrete technological processes will be explained, technical parameters, basics of construction of production machines and equipment, construction of machine tools, TS design, automation of production machines and equipment, industrial manipulators and robots, their applications, single-purpose and modular machines, production lines. Examples of application of production machines and equipment.			
2351084	Numerical Control of Production Machines and Equipment Control	Z,ZK	4
Numerical controlled cutting machines, means of programming, coordinate systems, ISO code. NC program, its creating using CAD/CAM layers, postprocessors. Numerical control of forming machines, control data preparation. CNC inner structure, interaction of its parts, microprocessors in machine control. Real-time operating systems.			
2351086	Reliability and Diagnostics	Z,ZK	3
Subject SD describes methods, practical case studies and measuring instruments used for machine tool diagnostics. Vibration measurements are the main topic discussed in the frame of the subject. Special care is taken to standards ISO and ČSN used for practical measurements.			
2351087	Industrial Robots and Manipulators	Z,ZK	3
Construction of industrial robots and manipulators, kinematic structures, various types of driving units, moving units, end effectors.			
2351121	Drives of Production Machines - Servomechanisms I	Z,ZK	4
Basis of continuous and discrete signal processing, frequency spectra, filter characteristics. Connection of operational amplifiers, counters and differential elements, AD and DA converters, demodulators. Acceleration, velocity, position sensors. Rotary and linear electric motors (DC, brushless).			
2351122	Servomechanisms of Production Machines	Z,ZK	4
Common linear theory of electric, hydraulic and electro-hydraulic servo-drives. Positional, speed and power servomechanisms structures, principles, device arrangement, transfer functions of regulators. Static and dynamic properties, dynamic compliance. Communication between control system and servo-drive, trajectory control of NC machines, position measuring systems. Mechanical gearings in servo-drives, optimization, rigidity, accuracy.			
2351123	Drives of Production Machines - Servomechanisms III.	Z,ZK	4
Requirements on servomechanisms in the production machines, particularity of the electromagnetic and linear drives, principles of regulation. Methods of torque, velocity and position control. Types of regulating algorithms, inferior feedbacks, feedforwards. Path accuracy in the path control at the multiaxis production machines, starting control, interpolation errors, influence of nonlinearities. Multi mass system regulation, dynamic malleability of regulation. Communication between control system and drive. Mathematical models, experimental methods of servomechanism examinations.			
2351158	Hydraulic and Pneumatic Systems	Z,ZK	4
Classification, principle and structure of hydraulic and pneumatic mechanisms (HPM). Transmission and conversion of energy. Design and function of hydraulic and pneumatic elements. Function of typical HPM. Proportional elements and their applications. Servomechanisms. Hydraulic and pneumatic drives. Assembly, operation and maintenance.			
2353033	Measurement Methods for Production Machines and Equipment I.	Z	3
Methodology of measuring in the field. Methodology of acquisition of scientific informations. Structure of the technical publications. Testing of the basic static and dynamic properties of the production machines and equipment. Comparison of the FEM computations of machines with experiments. Practical exercise of special methods in technical diagnostics. Application of numerical measuring systems.			
2353111	Project 1.	Z	5
Practicing of the design of machine parts with an emphasis on understanding geometric and dimensional tolerances and surface roughness.			
2353112	Project II	Z	5
The course is focused on the design of forming machines and on the design of the whole automated workplace. The design and design of the drives is designed with respect to a wide range of selected machine types. Depending on the product, the machine is designed first and then the entire workplace. The project has the character of a study and takes place in teams. The thesis is finally defended by all members			
2353113	Project III	Z	10
2353890	Project IV.	Z	4
Constructional and computational processing of real tasks of motion nodes and systems. A high level of creative thinking and innovative designs and practices are required. The tasks have a direct link to industrial practice and its needs. The second part is focused on the design of machine tool construction nodes (eg cradle, milling head, quill). The aim is to create a real construction node of a machine tool with all design calculations and drawing documentation in the form of a design drawing according to the entered parameters.			
2353998	Diploma Project	Z	10
The course focuses on processing the final thesis within the scope of the assigned topic of the bachelor thesis. The student is acquainted with the general principles of the final thesis and during regular weekly consultations with the supervisor proceeds in the professional solution of the assigned problem and at the same time works on the actual text of the final thesis. In the course of the solution, the student completes a small oral presentation where the work in progress is presented.			
2356024	CAD in Production Machine Design	Z	3
Basics of modeling in Siemens NX. Sketching of basic 2D geometry and creation of 3D models. Creating rotating and non-rotating parts and generating 2D drawings (views, sections, dimensions, geometric tolerances). Creating assemblies and subassemblies and creating assembly drawings with positions, generating parts lists. Creating weldments and machined welds. Creating parametric models, using "Synchronous technology" and other special functions.			
2356025	Simulation Production Machine	Z	3
Learning outcomes of the course unit The subject is aimed at gaining information about fundamentals of modeling of parts and whole machines by finite element method, preparation of geometry for FEM model, creation of free and mapped mesh, definition of boundary conditions, calculations of properties of single bodies.			

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.

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

Generated: day 02. 06. 2020, time 20:53.