ХАРАКТЕРИСТИКА НА УЧЕБНАТА ДИСЦИПЛИНА

Наименование на учебната дисциплина: **Изпитване на материалите**	Код: **ВрМТТ15**	Семестър: **7**
Вид на обучението: Лекции (Л), Лабораторни/семинарни упражнения (ЛУ/СУ)	Семестриален хорариум: Л - 30 часа ЛУ – 30 часа	Брой кредити: **5**

ПРЕПОДАВАТЕЛ:

Гл ас. д-р инж. Иван Тончев Панов (Факултет по машиностроене и уредостроене),
Катедра „МТТ”, тел: 032 659 623; имейл: specialista57@abv.bg

ТУ-София, филиал Пловдив

СТАТУТ НА ДИСЦИПЛИНАТА В УЧЕБНИЯ ПЛАН: Задължителен предмет в учебния план за специалност "Машиностроителна техника и технологии", бакалавърска степен.

ЦЕЛИ НА УЧЕБНАТА ДИСЦИПЛИНА: Да запознае студентите с разрушителните и безразрушителни методи за изпитване материали и конструкции.

ОПИСАНИЕ НА ДИСЦИПЛИНАТА: Основни теми: Влияние на технологичните фактори върху еластичността на материалите; Изпитване на опън ,Изпитване на натиск, Изпитване на огъване, Изпитване на усукване , Изпитване на ударна жилавост, Определяне на границата на еластичност, Изпитване на умора,Изпитване на твърдост ;Основи на механиката на разрушаването ; Еластична и пластична деформация; Технологични изпитвания; Натурни изпитания; Изпитване при ниски температури; Дефектоскопия: Ултразвукова, Гама и рентгенова, Вихрово- токова и Капилярна дефектоскопия; Магнитна дефектоскопия.

ПРЕДПОСТАВКИ ЗА ИЗУЧАВАНЕ НА ДИСЦИПЛИНАТА: Познания придобити по основни дисциплини като Физика, Химия, Материалознание и технология на материалите - Част I и II.

МЕТОД ЗА ПРЕПОДАВАНЕ: Лекции и лабораторни упражнения с използване на слайдове, табла, проектори и пробни тела.

МЕТОДИ ЗА КОНТРОЛ: Три теста за контрол в началото, средата и края на семестъра (20%), лабораторни упражнения (20%), писмен изпит (60%).

ЕЗИК НА ПРЕПОДАВАНЕ: Български.

ЛИТЕРАТУРА:
Христов С. Изпитване и дефектоскопия на металите, С., ВМЕИ, 1988. 2. Золоторевский В. Механические испытания и свойства металлов, М., М-е, 1974. 7. Броек, Д. Основы механики разрушения, М., 1980 8. Табакова Б. др. Ръководство за лабораторни упражнения по изпитване и дефектоскопия на металите, С., 1992 9. Weissbach, W. Werkstoffkunde унд Werkstoffprüfung, Брауншвайг, Vieweg Verlag, 1994. Kalpakjian S. Производствени процеси за инженерни материали, Addison-Wesley, 1999 година.

DESCRIPTION OF THE COURSE

Name of the course **Thermal Processing of Metals**	Code: **BpMTT16**	Semester: **7**
Type of teaching: Lectures, (L) Laboratory work (LW)/Seminars (S)	Hours per semester: L – 30 hours LW – 30 hours	Number of credits: **5**

LECTURER:

Prof. Dr. Angel Petrov Zyumbilev, Eng. (Faculty of Mechanical and Instrument Engineering), tel.: 032 659 606 , email: zumbilev @ mail.bg,

TU-Sofia, Plovdiv Branch

COURSE STATUS IN THE CURRICULUM: Compulsory subject in the curriculum for the major "Machine Building Technics and Technologies", Bachelor's degree.

AIMS AND OBJECTIVES OF THE COURSE: To introduce the students to the main points of the theory, the technology and the spheres of application of the basic methods of thermal and thermal and chemical processing of metals and their alloys.

DESCRIPTION OF THE COURSE: Consecutively, the students are introduced to the mechanism and kinetics of the main processes of thermal effect – emanation, hardening, cooling, ageing for chemical and thermal processing (nitrogenation, carbonization, chroming, etc.). Some other technological characteristics of thermal and chemical and thermal processing of instruments for cold and hot deformation, cutting instruments, springs, bearings and non-ferrous alloys are discussed.

TEACHING METHODS: Lectures and laboratory work with written statement and defense.

PREREQUISITES: Studying Chemistry, Physics and Materials Science.

METHOD OF ASSESSMENT: Written examination.

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1. Бучков Д. Термична обработка на металите, Техника, 1980; 2. Рашков Н. Термична обработка на стоманите, Техника, 1990; 3. Мичев В., В.Тошков, М. Димитров. Химико-термично обработване на стомани, Техника, 1981; 4. Гуляев А. П. Термическая обработка стали, 1960; 5. Лахтин Ю. М., Б. Н. Арзамасов. Химико-термичаская обработка металлов, М., Металлургия, 1985; 6. Четтерджи – Фишер и др., Азотирование и карбонитрирование, пер. с нем., М., Металлургия, 1990; 7. Ecktein Technologie der Warnebehanlung von Stahe, Leipzig, 1987.

DESCRIPTION OF THE COURSE

Name of the course: **Aided design in mechanical engineering"**	Code: **BpMTT17**	Semester: **7**
Type of teaching: Lectures, (L) Laboratory work (LW)/Seminars (S)	Hours per semester: L – 30 hours S – 30 hours	Numbers of credits**: 5**

LECTURER:

Assoc. Prof. Dr. Ilia Chetrokov, Eng. (Faculty of Mechanical and Instrument Engineering),

tel: 659 614, e-mail: chetrokov@tu-plovdiv.bg,

TU-Sofia, Plovdiv Branch,

COURSE STATUS IN THE CURRICULUM: Compulsory subject in the curriculum for major "Mechanical Engineering and Technologies ". Bachelor's degree.

AIMS AND OBJECTIVES OF THE COURSE: After completing the course the students should be familiar with intelligible materials of CAD/CAM systems, with designs methods in Solidworks and Simens-NX

DESCRIPTION OF THE COURSE: Basic topics:theoretical and practical familiar with CAD/CAM systems.

PREREQUISITES: Higher Mathematics; Engineering Graphics; Technology of Machine Building.

TEACHING METHOD: Lectures illustrated by sliders and laboratory work with written statements about the results from the researches (the observations).

METHOD OF ASSESSMENT: Test on the whole contents of the subject.

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1. Тодоров Н., Чакърски Д.; Автоматизация на проектирането в машиностроенето; Техника, София, 1994, 2. Донков Д. Й., Автоматизация на проектирането в машиностроенето, Габрово, 1998, 3. SOLIDWORKS 2006-КНИГА НА ПОТРЕБИТЕЛЯ София, 2006

DESCRIPTION OF THE COURSE

Name of the course **Technology of Welding**	Code: **BpMTT18**	Semester: **7**
Type of teaching: Lectures, (L) Laboratory work (LW)/Seminars (S)	Hours per semester: L – 30 hours LW – 15 hours	Number of credits: **5**

LECTURER:

Prof. Dr. Georgi levicharov, Eng. (Faculty of Mechanical and Instrument Engineering),

tel: 659 622,

TU-Sofia, Plovdiv Branch,

COURSE STATUS IN THE CURRICULUM: Compulsory subject in the curriculum for the major "Machine Building Technics and Technologies", Bachelor's degree.

AIMS AND OBJECTIVES OF THE COURSE: To secure the extended knowledge necessary to manufacture and test welded constructions and to create skills for practical work as well as to carry out experiments.

DESCRIPTION OF THE COURSE: Basic topics: Physical basis of welding; Heat sources; Electric welding arc; Metallurgical processes in welding; Technology of welding according to the following methods: manual electric-arc welding; submerge welding, shielding gas welding – TIG, MIG, MAG, plasma welding, electron beam welding, laser beam welding, electronic resistance welding, diffusion welding and welding by friction; welding stress and distortion; weldability; Cracking – hot, cold, lamellar; Weld metal; Thermal effect zone; Steel, aluminum and copper alloy welding characteristics.

PREREQUISITES: Physics, Chemistry, Materials Science and Technology of Metals – Part I and II.

TEACHING METHODS: Lectures and laboratory work supported by boards, slides, foil and samples.

METHOD OF ASSESSMENT: Three written test-paper marks (20 %), laboratory work (20 %), written examination (60 %).

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1. Велков К. Технология на заваряването, Техника, С., 1987; 2. Лолов, Н. Заваряемост на материалите, ТУ София, 1995; 3. Справочник по заваряване, в 2 тома, под ред. н а чл. кор. Л. Калев, С., Техника, 1982; 4. Сварка в машиностроении, справочник в 4 томах, 1979; 5. Dilthey, U. Schweisstechnische Fertigungsverfahren: Bd.1 Schweiß- und Schneidtechnologie, Springer Verlag, Berlin, 2005, Bd. 2 Verhalten der Werkstoffe beim Schweißen, VDI Verlag, 1994; 6. Messler, R., Jr. The Principles of Welding, John Wiley and Sons, 1999.

DESCRIPTION OF THE COURSE

Name of the course: **Engineering Economics**	Code: **BpMTT19**	Semester: **7**
Type of teaching: Lectures(L) Laboratory work (LW)/Seminars (S) Course work (CW)	Hours per semester: L – 15hours S –15 hours LW –0 hours	Number of credits: 3

LECTURER(S):
Assoc. Prof. Toni Mihova, PhD (FME), tel.: 0893 69 06 55, e-mail:mihova@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: The course"Economy"is included as mandatory for Bachelor degree students in Mechanical and instrument engineering

AIMS AND OBJECTIVES OF THE COURSE: Learning fundamentals and modern condition of dynamic economical processes in way students to be able to analyse ongoing economical processes in mechanical engineering enterprise as system

DESCRIPTION OF THE COURSE: TheMain topics:Capital and assets in enterprise, production capability, material economy, human resources in enterprise. Costs and cost price. Pricing. Disposal and sales. Effectiveness of enterprise activity. Investments.

PREREQUISITES: Fundamentals of economy of enterprise, industrial management and Humanities.

TEACHING METHODS: Lectures with presentations, discussions with active participation of students after preparation...

METHOD OF ASSESSMENT: Final assessment, resulting in a mark, consisting of two components: exam's test with a weight of 0,50 and assessment of the performance during seminarswith a factor of 0,50..

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:1. 1.Donchev, D.,and others,Economy of enterprise,Sofia,2020. 2.Deneva,A.,Gutsev,G.,Industrial economy,Avangard print 2008 3 Popov G.,Marinova U.,Economy and organization of company,Gorexpress 2006 . 4. Mihova. T.,Economy of enterprise,Macros,Plovdiv 2017. 5 Donchev,D.,Velev,Ml.,Dimitrov,I.,Bussiness economySoftrade 2003. 6 Marinov,G.,Velev,Ml., and others Economy of investment activity 2001. 7. Boyadjieva,E., and others Economy of enterprise,part 1 Dionis, 2006. 8 Chausheva,V., and others Economy of enterprise part 2,Dionis,Sofia. 9 Economy of enterpirse part 3,Dionis,Sofia,2008...

DESCRIPTION OF THE COURSE

Name of the course **Technology for the plastic deformation of the metal**	Code: **BpMTT20.1**	Semester: **7**
Type of teaching: Lectures, (L) Laboratory work (LW)/Seminars (S)	Hours per semester: L – 30 hours LW – 30 hours	Number of credits: **5**
Course project (CP)	Code: **BpMTT21**	Number of credits: **2**

LECTURER:

Prof.Dr. Eng. Angel Zumbilev (Metal Science and Technology of Metals),

tel: 032 659 624, TU-Sofia, Plovdiv Branch

COURSE STATUS IN THE CURRICULUM: Compulsory subject in the curriculum for the major "Machine Building Technics and Technologies", Bachelor's degree.

AIMS AND OBJECTIVES OF THE COURSE: The study of the topics of the curriculum aims at presenting theoretical knowledge and skills to analyze the technological opportunities of the operations and the principle concepts concerning the design of the basic processes of metal treatment by plastic distortion.

DESCRIPTION OF THE COURSE: Basic topics: tension and distortion condition during plastic distortion; Contact friction during plastic distortion; Metals conduct during plastic distortion; Methods of defining the force and the work for plastic distortion; Technological processes for producing articles by plastic distortion; Longitudinal stretch; Pressing; Orifice extension; Machine forging; Open and closed printing with efflux; Dividing operations of sheet printing; Bending sheet material; Deep extension with and without diminishing; Reducing and expansion of tube bodies; Borting.

PREREQUISITES: Required knowledge in Mathematics, Resistance of materials, Technology of materials, Materials science.

TEACHING METHODS: Lectures and laboratory work, with written statements about the research results.

METHOD OF ASSESSMENT: Written examination.

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1.Томов Б. Технология и инструменти за щамповане, Русе,1987, 2.Томов Б. Технология и инструменти за щанцоване,Русе, 1987, 3. Цанков Ц.,Попов Г.,Пецов Г. Обработване на металите чрез пластична деформация,С.,Техника, 1995, 4. Пенчев Т.,Нанкова Л. Машини и автоматизация за пластична деформация, С, Техника, 1983, 5. Аверкиев А.Ю. Ковка и штамповка,том 1,2,3,4. М., Машиностроение, 1987.

DESCRIPTION OF THE COURSE

Name of the course **Technology of Machine Building II**	Code: **BpMTT20.2**	Semester: **7**
Type of teaching: Lectures, (L) Laboratory work (LW)/Seminars (S)	Hours per semester: L – 30 hours LW – 30 hours	Number of credits: **5**
Course project (CP)	CP - Code: **BpMTT21**	Number of credits: **2**

LECTURER:

Assoc. Prof. Dr. Angel Dimitrov Lengerov, Eng. (Faculty of Mechanical and Instrument Engineering),

tel: 659 616; e-mail: anlengerov@abv.bg, TU-Sofia, Plovdiv Branch

COURSE STATUS IN THE CURRICULUM: Compulsory subject in the curriculum for the major "Machine Building Technics and Technologies", Bachelor's degree.

AIMS AND OBJECTIVES OF THE COURSE: After completing the course the students should be familiar with the methods of mechanical processing of model details from the machine building and to be able to design technological processes for them.

DESCRIPTION OF THE COURSE: Basic topics: Classification, technical requirements, materials and billets, model technological route and characteristics of the technological process for making the following: step shafts, crankshafts, eccentric and cammed shafts; Screws; Disks and sleeves; details with profile surfaces; Cylindrical cogged wheels; Conical cogged wheels; Worms and worm cogged wheel; Levers, forks and connecting rods; Corps details.

PREREQUISITES: Materials Science and Technology of Materials; Thermal Processing; Metrology and Measuring Equipment; Metals Cutting; Cutting Tools; Metal Cutting Machines; Technology of Machine Building – Part I.

TEACHING METHODS: Lectures illustrated by slides and laboratory work with written statements about the results from the researches (the observations).

METHOD OF ASSESSMENT: Written examination on a topic drawn by the student or a test on the whole content of the subject.

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1.Пашов Ст.К. Технология на машино-строенето, част 2. ИПК ТУ – София, 1993; 2.Пашов Ст., П. Хаджийски. Технология на машиностроенето част 1. ИПК ТУ - София, 1997. ISBN 954-438-203-8; 3. Патарински П. Технология на машиностроенето част II и III, С., Техника, 1979; 4. Гатев Г.К., В.И. Георгиев. Ръководство за лабораторни упражнения по технология на машиностроенето. София, "Техника", 1987; 5. Под ред. Пашов Ст. К. Справочник на технолога по механична обработка, том1. С., "Техника", 1989; 6. Под ред. Пашов Ст. К. и П. Петков. Справочник на технолога по механична обработка, том2.С., "Техника", 1990.

DESCRIPTION OF THE COURSE

Name of the course: **Sport**	Code: **FaSPR07**	Semester: 7
Type of teaching: Lectures (L) Laboratory work (LW)/Seminars (S) Self-Study (SS)	Hours per semester: L – 0 hours S – 0 hours SS – 30 hours	Number of credits: 1

LECTURER(S):
Assoc. Prof. Valentin Vladimirov, PhD (FEA), tel.: 032 659 646, e-mail: valdesv@tu-plovdiv.bg
Sen. Lect. Daniel Vladimdirov, PhD (FEA), tel.: 032 659 646, e-mail: danielv@tu-plovdiv.bg
Sen. Lect. Krassimir Djaldeti, PhD (FEA), tel.: 032 659 648, e-mail: krsj@tu-plovdiv.bg
Lect. Petar Doganov, PhD (FEA), tel.: 032 659 648, e-mail: pdoganov@tu-plovdiv.bg
Lect. Boris Spasov (FEA), tel.: 032 659 647, e-mail: boris_spassov@tu-plovdiv.bg
Technical University of Sofia-Branch Plovdiv
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Facultative subject from the curriculum for training of students to obtain Bachelor's degree, specialties Mechanical and Instrument Engineering, Mechanical Equipment and Technologies, Mechatronics Professional orientation 5.1 Mechanical engineering; Transport Equipment and Technologies, Aircraft Equipment and Technologies Professional orientation 5.5 Transport, Aviation and Shipping Navigation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: Targeted at further developing of students' physical activities, skills and hygiene habits through effective methods of physical education, improving their mental and physical performance.

DESCRIPTION OF THE COURSE: The knowledge and skills in Physical Education and Sports develop a wide range of motor skills and habits, help the hardening of the body and contribute to the moral development of students. The enhancement of physical skills is carried out through:

1. General Physical Preparedness (GPP) – in these seminars the students develop a wide range of motor skill and habits; work to improve strength, speed, endurance, flexibility, structure and skill; increase resistance to unfavourable environmental factors; develop their physical qualities and experience.

2. Sports-Specific Physical Preparedness (SPP) – students improve their sport skills and habits in a specific sport and gain experience through participation in competitions; work to improve strength, speed, endurance, flexibility, structure and skill; increase resistance to unfavourable environmental factors; develop their physical qualities and experience.

PREREQUISITES: The curricula presume the minimum of knowledge and skills acquired at secondary school.

TEACHING METHODS: Seminars in accordance with the curriculum in PE and Sport.

METHOD OF ASSESSMENT: Evaluation is based on functional tests at the end of semester. Lecturer's signature is required at the end of semester.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Владимиров В. Туризъм и ориентиране. Методическо ръководство за студентите от ТУ София, филиал Пловдив. Издателство на ТУ - София. 2010.

DESCRIPTION OF THE COURSE

Name of the course **Automation of machine manufacturing**	Code: **BpMTT22**	Semester: **8**
Type of teaching: Lectures, (L) Laboratory work (LW)/Seminars (S)	Hours per semester: L – 15 hours LW - 15 hours	Number of credits: **5**

LECTURER:

Assoc. Prof. Dr. Albena Taneva, Eng , tel: 659 585; e-mail: TU-Sofia, Plovdiv Branch

COURSE STATUS IN THE CURRICULUM: Compulsory subject in the curriculum for the major "Machine Building Technics and Technologies", Bachelor's degree.

AIMS AND OBJECTIVES OF THE COURSE: After completing the course the students should be familiar with the basic principles of automation of the discreet production and of the construction of automation devices, automatic technological modules, lines and complexes.

DESCRIPTION OF THE COURSE: Basic topics: Essence and prerequisites of the automation of the discreet production (ADP); Basic mechanisms for the construction of ADP – transporting, orienting, feeding, controlling; industrial robots and operators; Agregation of the means for ADP; Automated technological modules; Automated lines; Flexible automated production complexes.

PREREQUISITES: Higher Mathematics, Theoretical Mechanics, Theory of Mechanisms and Machines; Metal Cutting Machines; Technology of Machine Building.

TEACHING METHODS: Lectures illustrated by slides and laboratory work with written statements about the results from the researches (the observations).

METHOD OF ASSESSMENT: Written examination on a topic drawn by the student or a test on the whole content of the subject.

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1. Под ред. на Гановски В. Автоматизация на дискретното производство. С. "Техника", 1990; 2.Гановски В., Д.Дамянов, Д.Чакърски. Основи на автоматизацията, роботизацията и ГАПС. С. "Техника", 1990; 3.Гановски В., И. Бояджиев, Л. Клочков. Автоматични линии. С. "Техника", 1989. 4. Под ред. на Семенов Е. и Л. Волчкевич. Автоматизация на дискретното производство. С. "Техника", 1987; 5. Дамянов Д. и др. Ръководство по ОАР и ГАПС. С. "Техника", 1987.

DESCRIPTION OF THE COURSE

Name of the course **Programming and setting of machine tools with CNC**	Code: **BpMTT23.3**	Semester: **8**
Type of teaching: Lectures, (L) Laboratory work (LW)/Seminars (S)	Hours per semester: L – 30 hours LW – 30 hours	Number of credits: **5**

LECTURER:

Assoc. Prof. Dr. Ilia Chetrokov, Eng. (Faculty of Mechanical and Instrument Engineering),

tel: 659 614, TU-Sofia, Plovdiv Branch

COURSE STATUS IN THE CURRICULUM: Compulsory subject in the curriculum for the major "Machine Building Technics and Technologies", Bachelor's degree.

AIMS AND OBJECTIVES OF THE COURSE: After completing the course the students should be familiar with the technological properties of the metal CNC machine tools, the principles of designing technological operations and control programs. They should also be able to develop operation technologies and control programs for them.

DESCRIPTION OF THE COURSE: Basic topics: sphere of application and technological properties of metal CNC machine tools; working space and co-ordinates; structure of the control program and programming moves, dimensions, cutting modes, instruments and auxiliary actions; standard and multiple-thread cycles; parameter programming; specific characteristics of the billet and instruments location; dimension adjustment and sub-adjustment, corrections of the instruments; design of technological operations for lathes, drilling and milling machines, CNC centres, polishing machines and erosion machines.

PREREQUISITES: Materials Cutting; Metal Cutting Tools; Metal Cutting Machines; Technology of Machine Building – Part I; Technology of Machine Building – Part II; Management of the Production Engineering.

TEACHING METHODS: Lectures visualized by slides and laboratory work with written statements about the research (the observations).

METHOD OF ASSESSMENT: Written examination on a topic drawn by the student or filling in an examination test-paper covering the whole content of the subject.

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1. Хаджийски П. Ст. Пашов. Технология на машиностроенето, част 2 (Проектиране на технологични процеси за ММ с ЦПУ. Разработване на управляващи програми). ИПК ТУ-София, 2000. ISBN 954-438-281-Х.; 2. Караколов Л. Металорежещи машини и технологични процеси с програмно управление, кн. 1 и кн. 2, ИПК ТУ-София, 1985; 3. Караколов Л. и др. Металорежещи машини с ЦПУ. "Техника", С. 1993; 4. Иванов Г., А. Найденов, Ю. Кузнецов. Програмно управление на металорежещи машини и автоматизирани комплекси. Габрово, 1988.

DESCRIPTION OF THE COURSE

Name of the course **Methods for studying the microstructure of metals**	Code: **BpMTT23.2**	Semester: **8**
Type of teaching: Lectures, (L) Laboratory work (LW)/Seminars (S)	Hours per semester: L – 30 hours LW – 30 hours	Number of credits: **5**

LECTURER:

Prof. Dr. Angel Petrov Zyumbilev, Eng. (Faculty of Mechanical and Instrument Engineering),

tel.: 032 659 606 , email: zumbilev @ mail.bg, TU-Sofia, Plovdiv Branch

COURSE STATUS IN THE CURRICULUM: Optional subject in the curriculum for the major "Machine Building Technics and Technologies", Master's degree.

AIMS AND OBJECTIVES OF THE COURSE: To teach fundamental knowledge to the students specializing in "Material knowledge and technology of materials" about the most common methods in machine building for testing the structure of metals and their alloys.

ESCRIPTION OF THE COURSE: Step by step the students learn about the methods of determining the chemical content of materials, the methods of testing the type, size, location and quantity of the separate phases, as well as to determine the type of the elementary cell, its parameters, pressures of I, II and II order, type and quantity of defects, the density of dislocations and phase transformations through volume changes.

PREREQUISITES: Required knowledge in Physics, Chemistry, Materials Science and Heat Processing from the Bachelor's course.

TEACHING METHODS: Lectures and laboratory work supported by tabloids, slides, written statements, etc.

METHOD OF ASSESSMENT: Written examination.

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1. Анчев В. Физическо металознание, част I, С., 1990, 2.Анчев В., В. Тошков и др. Ръководство за лабораторни упражнения по Материалознание, ИК "КИНГ", София, 2001. 3Анчев В. Ръководство за лабораторни упражнения по физика на металите, ВМЕИ – София, С., 1986.4..Зюмбилев А. Материалознание, АУ – Пловдив, 2010 5..Askeland D., The Sience and Engineering of Materials, second S. I. Edition, Chapman, 1998.

DESCRIPTION OF THE COURSE

Name of the course **Technological processes,programming and adjustment of CNC metal cutting machines**	Code: **BpMTT23.1**	Semester: **8**
Type of teaching: Lectures, (L) Laboratory work (LW)/Seminars (S)	Hours per semester: L – 30 hours LW – 30 hours	Number of credits: **5**

LECTURER:

Prof. Dr. Angel Petrov Zyumbilev, Eng. (Faculty of Mechanical and Instrument Engineering),

tel.: 032 659 606 , email: zumbilev @ mail.bg, TU-Sofia, Plovdiv Branch

COURSE STATUS IN THE CURRICULUM: Optional subject in the curriculum for the major "Machine engineering and Technologies", Bachelor's degree.

AIMS AND OBJECTIVES OF THE COURSE: To introduce students to features of preparation and organization of CNC metal cutting machines: Focus on development and description of technological processes and programmed operation, quality insurance during CNC metal cutting operation, programing of operation for data creation; Students to attain skills about development and description of programmed operation on different CNC metal cutting machines; The subject is based on knowledge, attained on subjects included in bachelor`s degree, "Machine engineering and technologies" ("Advances mathematics", "Material science"," Technology of casting manufacturing"," Plastic strain, etc.); The subject is useful for prospective engineers of specialty "Machine engineering and technologies" in their realization in sphere of science and different fields of production using CNC metal cutting machines.

DESCRIPTION OF THE COURSE: Features of technological processes designing of CNC metal cutting machines and designing of types of technological decisions and description of technological processes. quality insurance, rates and effectiveness of technological processes for other types CNC metal cutting machines.

TEACHING METHODS: Lectures and laboratory work with written statement and defense.

PREREQUISITES: Chemistry, Physics and Material Science.

METHOD OF ASSESSMENT: Written examination.

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1. Кузманов Т., В. Геориев, Хр. Метев. Технологически процеси за ММ с ЦПУ, П., "ЕКС-ПРЕС" ООД, Г., 2007, 2. Кузманов Т., Хр. Метев. Технология на машиностроенето ч. 4 *(Технологически процеси за машини с ЦПУ)*, Г., "ЕКС-ПРЕС" ООД, 2007, 3. Бучков Д. Термична обработка на металите, Техника, 1980; 4. Рашков Н. Термична обработка на стоманите, Техника, 1990; 5. Мичев В., В.Тошков, М. Димитров. Химико-термично обработване на стомани, Техника, 1981; 6. Гуляев А. П. Термическая обработка стали, 1960; 7. Лахтин Ю. М., Б. Н. Арзамасов. Химико-термичаская обработка металлов, М., Металлургия, 1985; 8. Четтерджи – Фишер и др., Азотирование и карбонитрирование, пер. с нем., М., Металлургия, 1990; 9. Ecktein Technologie der Warnebehanlung von Stahe, Leipzig, 1987.

DESCRIPTION OF THE COURSE

Name of the course **Technological Processes of Coating**	Code: **BpMTT24.1**	Semester: **8**
Type of teaching: Lectures, (L) Laboratory work (LW)/Seminars (S)	Hours per semester: L – 15 hours LW – 15 hours	Number of credits: **5**

LECTURER:

Prof. Dr. Angel Petrov Zyumbilev, Eng. (Faculty of Mechanical and Instrument Engineering),

tel: 032 659 606, email: zumbilev @ mail.bg, TU-Sofia, Plovdiv Branch

COURSE STATUS IN THE CURRICULUM: Compulsory subject in the curriculum for the major "Machine Building Technics and Technologies", Bachelor's degree.

AIMS AND OBJECTIVES OF THE COURSE: The course aims at introducing the students to the basic knowledge concerning the most widespread in machine building methods to change the structure and the properties of the surface of materials.

DESCRIPTION OF THE COURSE: The students get introduced to the basic electrochemical processes of coating – chromium plating, nickel plating, etc. The opportunities of chemical and heat treatment (carbonization, nitriding, chromium plating, aluminizing, etc.) to improve the exploitation performance (wear resistance, corrosion resistance, heat resistance) of ferrous-carbon alloys and the physical methods of coating settling are discussed.

PREREQUISITES: Studying Physics, Chemistry, Heat Processing of Metals and Materials Science.

TEACHING METHODS: Lectures and laboratory work with written statements.

METHOD OF ASSESSMENT: Written examination.

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1. Мичев В., В. Тошков, М. Димитров, Химико-термично обработване на стомани. София, Техника, 1981; 2. Кънев М. и др. Вакуумно метализиране. С., Техника 1986; 3. Конрад Х., Р. Крампиц, Електротехнология, превод от немски, С., Техника, 1990; 4. Бучков Д., В. Тошков, Йонно азотиране. С., Техника, 1990.

DESCRIPTION OF THE COURSE

Name of the course **Technology of Tools' Production**	Code: **BpMTT24.2**	Semester: **8**
Type of teaching: Lectures, (L) Laboratory work (LW)/Seminars (S)	Hours per semester: L – 15 hours LW – 15 hours	Number of credits: **5**

LECTURER:

Assoc. Prof. Dr.. Stanislav Lyubenov Alexiev, Eng. (Faculty of Mechanical and Instrument Engineering), Tel. 032 659 611, e-mail – stanislav_al@abv.bg, TU-Sofia, Plovdiv Branch

COURSE STATUS IN THE CURRICULUM: Compulsory subject in the curriculum for the major "Machine Building Technics and Technologies", Bachelor's degree.

AIMS AND OBJECTIVES OF THE COURSE: To introduce the students to the fundamentals of developing engineering processes and the different methods of treatment.

DESCRIPTION OF THE COURSE: The subject introduces basic information concerning the improvement of the quality of tools, the methods of production, mechanization and automation of the engineering processes and some specific machines, applied in this type of production.

PREREQUISITES: All specialized subjects.

TEACHING METHODS: Lectures and laboratory work.

METHOD OF ASSESSMENT: Written examination.

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1. Жеков Г. К., Технология на ИП, ВМЕИ, С., 1980; 2. Ненков Г. П., Технология на ИП, ВМЕИ Габрово, 1987.

DESCRIPTION OF THE COURSE

Name of the course: **Welded Constructions**	Code: **BpMTT25.1**	Semester: **7**
Type of teaching: Lectures (L) Laboratory work (LW)/Seminars (S) Course work (CW)	Hours per semester: L – 30 hours S – 0 hours LW – 20 hours	Number of credits: **5**

LECTURER(S):

Assoc. Prof. Eng. Georgi Levicharov, PhD (FME), tel.: 659 624, e-mail: glevi@tu-plovdiv.bg

Assist. Prof. Eng. Todor Petrov (FME), тел.: 659 616, e-mail: petod@tu-plovdiv.bg

Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory elective subject from the curriculum for training of students to obtain Bachelor's degree, specialty Industrial Engineering, Professional orientation 5.1 Mechanical Engineering, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The aim of the subject is the students to obtain detailed knowledge of calculation, design, construction and testing of welded joints and structures. To create skills for practical work and control of the final product.

DESCRIPTION OF THE COURSE: The main topics concern: Selection of materials for welded constructions; Strength calculations of welded joints under static and dynamic loading; Calculation of welding stress and distortion; Limitation of stress and distortion; Fractual mechanics fundamentals; Building full-wall, pole, plate and machine constructions; Heat processing of welded constructions, main and auxiliary equipment in welding production.

PREREQUISITES: Physics, Chemistry, Strength of Materials, Materials Science, Processing of metals by plastic deformation, Welding Technology.

TEACHING METHODS: Lectures, using slides, case studies, laboratory work, protocols.

METHOD OF ASSESSMENT: Exam at the end of semester (82%), laboratories (18%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:
1. Желев, А., Христов, Ст. Заварени конструкции, т.1., С., Техника, 1988; 2. Желев, А., Коларов, И. Заварени конструкции, т.2., С., Техника, 1993; 3. Желев, А., Костадинов, Й. Заварени конструкции, т.3., С., Техника, 1989; 4. Справочник по заваряване, в 2 тома, под ред. на чл. кор. Л. Калев, С., Техника, 1982; 5. Лолов, Н. Заваряемост на материалите, ТУ София, 1995; 6. Винокуров, В., Куркин, С., Николаев, Г. Сварные конструкции. Механика разрушения и критерии работоспособности, Москва, Машиностроение, 1996; 7. Dilthey, U. Schweisstechnische Fertigungsverfahren: Bd. 3 Gestaltung und Festigkeit von Schweißkonstruktionen, Springer Verlag, Berlin, 2002; 8. Dilthey, U. Fügen zukunftweisender Werkstoffe, Aachen, 1999; 9. Neumann. A. Schweisstechnisches Handbuch fur Konstrukteure, in 4 Banden, 1984.

DESCRIPTION OF THE COURSE

Name of the course **Technological Equipment**	Code: **BpMTT25.2**	Semester: **8**
Type of teaching: Lectures, (L) Laboratory work (LW)/Seminars (S)	Hours per semester: L – 30 hours LW – 20 hours	Number of credits: **5**

LECTURER:

Sen. Asst. Dr.. Stoicho Kolev Stoev, Eng. (Faculty of Mechanical and Instrument Engineering),

tel: 032 659 613; e-mail: stevini@abv.bg, TU-Sofia, Plovdiv Branch

COURSE STATUS IN THE CURRICULUM: Compulsory subject in the curriculum for the major "Machine Building Technics and Technologies", Bachelor's degree.

AIMS AND OBJECTIVES OF THE COURSE: The course aims at introducing and developing knowledge concerning the design, selection and setting of devices for mechanical treatment of details.

DESCRIPTION OF THE COURSE: Basic topics: Basing elements for flat surface location; On external and internal cylindrical surface; On two or three cylindrical apertures with parallel axes and a surface that is perpendicular to them; Of centres; Of cogged surfaces; Fixing elements; Screw; Eccentric; Cotter, Membrane; Auxiliary elements and devices; Corpses, conductor sleeves; Sample; Types of devices – universal, USP; UNP; Devices for group and line processing; automated devices.

PREREQUISITES: Required preliminary or parallel knowledge of Mechanics, Strength of Materials, Metals Cutting, Metal Cutting Tools, Metal Cutting Machines, Technology of Machine Building.

TEACHING METHODS: Lectures illustrated by slides and laboratory work with written statements.

METHOD OF ASSESSMENT: Written examination and additional specific oral examining.

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1.Замфиров И., Рачев Р. Х. Технологична екипировка, ТУ-Русе, 1984; 2. Делчев Н., Замфиров И., Рачев Р. Х. Технологична екипировка, ТУ-Габрово,1986; 3. Недялков А. С., Събчев П. И., Марков М. Д. Технологична екипировка, С., Техника, 1987; 4. Под ред на Вардашкин Б. Н. Станочны приспособления, М., Машиностроение, 1984 (т.1и2); 5. Корсаков В. С. Основы конструирования приспособлений в машиностроении, М., Машиностроение, 1983; 6. Ансеров М. А. Приспособления для металорежущих станоков, Санкт Петербург, Машиностроение, 1975; 7. Замфиров И., Рачев Р. Х., Георгиев В. Г. Ръководство за упражнения по технологична екипировка, ВТУ "А. Кънчев" – Русе, 1985, 1992; 8. Горожкин А.К. Приспособления за металорежещи машини, С., Техника, 1982.

DESCRIPTION OF THE COURSE

Name of the course: **Sport**	Code: **FaSPR08**	Semester: 8
Type of teaching: Lectures (L) Laboratory work (LW)/Seminars (S) Self-Study (SS)	Hours per semester: L – 0 hours S – 0 hours SS – 30 hours	Number of credits: 1

LECTURER(S):
Assoc. Prof. Valentin Vladimirov, PhD (FEA), tel.: 032 659 646, e-mail: valdesv@tu-plovdiv.bg
Sen. Lect. Daniel Vladimdirov, PhD (FEA), tel.: 032 659 646, e-mail: danielv@tu-plovdiv.bg
Sen. Lect. Krassimir Djaldeti, PhD (FEA), tel.: 032 659 648, e-mail: krsj@tu-plovdiv.bg
Lect. Petar Doganov, PhD (FEA), tel.: 032 659 648, e-mail: pdoganov@tu-plovdiv.bg
Lect. Boris Spasov (FEA), tel.: 032 659 647, e-mail: boris_spassov@tu-plovdiv.bg
Technical University of Sofia-Branch Plovdiv
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Facultative subject from the curriculum for training of students to obtain Bachelor's degree, specialties Mechanical and Instrument Engineering, Mechanical Equipment and Technologies, Mechatronics Professional orientation 5.1 Mechanical engineering; Transport Equipment and Technologies, Aircraft Equipment and Technologies Professional orientation 5.5 Transport, Aviation and Shipping Navigation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: Targeted at further developing of students' physical activities, skills and hygiene habits through effective methods of physical education, improving their mental and physical performance.

DESCRIPTION OF THE COURSE: The knowledge and skills in Physical Education and Sports develop a wide range of motor skills and habits, help the hardening of the body and contribute to the moral development of students. The enhancement of physical skills is carried out through:

1. General Physical Preparedness (GPP) – in these seminars the students develop a wide range of motor skill and habits; work to improve strength, speed, endurance, flexibility, structure and skill; increase resistance to unfavourable environmental factors; develop their physical qualities and experience.

2. Sports-Specific Physical Preparedness (SPP) – students improve their sport skills and habits in a specific sport and gain experience through participation in competitions; work to improve strength, speed, endurance, flexibility, structure and skill; increase resistance to unfavourable environmental factors; develop their physical qualities and experience.

PREREQUISITES: The curricula presume the minimum of knowledge and skills acquired at secondary school.

TEACHING METHODS: Seminars in accordance with the curriculum in PE and Sport.

METHOD OF ASSESSMENT: Evaluation is based on functional tests at the end of semester. Lecturer's signature is required at the end of semester.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Владимиров В. Туризъм и ориентиране. Методическо ръководство за студентите от ТУ София, филиал Пловдив. Издателство на ТУ - София. 2010.