DESCRIPTION OF THE COURSE

Name of the course	Code: **BMEC01**	Semester: **1**
Mathematics I		
Type of teaching: Lectures and Tutorials	Lessons per week: L – 3 hours; T – 3 hours	Number of credits: **7**

LECTURER:

Assoc. Prof. Ph.D. Borislav Donevsky (FAMI), tel.: 965 2340,
email: snejanka_bd@yahoo.co.uk

Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for the students specialty Mechanical Engineering BEng programme of the Department of Mechanical Engineering.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are expected to be able to apply the Mathematics in solving of engineering problems.

DESCRIPTION OF THE COURSE: The main topics concern: Complex numbers; Polynomials; Inverse Trigonometric functions: Conics, the parabola, the ellipse, the hyperbola; Plane curves and parametric equations; Vectors: dot product, cross product, vectors in space; Functions and their graphs; Limits and continuity; Differentiation and using derivatives; Some applications of derivatives.

PREREQUISITES: Elementary Mathematics.

TEACHING METHODS: Lectures and Tutorials.

METHOD OF ASSESSMENT: Exam.

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY: 1. Donevska S., B. Donevsky. Calculus and Analytic Geometry 1, Part 1, Technical University of Sofia, Sofia, 2006; 2. Donevska S., B. Donevsky. Calculus and Analytic Geometry 1, Part 2, Technical University of Sofia, Sofia, 2007; 3. Donevska S., B. Donevsky. Calculus and Analytic Geometry 1, Part 3, Technical University of Sofia, Sofia, 2009; 4. Donevska S., B. Donevsky. Calculus and Analytic Geometry 2, Part 1, Technical University of Sofia, Sofia, 2008.

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DESCRIPTION OF THE COURSE

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Name of the course **Physics 1**	Code: **BMEC02**	Semester: **1**
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 2 hour	Number of credits: **6**

LECTURER: Assoc. Prof. Ph.D. Stefan L. Nitsolov, Department of Applied Physics, Technical University of Sofia, tel.: 965 3114, email: sln@tu-sofia.bg

COURSE STATUS IN THE CURRICULUM: Compulsory for the students specialty Mechanical Engineering BEng programme of the Mechanical Engineering Faculty.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are expected to have basic knowledge on notions and laws of classical physics and to be able to apply their knowledge in analysis and solving of engineering problems and interpretation of results.

DESCRIPTION OF THE COURSE: The main topics concern: Introduction; Kinematics; Newton's laws; Application of Newton's laws; Circular motion, Angular momentum and torque; Work and energy; Systems of particles; Motion of rigid body; Ideal gas; First and second principle of thermodynamics; Electrostatics.

PREREQUISITES: Physics on standard secondary level, Elements of calculus, analytical geometry and vector calculus.

TEACHING METHODS: Lectures, using slides, and laboratory work.

METHOD OF ASSESSMENT: Homework (20%), laboratories (20%), final exam (60%).

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:

1. Nitsolov, S., *Physics 1 Lecture Notes.*
2. Knight, R. *Physics for Scientists and Engineers: a Strategic Approach*, 2/E, Pearson Addison Wesley. 2008.
3. Serway R.A., Jewett J.W., *Physics for scientists and engineers* 7/ E, Thomson, 2004
4. Tipler, P. A., Mosca G., *Physics for Scientists and Engineers,* 6/E, Freeman, 2008.
5. Young, H., R. Freeman, *Sears and Zemansky's University Physics with Modern Physics*, 12/E, Pearson/Addison Wesley (2008)
6. Crowell, B., *Simple Nature (An Introduction to Physics for Engineering and Physical Science Students)*, 2009, http://www.lightandmatter.com/simple.pdf.
7. Fitzpatrick, R., *Classical Mechanics*, http://farside.ph.utexas.edu/teaching/301/301.html
8. Fitzpatrick, R., *Electromagnetism and Optics*, http://farside.ph.utexas.edu/teaching/302l/302l.html

DESCRIPTION OF THE COURSE

Name of the course : **Materials Science**	Code: **BMEHS16**	Semester: **1**
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 2 hours	Number of credits: **6**

LECTURER:

Assoc. Prof. Ph.D. L. Vassileva (FMT), tel.: 965 3361, email: lsv@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for students IN specialty "Mechanical Engineering"at MF," Degree of bachelor "

AIMS AND OBJECTIVES OF THE COURSE: To give knowledge about: Relationships of "chemical content–structures -properties" of the materials;

Competition and future trends for applications of traditional and advanced materials. Structure changes and predicting of performance behaviour; Optimized selection of the best material for defined application;Euro Standards for materials.

DESCRIPTION OF THE COURSE: The main topics concern: Atomic-crystal structure of materials: Atomic bonding, crystal lattices parameters, coordination number, vacancies and dislocations; Equilibrium solidification; -Metastable and Stable Iron-Carbon Phase Diagrams; Ferrous and Non-Ferrous Alloys; Phase and structure transformations: Continuous Cooling diagram Transformation(CCT) and Temperature Time Transformation (TTT) Phase Diagrams; Structure and properties changes. Mechanical properties: Tensile and Bending Strength, Modulus of Elasticity, Elongation, Hardness, Toughness, Fatigue, Creep, Brittle and Ductile Fracture; Prediction of mechanical properties ; Optimizing of materials selection procedures; Euro Norm Materials Standards.

Structures, properties and applications of Polymers; Ceramic materials; Metal, ceramics amd polimer matrix composites.

TEACHING METHODS: Lectures using slides; Laboratory work- laboratory manual, work in team, protocols preparation and defence.

PREREQUISITES: Physics, Chemistry.

METHOD OF ASSESSMENT: Two control tests in two-hours give average assessments (75%) plus laboratories (25%)

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:

1. William D.Callister,Jr.: Materials Science and Engineering,John Wiley& Sons,Inc., 2001.
2. Donald R. Askeland :The Science and Engineering of Materials, Chapman and Hall,1990.
3. Willam I.Smith : Principles of Materials Science and Engineering,Mc.Crow-Hill Publishing Compony,1990.
4. Sidney H.Avner,Introduction to Physical Metallurgy, Mc.Crow-Hill Inc.1974

DESCRIPTION OF THE COURSE

Name of the course **Informatics I**	Code: **BMEC04**	Semester: **1**
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 2 hour	Number of credits: **5**

LECTURER:

Assoc. Prof. Ph.D. Ivan Pankov Pankov, tel. 02 965 3981 GSM: 0985590503

Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for the students specialty

Mechanical Engineering

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are expected to have theoretical knowledge of: computer architecture, organization of operation of computer, computer arithmetic.

To be able to use program application of Microsoft Office Package: Word and Excel(first level) in engineering application .

DESCRIPTION OF THE COURSE:

PREREQUISITES:

Basic knowledge of computing.

TEACHING METHODS: Lectures, using slides, case studies, laboratory and course work, work in teams, protocols and course work description preparation and defence.

METHOD OF ASSESSMENT: Two one-hour assessments at mid and end of semester (62%), laboratories (18%), course work - two off assignments (20%)

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:

1. Comer, D. Computer Networks and Internets with Internet Applications, Prentice Hall, 2001
2. Date, C**.** An Introduction to Database Systems, Addison-Wesley, 1995
3. Hutchinson, S., S. Sawyer. Computers and Information Systems, Irwin Inc., 1994
4. Muller, R., Database Design for Smarties. Using UML for Data Modeling, Morgan Kaufmann Publishers, 1999.
5. Spiegel, M. Theory and Problems of Statistics, McGrow Hill, 1991
6. Zorkoczy, P. Information Technology. An Introduction, Pitman, 1991
7. Preece, J. (ed.). A Guide to Usability. Addison-Wesley, 1993

DESCRIPTION OF THE COURSE

Name of the course **Engineering graphics with CAD I**	**Code: BMEC05**	Semester: 1
Type of teaching: Lectures (L) and laboratory work (LW)	Lessons per week: L – 2 hours; LW – 2 hours	Number of credits: **6**

LECTURER:

Assoc. Prof. Ph.D. E. Todorova (MF) – tel.: 965 3789, email: etodorova@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory course for the students speciality Mechanical engineering (in English language), educational degree "Bachelor" of the Faculty of Mechanical Engineering in the Technical University of Sofia.

AIMS AND OBJECTIVES OF THE COURSE: To develop spatial thinking and technical culture of the students through the conceptual apparatus of applied geometry and documentation of design of machine objects and create skills for implementing the basic approaches to geometric modelling of simple details and creating their technical drawings in a CAD environment.

DESCRIPTION OF THE COURSE: The main topics concern: Design process – essence and structure of design process, standardization, documentation, drawing types; Basic information about Applied CAD-systems, creating technical drawings with AutoCAD; Basic method for design. Projection, types of projection - parallel and perspective projection, axonometric projection; Orthographic projection, first-angle projection**;** Projection of point, lines and planes using the method of Monge; True length of line and true size of figure, auxiliary projection plane; Projection of surfaces and solids; Intersection of solid and plane, intersection of solids; Unfolding, constructing the unfolding of expandable surfaces and non expandable surfaces; Types of views, sections and cross sections; Conventional treatment of objects; Detail drawing; Dimensioning in detail drawings – dimension types, basic principles of dimensioning.

PREREQUISITES: Basic knowledge on using computers is necessary.

TEACHING METHODS: Lectures delivered by using traditional educative and technical means and multimedia, laboratories using computers.

METHOD OF ASSESSMENT: Continuous assessment grade, defined from the grade of the test (60%), course work (30%) and laboratory work (10%).

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1. Sandalski Br., P. Goranov, G. Dinev, I. Nikolova, Fundamentals of Design and CAD, S., Softtrade, 2007 (bul). 2. Leparov, M., M. Vicheva, M. Georgiev, Fundamentals of engineering design, S., Softtrade, 2009 (bul). 3. Tudjarov, B., E. Todorova, D. Peneva, M. Yancheva, Guidance for classes and coursework in fundamentals of design and CAD, S., Softtrade, 2008 (bul). 4. Bertoline G., E. Wiebe, Fundamentals of Graphics Communication, McGraw-Hill, 2005. 5. Ostrowsky O., Engineering drawing with CAD applications, Great Britain, 1989. 6. Earle J., Engineering Design Graphics, Addison-Wesley Publ. Company, 1990. 7. Finkelstein E., AutoCAD 2009 and AutoCAD LT 2009 Bible, Wiley Publishing, 2008. 8. Otto, K., K. Wood, Product Design. Techniques in Reverse Engineering and New Product Development – Prentice Hall, New Jersey, 2001. 9. Pahl G., W. Beitz. Engineering Design. A Systematic Approach, Springer - Verlag Berlin, 2001. 10. Standards BDS, BDS EN, BDS IEC, BDS ISO for technical drawings and documents.

<div align="center">**DESCRIPTION OF THE COURSE**</div>

Name of the course: **Foreign Language**	Code: **BMEC06, BMEC13, BMEC20, BMEC26**	Semester: **1, 2, 3, 4**
Method of Teaching: Tutorials	Academic hours per week: **2**	Number of credits: **0**

LECTURER:
Lecturers from Department of Foreign Language Teaching and Applied linguistics, tel. 9653575, http://dfl.tu-sofia.bg,
      Technical University of Sofia,

COURSE STATUS IN THE CURRICULUM: Compulsory for full-time students of "Mechanical Engineering" in English of the Faculty of Machine Engineering at TU- Sofia required for obtaining Bachelor's Degree.

AIMS AND OBJECTIVES OF THE COURSE: to enable students in using scientific literature and specialized texts, as well as to enhance their communicative competence adopting culturally appropriate modes of behaviour relevant to the concrete situation and apply effective compensatory strategies in overcoming communicative problems.

DESCRIPTION OF THE COURSE: Foreign language education builds up communicative abilities and competence allowing students to socialize and function effectively in real-life professional situations. They develop the four language skills / Listening, Reading, Speaking and Writing/ aiming to facilitate their adequate auditory and visual comprehension of information, offered in a foreign language, as well as their active ability to respond in keep with the stylistics and norms of multicultural communication. The modern equipment and facilities of the Department of Foreign Language Teaching and Applied Linguistics allows the use of up-to-date audio-visual and technical equipment such as: language labs, VDU, cassette recorders, OHP-s, and computers.

PREREQUISITES: basic knowledge of the language and elementary rules of grammar and basic lexical items and their use, taught at secondary schools and vocational schools.

TEACHING METHODS: The selection and structuring of syllabus content is carried out by way of an integrated theoretical-practical communicative approach, taking into consideration the functional needs of students to use the language competently in cross-cultural and professional medium. Various interactive methods of classroom management are applied, such as discussions, presentations, case studies, role, theme projects, computer tests in grammar and lexicology on different proficiency levels, as well as translation of specialized scientific texts. The modular principle of foreign language teaching allows for a synthesis of a learner-centered seminar work in a given sphere with individual forms of study and self-study.

METHODS OF ASSESSMENT: written tests during the semester, the final exams are administered in the form of standard EU recognized exit tests on several proficiency levels to estimate the achieved progress and quality of acquired knowledge. Some specialties request that part of the final assessment includes translation of an abstract from a scientific book in a subject-specific field from a foreign language into Bulgarian. The final grade is made on the basis of two written tests for the period of training throughout the semester (an overall of 80%) and active participation in seminars and workshops and individual presentations (an overall of 20%).

LANGUAGES OF INSTRUCTION: English.

RECOMMENDED TEACHING MATERIALS: A number of course materials and textbooks have been developed under European projects and in collaboration with the British Council. There are rich resources available at the English, German and French Departmental libraries and multimedia packages of original software programmes in FLT.

<div align="center">**DESCRIPTION OF THE COURSE**</div>

Name of the course **Mathematics II**	Code: **BMEC08**	Semester: **2**
Type of teaching: Lectures and Tutorials	Lessons per week: L – 3 hours; T – 3 hours	Number of credits: **7**

LECTURER:

<div align="center">Assoc. Prof. Ph.D. Borislav Donevsky (FAMI), tel.: 965 2340,
email: snejanka_bd@yahoo.co.uk</div>

<div align="center">Technical University of Sofia</div>

COURSE STATUS IN THE CURRICULUM: Compulsory for the students specialty Mechanical Engineering BEng programme of the Department of Mechanical Engineering.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are expected to be able to apply the Mathematics in solving of engineering problems.

DESCRIPTION OF THE COURSE: The main topics concern: Integration; Applications of definite integrals: volumes by slicing and rotation about an axis, volumes by cylindrical shells, lengths of plane curves, areas of surfaces of revolution; Integrals and transcendental functions; Techniques of integration; Equations and Mathematical modeling: first order differential equations; Linear second order differential equations; Functions of several variables.

PREREQUISITES: Elementary Mathematics, Mathematics I.

TEACHING METHODS: Lectures and Tutorials.

METHOD OF ASSESSMENT: Exam.

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY: 1. Donevska S., B. Donevsky. Calculus and Analytic Geometry 1, Part 1, Technical University of Sofia, Sofia, 2006; 2. Donevska S., B. Donevsky. Calculus and Analytic Geometry 1, Part 2, Technical University of Sofia, Sofia, 2007; 3. Donevska S., B. Donevsky. Calculus and Analytic Geometry 1, Part 3, Technical University of Sofia, Sofia, 2009; 4. Donevska S., B. Donevsky. Calculus and Analytic Geometry 2, Part 1, Technical University of Sofia, Sofia, 2008.

Name of the course **Physics II**	Code: **BMEC09**	Semester: **2**
Type of teaching: Lectures, laboratory works, tutorials	Lessons per week: L – 2 hours; LW – 1 hour; T – 2 hours	Number of credits: **6**

LECTURER: Assoc. Prof. Ph.D. Stefan L. Nitsolov, Department of Applied Physics, Technical University of Sofia, tel.: 965 3114, email: sln@tu-sofia.bg

COURSE STATUS IN THE CURRICULUM: Compulsory for the student specialty Mechanical Engineering BEng programme of the Mechanical Engineering Faculty.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are expected to have basic knowledge on oscillations, waves, quantum and atomic physics and to be able to apply their knowledge in analysis and solving of engineering problems.

DESCRIPTION OF THE COURSE: The main topics concern: Electric Current; Magnetic Interaction; Electromagnetic Induction; Oscillations; Waves; Geometrical Optics; Wave Optics, Electric Structure of Matter; Interaction of Electromagnetic Radiation with Matter; Fundamentals of Quantum Mechanics; Fundamentals of Atomic Physics.

PREREQUISITES: Physics 1, Calculus 1, Elements of differential equations and vector calculus.

TEACHING METHODS: Lectures, using slides, laboratory work and tutorials.

METHOD OF ASSESSMENT: Homework (20%), laboratories (20%), final exam (60%).

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:

1. Nitsolov, S., *Physics 2 Lecture Notes.*
2. Knight, R. *Physics for Scientists and Engineers: a Strategic Approach*, 2/E, Pearson Addison Wesley. 2008.
3. Serway R.A., Jewett J.W., *Physics for scientists and engineers* 7/E, Thomson, 2004
4. Tipler, P. A., Mosca G., *Physics for Scientists and Engineers,* 6/E, Freeman, 2008.
5. Young, H., R. Freeman, *Sears and Zemansky's University Physics with Modern Physics*, 12/E, Pearson/Addison Wesley (2008)
6. Crowell, B., *Simple Nature (An Introduction to Physics for Engineering and Physical Science Students)*, 2009, http://www.lightandmatter.com/simple.pdf.
7. Fitzpatrick, R., *Electromagnetism and Optics*, http://farside.ph.utexas.edu/teaching/302l/302l.html

DESCRIPTION OF THE COURSE

Name of the course **Informatics II(Computing)**	Code: **BMEC10**	Semester: **2**
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 2 hour	Number of credits: **5**

LECTURER:

Assoc. Prof. Ph.D. Ivan Pankov Pankov, tel. 02 965 3981 GSM: 0985590503

Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for the students specialty

Mechanical Engineering

AIMS AND OBJECTIVES OF THE COURSE:

To be able to apply programs for engineering tasks as: Excel (second level), database with Access. .

DESCRIPTION OF THE COURSE:

Application of mathematical methods with Excel

Introduction of data base, models in data base, relation model.

Application of Access

PREREQUISITES:

Basic knowledge of computing.

TEACHING METHODS: Lectures, using slides, case studies, laboratory and course work, work in teams, protocols and course work description preparation and defence.

METHOD OF ASSESSMENT: Two one-hour assessments at mid and end of semester (62%), laboratories (18%), course work - two off assignments (20%)

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:
1. Comer, D. Computer Networks and Internets with Internet Applications, Prentice Hall, 2001
    2. Date, C**.** An Introduction to Database Systems, Addison-Wesley, 1995
    3. Hutchinson, S., S. Sawyer. Computers and Information Systems, Irwin Inc., 1994
    4. Muller, R., Database Design for Smarties. Using UML for Data Modeling, Morgan Kaufmann Publishers, 1999.
    5. Spiegel, M. Theory and Problems of Statistics, McGrow Hill, 1991
    6. Zorkoczy, P. Information Technology. An Introduction, Pitman, 1991
    7. Preece, J. (ed.). A Guide to Usability. Addison-Wesley, 1993

DESCRIPTION OF THE COURSE

Name of the course **Mechanics**	Code: **BMEC11**	Semester: **2**
Type of teaching: Lectures and Seminar work	Lessons per week: L – 3 hours; SW – 2 hour	Number of credits: **7**

LECTURER:
Assoc. Prof. Ph.D. Ivan Kralov (TF) – tel.: 965 2053, email: kralov@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for the students specialty Machinebuilding, BEng programme of the Machinebuilding Faculty.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students to know and to be able to apply in their practice the main axioms, laws and methods of the Mechanics, as well as to form an engineering way in the process of design of devices, apparatuses and machines.

DESCRIPTION OF THE COURSE: The main topics concern: Introduction to Mechanics. Main conceptions. Divisions of Mechanics. Introduction to Statics. Statics of a particle. Reduction and equilibrium of a concurrent system of forces. Moment of a force with respect to a point and to an axis. Theory of Couples. Reduction and equilibrium of an arbitrary spatial system of forces. Reduction and equilibrium of an arbitrary system of parallel forces. Center of gravity. Equilibrium in case of friction. Kinematics of a particle. Kinematics of a rigid body. Plane motion of a rigid body. Kinematics of the relative motion of a particle. Dynamics of a particle. Work and power of forces. Vibrations of a particle. Dynamics of a relative motion of a particle. Geometry of masses. Dynamics of mechanical systems and of an ideal rigid body. Kinetic energy of a mechanical system and of an ideal rigid body. Kyonig's theorem for the kinetic energy. Theorem of changing of the kinetic energy. Dynamics of the simple motions of a rigid body. Kinetostatics.

PREREQUISITES: Common knowledge of Physics, Mathematics and computer literacy.

TEACHING METHODS: Lectures, seminar works and self-preparing.

METHOD OF ASSESSMENT: Written test of three problems – each of them covering the material of the main subdivisions of the Classical Mechanics.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:

1. Buchvarov, S., Mechanics I – Statics, TU-Sofia, Sofia, 2007.
2. Kralov, I., Mechanics. Part I – Statics & Konematics, TU-Sofia, Sofia, 2010.
3. Kralov, I., S. Tchitakov, Seminar courses for solving problems in Mechanics II – Dynamics, TU-Sofia, Sofia, 2008.
4. Kralov, I., S. Tchitakov, Seminar courses for solving problems in Mechanics I – Statics & Kinematics, TU-Sofia, Sofia, 2010.
5. www.mechanics-bg.com.
6. Johanson, Beer, Vector Mechanics for Engineers, part I and II, McGrawHill, USA, 1995.

DESCRIPTION OF THE COURSE

Name of the course **Fundamentals of design and CAD II**	Code: **BMEHS12**	Semester: 2
Type of teaching: Lectures (L) and laboratory work (LW)	Lessons per week: L – 2 hours; LW – 2 hours	Number of credits: **7**

LECTURER:

Assoc. Prof. Ph.D. M. Georgiev (MF) – tel.: 965 3787, email: mtge@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for the students specialty Mechatronic systems (in English language), educational degree "Bachelor" of the Faculty of Mechanical Engineering in the Technical University of Sofia.

AIMS AND OBJECTIVES OF THE COURSE: To help the students to acquire knowledge and skills to design and develop documentation of electrical circuits, parts, assembly units and electrical joints of technical objects in the field of mechatronic systems; to know the meaning and application of tolerances and fits to ensure fundamental aspects of quality of machines and equipment; to know and apply the basic approaches to building a computer model of the design object and to develop technical documentation in a CAD environment.

DESCRIPTION OF THE COURSE: The main topics concern: Basic design methods - parallel and perspective projection, axonometric projection; Orthographic projection, first-angle projection**;** Projection of point, lines and planes using the method of Monge; True length of line and true size of figure, auxiliary projection plane; Projection of surfaces and solids; Intersection of solid and plane, intersection of solids; Unfolding, constructing the unfolding of expandable surfaces and non expandable surfaces; Design and representation of machine joints and transmissions; Fits - types, standard fits and systems of formation; Design and documentation of assembly units. Content and requirements for implementation of the design drawing and specification; Use of CAD systems for 3D modeling and automated execution of set design.

PREREQUISITES: Basic knowledge on Fundamentals of design and CAD I.

TEACHING METHODS: Lectures delivered by using traditional educative and technical means and multimedia, laboratories using computers.

METHOD OF ASSESSMENT: A two hours assessment at the end of semester (total 70%), course work (30%).

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1. Leparov, M., M. Vicheva, M. Georgiev, Fundamentals of engineering design, S., Softtrade, 2009 (bul). 2. Sandalski Br., P. Goranov, G. Dinev, I. Nikolova, Fundamentals of Design and CAD, S., Softtrade, 2007 (bul). 3. Николова, И., М. Вичева, М. Янчева, В. Пенчев, Ръководство за упражнения и курсова работа по основи на конструирането и CAD – II част, С., СОФТРЕЙД, 2008. 4. Bertoline G., E. Wiebe, Fundamentals of Graphics Communication, McGraw-Hill, 2005. 5. Earle J., Engineering Design Graphics, Addison-Wesley Publ. Company, 1990. 6. Finkelstein E., AutoCAD 2009 and AutoCAD LT 2009 Bible, Wiley Publishing, 2008. 7. Lombard M., SolidWorks 2007 Bible, Wiley Publishing Inc., 2007. 8. Otto K., K. Wood, Product Design. Techniques in Reverse Engineering and New Product Development – Prentice Hall, New Jersey, 2001. 9. Pahl G., W. Beitz. Engineering Design. A Systematic Approach, Springer- Verlag Berlin, 2001. 10.Стандарти БДС, БДС EN, БДС IEC, БДС ISO за технически чертежи и документи.

DESCRIPTION OF THE COURSE

Name of the course **Electrical Engineering**	Code: **BMEC15**	Semester: 3
Type of teaching: Lectures and Laboratory Works	Lessons per week: L – 2 hours; LW – 2 hours	Number of credits: **5**

LECTURER: Assoc. Prof. Dr. Valeri Mladenov
Dept. Theoretical Electrical Engineering, Faculty of Automatics, Technical University of Sofia, tel./fax. +359 2 9652386, e-mail: valerim@tu-sofia.bg

COURSE STATUS IN THE CURRICULUM: Compulsory for the students specialty Machine Building, B.Eng. programme of the Mechanical Engineering Faculty on English Language.

AIMS AND OBJECTIVES OF THE COURSE: To teach students to the basic approaches for description the processes of linear electric circuits with and without coupled inductors, methods for analysis of DC and AC circuits and the transients in linear electric circuits. The acquired knowledge will help students to understand the relationship between the mathematical representation of electrical circuit or electrical machines behaviour and corresponding real-life effects.

DESCRIPTION OF THE COURSE: The course includes: the basic concepts for linear electric circuits, the methods, properties and the theorems for DC and AC analysis of linear electric circuits with and without coupled inductors, the basic properties of the resonance phenomena, and the concepts and equations for three phase circuits. The students will also know the fundamentals of the transient analysis of linear circuits, power transformers, dc and induction motors.

PREREQUISITES: Basic knowledge in Mathematics, Calculus and Physics is necessary.

TEACHING METHODS: Lectures are illustrated with slides, schemes and pictures. Laboratory works are done in accordance with laboratory manual. The laboratory reports and course works are supervised by the teacher.

METHOD OF ASSESSMENT: Written exam at the end of the semester. The results from the laboratory and course works are considered also.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1. C.K. Alexander, M.N.O. Sadiku., *Fundamentals of Electric Circuits*, 2-nd edition, McGraw-Hill, Inc., 2004; 2. James W. Nilsson, Susan Riedel, *Electric Circuits*, 7th Edition, Prentice Hall, 2005, ISBN-10: 0131329723; 3. R.C. Dorf and J.A. Svoboda, *Introduction to Electric Circuits*, John Wiley & Sons. 1999. 4th edition. ISBN 0-471-19246-5; 4. Zoya Popovic, Branco D. Popovic, *Introductory Electromagnetics*, Prentice Hall, 1999, ISBN10: 0-201-32678-7. 5. R. DeCarlo and P.-M. Lin, *Linear Circuit Analysis - A TIme Domain and Phasor Approach*, Prentice Hall. 1995; 6. К. Брандиски, Ж. Георгиев, В. Младенов, Р. Станчева., "*Учебник по теоретична електротехника – Част I*", ИК КИНГ 2004, ISBN 954-9518-28-0, София; 7. К. Брандиски, Ж. Георгиев, В. Младенов, Р. Станчева., "*Учебник по теоретична електротехника – Част II*", ИК КИНГ 2004, ISBN 954-9518-29-9, София; 8. J. Bird, Electrical and Electronic Principles and Technology, Elsevier, 2007; 9. Д. Цветков и др., Електротехника и електроника, печат ЕТ "Здравков", 1997; 10. *Ръководство за лабораторни упражнения по Електротехника и Електроника*, печат ЕТ "Здравков", 1997; 11. К. Брандиски и др., *Ръководство за лабораторни упражнения по Теоретична електротехника*, КИНГ, София, 2004.

DESCRIPTION OF THE COURSE

Name of the course **Thermodynamics and heat transfer**	Code: **BMEC16**	Semester: **3**
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 2 hours	Number of credits: **6**

LECTURER:

Prof. DSc P.Stankov (FPE) – tel.965 2326, pstankov@tu-sofia.bg, Technical University of Sofia, Department of Hydroaerodynamics and hydraulic machines

COURSE STATUS IN THE CURRICULUM: Compulsory for the students in the BEng program of the Faculty of Mechanical Engineering in the specialty Mechanical Engineering.

AIMS AND OBJECTIVES OF THE COURSE: The course is organised so that to build both theoretical background and practical skills necessary for understanding and further studies in the field of applied thermodynamics and heat transfer and theoretical predictions.

DESCRIPTION OF THE COURSE: The course consists of three parts: Thermodynamics, Applications and Heat transfer. The course program is correlated with the other subjects (inputs and outputs) related to Thermodynamics and heat transfer. First part of the course covers the following main topics: fundamental concepts of thermodynamics; basic definitions and units; conservation of mass and energy; properties of pure substances; ideal and actual gases; energy analysis of closed and open systems; the second law of thermodynamics and entropy; non-reacting ideal gas mixtures and ideal gas water vapour mixtures. Second part of the covers the following: internal combustion engines; vapour power systems; refrigeration and air-conditioning systems. The third part of the course deals with the basic modes of heat transfer (conduction, convection and radiation) and some combined modes of heat transfer as well as with heat exchangers (shell and tube heat exchangers and tube in tube heat exchangers).

PREREQUISITES: Physics, Fluid Mechanics, Mathematics

TEACHING METHODS: Lectures – a mixture of classical method and powerpoint presentations, laboratory work – experimental work, protocols preparation and presentation, solving of problems.

METHOD OF ASSESSMENT: Three hours long exam at the end of the term, composed of answers to 5 questions (50 points) and solving of 3 problems (50 points). Marks: Satisfactory (3) – minimum 20 points for answering the questions and minimum 20 points for solving problems, Good (4) – 25 points/points; Very good (5) – 30 points/30 points; Excellent (6) – 35 points/35 points.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1. Burghardt M., J.A. Harbach, Engineering Thermodynamics, Harper Collins College Publishers, 1992, ISBN 0-06-041049-3; 2. Howell J.R., R.O. Buckius, Fundamentals of Engineering Thermodynamics, McGraw-Hill Book Company, 1987, ISBN 0-07-079663-7; 3. Ozisik M.N., Heat transfer a basic approach, McGraw-Hill Book Company, 1985, ISBN 0-07-047982-8.

DESCRIPTION OF THE COURSE

Name of the course **Systems Modelling and Simulation**	Code: **BMEC17**	Semester: **3**
Type of teaching: Lectures and laboratory work Course work	Lessons per week: L – 3 h.; T – 2 h. LW – 1 h.	Number of credits: **7**

LECTURER:

Assoc. Prof. Ph.D. G. Stoychev (FT) – tel.: 965 2296, email: gstojch@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for the students specialty Mechanical Engineering, BEng programme of the Faculty of Mechanical Engineering.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are expected to be able to apply the methods of structural design, to use simplified mechanical models for design of details and structures, to analyze the stress and strain state in the structures and to make adequate decisions in the structural design.

DESCRIPTION OF THE COURSE: The main topics concern: Area moments of inertia; Internal forces in beams and frames, diagrams. Axial loading. Normal stress, normal strain, stress–strain diagram, Hooke's law; Design of axial loaded members. shearing stress, shearing strain, Hooke's law; Pure bending - stresses, neutral axis, design of beams; Unsymmetric bending - stresses, neutral axis, design; Eccentric axial loading in a plane of symmetry- stresses, neutral axis, design; General case of eccentric axial loading, transformation of plane stress, principal stresses, maximum shearing stress; Transformation of plane strain; Generalized Hooke's law; Finite element method; Yield criteria; Transverse loading, normal and shearing stresses, design of beams for strength; Torsion and bending of shafts, design of shafts for strength; Castigliano's theorem - deflections, statically indeterminate structures; Stability of columns, Euler's formula, design of columns under a centric load; Fatigue.

PREREQUISITES: Mathematics, Physics, Mechanics, Properties of materials.

TEACHING METHODS: Lectures, using multimedia technique, tutorials and laboratory work.

METHOD OF ASSESSMENT: Three-hour written exam with two theoretical questions and three problems, control tests.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:
1. G. Stoychev, Strength of Materials, Technical University of Sofia, Sofia, 2006.
2. F. P. Beer, E. Russell Johnston, JR, Mechanics of Materials, McGrow-Hill, New York, 1985.
3. J. M. Gere, S. P. Timoshenko, Mechanics of Materials, Van Nostrand Reinhold (int.),1987.

DESCRIPTION OF THE COURSE

Name of the course: **Machine elements I**	Number: **BMEC18**	Semester: **3**
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 2 hours:	Number of credits: 6

LECTURERS:

Assoc. Prof. Ph.D. L. Dimitrov (MF)–tel.:965 2996,
email: lubomir_dimitrov@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for the students specialty Mechanical Engineering, BEng programme of the Mechanical Engineering Faculty.

AIMS AND OBJECTIVES OF THE COURSE: To develop basic machine design concepts of strength, deflection, and failure, plus a study of basic machine elements.

DESCRIPTION OF THE COURSE: The main topics concern: Design methodology. Design for static and for fatigue loading. Strength and failure analyses. Design of mechanical components and joints of common use such as: keys, splines, pins, rivets, threaded fasteners, press joints, welded joints, springs, bearings, couplings.

PREREQUISITES: Physics, Mechanics, Applied Geometry and Engineering Graphics, Strength of Materials, Material Science, Mathematics.

TEACHING METHODS: Lectures, laboratory work (defense of protocols).

METHOD OF ASSESSMENT: A two-hour assessments at the end of semester - 70%, laboratory work – 30%.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1. Dimitrov L. Principles of Mechanical Engineering Design, Technical University of Sofia, 2009; 2. Shigley, J., Ch. Mischke. Mechanical Engineering Design, 6th ed., McGraw Hill, 2009; 3. Juvinal R., K. Marshek. Fundamentals of Machine Component Design. John Wiley & Sons, 1991; 4. Glayer J.F., C.R. Shotbolt. Metrology for engineers. Cassell Publishers Ltd, 1990.

DESCRIPTION OF THE COURSE

Name of the course: Theory of Mechanisms and Machines	Code: **BMEC19**	Semester: 3
Type of teaching: Lectures, laboratory workshops, course work.	Lessons per week: L – **2 h**, Lab. – **2 h**	Number of credits:**6**

LECTURER:

Assoc. Prof. Ph. D. Todor Stoilov Todorov, MTF, tel.: 965 2794,
e-mail: tst@tu-sofia.bg, Technical University of Sofia

COURSE STATUS IN THE CURRICULUM:
Compulsory course for full-time students pursuing the educational and qualification degree "bachelor" with major field of study "Mechanical engineering" in the Faculty of Machine Engineering at the Technical University of Sofia.

COURSE OBJECTIVES:
The main course objective is to accomplish the transition from general scientific knowledge to design and technology knowledge and educate students about the nature of mechanical systems and their construction. This course increases the engineering and technical skills of students and helps in developing creative and inventive thinking when designing, and improving the design of, various technology products.

DESCRIPTION OF THE COURSE:
The course material addresses the problems of structural, geometric, and kinematic, force analysis and dynamic analysis and synthesis of mechanisms and machines. The course also covers the implementation of a desired law of motion, the generation of a given trajectory, the regulation and control of motion of mechanical systems for various machines, instruments and devices.

PREREQUISITES:
Necessary knowledge of Mathematics (Linear Algebra and Geometry, ODE, LDE), Physics, Theoretical Mechanics.

TEACHING METHODS:
Concepts in lectures are illustrated by various visual means such as working devices, mock-ups and models of mechanisms, panels and slides. Guided lab workshops based on lab manuals use real working set-ups, equipped with modern computer systems for data collection and processing of the measured parameters. Students must write lab reports and defend them before the lecturer.

METHOD OF ASSESSMENT:
Continuous assessment and final exam.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:
1. Paul, B., Kinematics and Dynamics of Planar Machinery, Prentice-Hall, New Jersey, 1989.
2. Erdman, A., G., Sandor, G. N. Mechanism Design: Analysis and Synthesis. Prentice-Hall Inc., New Jersey, Vol. 1, 1984, 2-nd Edition, 1991, ISBN 0-13-569872-3.
3. Shigley, J. E., and J. J. Uicker Jr. Theory of Machines and Mechanisms. McGraw-Hill Book Company, Inc., New York, 1995, 710 p., ISBN 0-07-056930-4.
4. Chen, F. Y. Mechanics and Design of CAM Mechanisms. Pergamon press, N.Y., 1982, 523 p., ISBN 0-08-028049-8.
5. Suh, C. H., Radcliffe, C.W. Kinematics and Mechanisms Design. John Willey& Sons, Inc., New York, 1978, 434 p., ISBN 0-471-01461-3.
6. Uicker J. J., Jr., G. R. Pennock, J. E. Shigley, Theory of Machines and Mechanisms (third ed.), Oxford University Press, New York, 2004, p.734, ISBN 0-19-515598-X.

DESCRIPTION OF THE COURSE

Name of the course: **Electronics (in English)**	Code: **BMEC22**	Semester: 4
Type of teaching: Lectures, seminar and laboratory work Course work	Lessons per week: L – 3 hours; SW – 0 hour; LW – 2 hours.	Number of credits: **7**

LECTURERS:
Assoc. Prof. Dr. Tania Vasileva (FEET) – tel.: 965 27 40, email: tkv@tu-sofia.bg
Technical University of Sofia
Assoc. Prof. Dr. Ivailo Pandiev (FEET) – tel.: 965 30 27, email: ipandiev@tu-sofia.bg
Technical University of Sofia
Assoc. Prof. Dr. Petar Yakimov (FEET) – tel.: 965 32 65, email: pij@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for the Bachelor of Science degree full-time students, specialty "Mechanical Engineering" (in English) from the Mechanical Engineering Faculty at the Technical University of Sofia.

AIMS AND OBJECTIVES OF THE COURSE: The students are provided with knowledge and skills about semiconductor devices and integrated circuits, fundamental analog and digital circuits and systems, as well as some design methods and principals of their building. At the end of the course the student are expected to analyze and to design analog and digital devices.

DESCRIPTION OF THE COURSE: The main topics concern: PN junction diodes; Transistors (BJT and FET); Basic amplifier circuits with op amps; Active filters; Current-controlled voltage sources and voltage-controlled current sources; Linear and non-linear computing circuits (summers, integrators, differentiators, sample and hold amplifiers, logarithmic amplifiers, analog multipliers, analog comparators, etc.); SC – circuits and FPAA ICs; Power supply circuits; Logic families – CMOS, TTL, BiCMOS and LVL; Combinational logic devices – multiplexes, demultiplexes, coders, encoders, comparators, adders, etc.; Sequential logic devises – latches, flip-flops, counters, registers, etc.; Delay devices, Impulse oscillators; Digital indicators and displays; Digital-to-analog converters; Analog to digital converters; Phase Locked Loops (PLLs); Frequency locked loops; Basic elements and architectures of the microprocessor systems.

PREREQUISITES: Mathematics, Physics, Electrical engineering.

TEACHING METHODS: Lectures are performed with classical methods of teaching, using additional teaching materials (slides, schemes, tables, graphs). Laboratory work in teams with protocols and defence.

METHOD OF ASSESSMENT: Students are required to take a written exam – final test, including questions and problems (80 %), laboratories (20 %).

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1. *Thomas L. Floyd,* Electronics Fundamentals: Circuits, Devices and Applications (7th Edition) (Floyd Electronics Fundamentals Series) (Hardcover - April 9, 2006); 2. *Hambley, A.* Electronics. Second editions. Prentice Hall, 2000; 3. *Floyd, T.* Digital Fundamentals. New York, Macmillan Publishing Company, 1990.

DESCRIPTION OF THE COURSE

Name of the course: **Machine elements II**	Number: **BMEC23**	Semester: **4**
Type of teaching: Lectures, tutorials, laboratory work, course project	Lessons per week: L – 2 hours; TUT – 1 hour, LW – 2 hour: course project – 2,1 hour/person	Number of credits: 8

LECTURERS:

Assoc. Prof. Ph.D. L. Dimitrov (MF)–tel.:965 2996,

email: lubomir_dimitrov@tu-sofia.bg

Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for the students from specialty Mechanical Engineering, BEng programme of the Mechanical Engineering Faculty.

AIMS AND OBJECTIVES OF THE COURSE: To continue the course of Machine elements I. To deliver to the students basic machine design concepts of strength, deflection, and failure, plus a study of basic machine elements. To focus their attention on the design for manufacture philosophy.

DESCRIPTION OF THE COURSE: The main topics concern: Design of basic machine elements such as shafts, gears, belt drives, friction drives, couplings, clutches and brakes. Design for manufacturing. Technical approach in design of components and systems. Material selection.

PREREQUISITES: Physics, Mechanics, Applied Geometry and Engineering Graphics, Strength of Materials, Material Science, Mathematics, Machine elements I.

TEACHING METHODS: Lectures, tutorials, laboratory work (defense of protocols). Course project.

METHOD OF ASSESSMENT: A two-hours assessments at the end of semester - 70%, tutorials – 30%, laboratory work – 30%.
Defense of a course project – 100%.
INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1. Dimitrov L. Principles of Mechanical Engineering Design, Technical University of Sofia, 2009; 2. Shigley, J., Ch. Mischke. Mechanical Engineering Design, 6th ed., McGraw Hill, 2009; 3. Juvinal R., K. Marshek. Fundamentals of Machine Component Design. John Wiley & Sons, 1991; 4. Glayer J.F., C.R. Shotbolt. Metrology for engineers. Cassell Publishers Ltd, 1990.

Name of the course **Hydraulic and pneumatic fluid power**	Code: **BMEC24**	Semester: **4**
Type of teaching: **Lectures (L) and Laboratory Works (LW)**	Lessons per week: L– **3** hours; LW- **2** hours	Number of credits: **7**

LECTURER:
Assoc. Prof. Ph.D. Ilcho Angelov (EMF) – tel.: 965 2321, e-mail: ilangel@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory course for the students of specialty "Mechatronic systems", Professional branch 5.1. "Mechanical engineering" the Faculty of Mechanical Engineering, Bachelor Engineering programme.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are expected to know the structure, operation, performances, regulation and application of the fluid power machines, components and systems and use this knowledge to compose the circuit diagrams, to calculate and choose the appropriate machines and components of the fluid power systems of the work machines and installations.

DESCRIPTION OF THE COURSE: The main topics concern: Fluid mechanics – basic terms and quantities, Structure, action and application of the hydraulic and pneumatic fluid power; Hydraulic turbo-machines end turbo-transmissions – structure, action and performances; Hydraulic and pneumatic displacement machines and components – structure, action and performances; Analysis of the hydraulic and pneumatic fluid power systems: systems wits open and close circulation; parallel and series connection of the pumps, motors and directional valves; systems protection against overload; unloading of the pumps; coordination of the motors action; regulation of the motors speed.

PREREQUISITES: Mathematics, Physics, Mechanics, Mechanisms and machines theory, Machine components.

TEACHING METHODS: Lectures, using visual aids, laboratory works in teams with nature and simulation modelling experiments, protocols description, preparation and defence.

METHOD OF ASSESSMENT: examination (one and half -hour in written form after 4th Semester -80% and laboratories- 20%).

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY: 1.Грозев, Г., С. Стоянов, Г. Гужгулов. Хидро- и пневмомашини и задвижвания. София, Техника, 1990; 2.Герц Е. Пневматические приводы. Москва, Машиностроение, 1969; 3.Комитовски, М. Елементи на хидро- и пневмозадвижването. София, Техника, 1985; 4. Prof. PhD Astinov I., Prof. PhD Ilcho Angelov etc. Hydraulic Elements and System Trainer 2 –Bosch Rexroth Group, 2008. 5. Hydraulic in Theory and Practise, Bosch Rexroth Group, Aachen, Germany, 2000.

DESCRIPTION OF THE COURSE

Name of the course **Machine-Building Technology**	Code: **BMEC25**	Semester: **4**
Type of teaching: Lectures and laboratory work Course work	Lessons per week: L – 3 hours; LW – 2 hours	Number of credits: **8**

LECTURER:
Assoc. Prof. Ph.D. E. Sokolov (MBF) – tel.: 965 3439, email: evg_sok@tu-sofia.bg, Assist. Prof. V. Pashov (MBF) – tel.: 965 2980, email: v_pash@abv.bg, Assist. Prof. N. Andreeva (MBF) – tel.: 965 3065, email: nandr@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for the students specialty Machine-Building BEng programme of the Machine-Building Faculty.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are expected to ensure theoretical knowledge and practical skills, necessary for the understanding and implementation of contemporary manufacturing processes and the setting up of manufacturing systems. Special attention is paid to the including of the latest achievements of production automation for manufacturing system purposes.

DESCRIPTION OF THE COURSE: The main topics concern: Metal cutting; Turning and related operations; Milling, broaching and sawing; Grinding and related abrasive-finishing processes; Gear manufacturing; Special machining processes; Numerical control (NC) and computer numerical control (CNC); Introduction to manufacturing systems; Technical resources for manufacturing systems; Design and structuring of manufacturing processes; Elements of manufacturing systems; System approach to manufacturing systems; Examples for operation of on-going manufacturing systems, etc.

PREREQUISITES: Physics, Mechanics, Material Science, Strength of Materials, Machine Elements, Theory of Machines and Mechanisms.

TEACHING METHODS: Lectures, using slides, case studies, laboratory and course work, work in teams, protocols and course work description preparation and defence.

METHOD OF ASSESSMENT: A 2 hours written exam at the end of the term (70%) and course work (30%).

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1. Niebel B. Modern Manufacturing Processes Engineering, McGraw-Hill Book Company, 1989. 2. Amstead D., Ostwald P., Begeman M., Manufacturing Processes, Wiley and Sons, 1989. 3. Wakil S., Processes and Design for Manufacturing, Prentice Hall International, 1991. 4. Lindberg R. A. Processes and Materials of Manufacturing, Allyn and Bacon, 1990. 5. Groover, M. Automation, Production Systems and CIM. Prentice Hall International Inc., 1987. 6. Wo, B. Manufacturing System Design and Analysis. Chapman & Hall, 1992. 7. Lentz Jr., K. Design of Automatic Machinery. Van Nostrand Reinhold Co., 1985.

DESCRIPTION OF THE COURSE

Name of the course **Introduction to Internet programming**	Code: **BMEC28**	Semester: **5**
Type of teaching: Lectures and laboratory work Course work	Lessons per week: L – 2 hours; LW – 3 hour	Number of credits: **8**

LECTURER:

Prof. Ognyan Nakov Nakov Ph.D. (FCSC), tel.: 965 3513, email: nakov@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory course for students in speciality "Mechanical engineering" – bachelor degree in Faculty of Machine Technology of TU-Sofia).

AIMS AND OBJECTIVES OF THE COURSE: Detailed outlook of the course's content: DHTML; script languages: JavaScript/JScript; Dynamic HTML (cascade stylesheets (CSS)); object model and collections; script and events; filters and transitions; data binding; structured graphics; implementation of Active X controls; multimedia effects; ASP (Active Server Pages) technology, basics and comparison with PHP; XML(Extensible Markup Language).

DESCRIPTION OF THE COURSE: The course introduces in modern technologies in Internet programming: JavaScript/ Jscript script language; Dynamic HTML (cascade stylesheets (CSS)); object model and collections; script guiding events; filters and transitions; data binding; structured graphics; implementation of Active X controls; multimedia effects; ASP (Active Server Pages) technology, basics and comparison with PHP; XML(Extensible Markup Language). In practice students get familiar and work with the following products apart from the given above: IE 6; InterDev 6; FrontPage; Paint Shop Pro; Web Servers - IIS, PWS.

PREREQUISITES: Basic programming knowledge.

TEACHING METHODS: Lectures in multimedia; web site with full materials of the course; laboratory work (based on instructions) and course work description preparation and defence.

METHOD OF ASSESSMENT: Written examination with developed individual program.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: Deitel H., Internet & WEB programming, Prentice Hall, 2000. Шурман Е., Dynamic HTML в действие, СофтПрес, 2000. Негрино Т., JavaScript за World Wide Web, ИнфоДар, 2000. WEB Database Development - .NET edition, Microsoft Press, 2002. Sceppa David, Programming ADO, Microsoft Press, 2001. Хоумър А., Професионално програмиране с Active Server Pages, СофтПрес, 2001. Microsoft Corp., SQL Server administration, certification course. A full material site with student&teacher parts - lectures and exercises, distributed with the course, developed by O. Nakov and D. Petrova.

Name of the course **Materials Handling Equipment**	Code: **BMEC30**	Semester: V
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 2 h	Number of credits: 5

LECTURER:
Assoc. prof. Bojidar Grigorov, Faculty of Mechanical Engineering, tel.: 9652670, email: b.grigorov@tu-sofia.bg
Technical University of Sofia
COURSE STATUS IN THE CURRICULUM: Compulsory course for the students of Bachelor degree, specialty Mechanical Engineering at the Faculty of Mechanical Engineering
AIMS AND OBJECTIVES OF THE COURSE: The aim of the course Material handling equipment is for the students to obtain knowledge about the structure, basic parameters, exploitation and functional abilities of the material handling machinery which themselves are used as elements of one logistic material handling system. Such systems are applicable in all areas of economics and material production. The knowledge gained will be of great importance for the right choice, design and exploitation of such equipment in order to ensure quality and reliability of the material handling technologies.

DESCRIPTION OF THE COURSE: Basic topics: The importance of materials handling in industry and all human activities. Classification of the loads and equipment; Technical parameters; Exploitation conditions; Combination of forces; Elements – ropes, chains, sheaves, drums, load attachments, brakes; Jacks, winches, hoists. Cranes – classification, mechanisms, metal frames; Gantry cranes, jib cranes, stationary tower cranes, mobile cranes, hydraulic articulated arms cranes; Belt conveyors, chain conveyors, roll conveyors, shoots; Exploitation, reliability and safety of the materials handling equipment.

PREREQUISITES: Basic knowledge of Mechanics, Strength of Materials as well as of Elements of Machines, Hydraulic and Electrical driving systems.
TEACHING METHODS: Lectures are supplemented by examples and practical tasks which have been solved and applied in the practice. Presentation materials and slides are widely used. At the laboratory works the students take active participation in experimental research projects documented by written reports.
METHOD OF ASSESSMENT: Written exam at the end of the fifth semester.
INSTRUCTION LANGUAGE: English
BIBLIOGRAPHY: 1. Grigorov, B. Lecturer notes. 2. Дивизиев Вл., И. Коларов, М. Проданов, П. Караиванов. Подемно-транспортни машини и системи, С., Техника, 1993. 3. ПЕНКОВ, Б., Подемно-транспортни машини, Габрово, 2006г. 4. Начев, Сл. Машини и съоръжения за непрекъснат транспорт. С., Техника, 1984. 5. Дивизиев Вл., Основи на товароподемните машини, С., Техника, 1987.6. Коларов, И., М. Проданов, П. Караиванов. Проектиране на товароподемни машини, С., Техника, 1986.

Name of the course **Precision and Optical Engineering**	Code: **BMEC31**	Semester: 5
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 2 hours	Number of credits: 5

LECTURER:

Assoc. Prof. Ph.D. I. Kalimanova (MF) – tel.965 3056, email: ikaliman@tu-sofia.bg

Assist. Prof. Ph.D. Mag. Eng. Vladimir Kamenov (MF), 965 2238; vkamenov@tu-sofia.bg

Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for the student's specialty "Mechanical engineering" BEng program of the Mechanical Engineering Faculty.

AIMS AND OBJECTIVES OF THE COURSE: To provide the basic knowledge in the field of optical engineering and opto-mechanical design, exploitation and applying the optical instruments in the field of metrology and industrial engineering, the basic knowledge for appropriate choice of optical methods and instruments for practical problems solutions, as well as information about some promising areas of application of optical equipment and precise mechanisms and systems.

DESCRIPTION OF THE COURSE: The main topics concern: Fundamentals of geometrical optics, photometry and radiometry; Theory of image formation; Coaxial optical systems; Diaphragms in optical systems; Basic optical elements; Basic optical units and systems – principle layout, optical characteristics, applications; Mechanical systems in optical devices – functions, basic parameters and characteristics, Conventional optical measuring methods and devices used in mechanical engineering.

PREREQUISITES: Physics, Mathematics, Material Science, Machine Elements; Theory of Mechanisms and Machines, Electronics.

TEACHING METHODS: Lectures, using slides, laboratory works (work in teams), protocols preparation and defence, solving problems.

METHOD OF ASSESSMENT: One three-hour exam (70%), laboratories (30%), **INSTRUCTION LANGUAGE:** English

BIBLIOGRAPHY: Banerjee P.P., Ting-Chung Poon, Principles of Applied Optics, Irwin,Inc., Boston, 1991; Heavens O. S., R. W. Ditchburn. Insight into optics. Wiley & Sons, Essex, 1991; Optical Methods in Engineering Metrology, Edited by D.C.Williams, Chapman & Hall, 1993, ISBN 0-412-39640-8; Optical transducers and techniques in engineering measurement. Edited by A.R. Luxmoore. Hall, 1993, ISBN 0-412-39640-8; Paul R., P.Yoder, Opto-mechanical systems design, Taylor&Francis, New York, 2006; Вълева Е. А. Техническа оптика. С., "Техника", 1993; Вълева Е. А. Оптични уреди. С., "Техника", 1993; Справочник конструктора оптико-механических приборов., под редакции Панова, Л., "Машиностроение", 1986.

DESCRIPTION OF THE COURSE

Name of the course **Metrology and measuring instruments**	Code: **BMEC33**	Semester: **6**
Type of teaching: **Lectures (L) and Laboratory Works (LW)**	Lessons per week: L– **2** hours; LW- **2** hour	Number of credits: **7**

LECTURER:

Assoc. Prof. Vassil Bogev, PhD (Mech. Eng. Faculty), tel. 965 2898, e-mail: bogev@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for the students specialty "Mechatronics" (in English language) of the Mechanical Engineering Faculty, Bachelor of Engineering degree.

AIMS AND OBJECTIVES OF THE COURSE: To provide students knowledge in metrology and measuring instruments. To train practical skills for work with measuring instruments most widely used in the industry.

DESCRIPTION OF THE COURSE: To give knowledge in metrology, analysis and estimation of the errors in measurement, metrological characteristics and application of measuring instruments. Principles of specification and standardization of measured objects' parameters are discussed, as well as principles interchangeability and modern concepts in quality assurance. Students gain experience in use of measuring instruments and solving practical tasks during laboratory works.

PREREQUISITES: Knowledge in mathematics, physics, mechanics, drawing, machine components, material science.

TEACHING METHODS: Lectures are taught using transparencies, lantern-slides, and video. Students solve individual tasks during laboratory works, as well as individual course works.

METHOD OF ASSESSMENT: Exam after the end of the term. The final mark is formed as follows: the mark of the tests – 60%, labs – 20%, course work – 20%.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:
1. Радев Хр. и др., Метрология и измервателна техника, С., Софттейд, 2008
2. Харт X. Въведение в измервателната техника, С. Техника, 1982
3. Димитров Д., Взаимозаменяемост, стандартизация и технически измервания,
С. Техника, 1982,
4. Радев Хр., Уреди за измерване на линейни и ъглови размери, С., Техника 1989,
5. Димитров Д. и др., Ръководство за лабораторни упражнения по
взаимозаменяемост и технически измервания. С., Техника, 1989
6. Яръмов К., Р. Йорданов, Ръководство за решаване на курсови задачи по взаимозаменяемост, С., Софттрейд, 2007

DESCRIPTION OF THE COURSE

Name of the course **Economics**	Code: **BMEC34**	Semester: **6**
Type of teaching: Lectures and Seminars Course work	Lessons per week: L – 2 hours; S – 2 hour	Number of credits: **5**

LECTURER:
Prof. Ph.D. M. Velev (Faculty of Management) – tel.: 965 2672, email: mvelev@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for the students in specialty "Mechanical Engineering", bachelor degree, Faculty of Mechanical Engineering.

AIMS AND OBJECTIVES OF THE COURSE: The aim of the course is to give students knowlege of the enterprise functioning in market conditions. At the end of this course the students will be able to deal with issues related to the economics of business organizations and also will be familiar with: - the good markets, labor markets and capital markets; - the relations between finance, accounting, marketing, corporate management, international trade and commercial law; - the company economic tools.

DESCRIPTION OF THE COURSE: The main topics concern: Market functioning – theory and technology. Price elasticity types. Marginal analysis and consumer behavior. Production function and its result. Company income, company expenditure and company balance. Market "Labor – wages" prices, market "land - land rent" prices and market "capital-interest-profit" prices; National economy main parameters; Money, banking and monetary equilibrium; Business- cycles, inflation and unemployment – the nature and types; Company capital and investments; Company assets; Company production and delivery costs; Product prices and pricing methods; Product marketing; Finance and financial operations and etc.

PREREQUISITES: Management Theory, Mathematics and Computing

TEACHING METHODS: Lectures - using slides, case studies, seminars –discussions over defined cases and national economic problems

METHOD OF ASSESSMENT: The course ands with an exam. The grade is based on the knowledge of two topics, with equal weighting – 0,5, randomly chosen from the questionnaire.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1**.** Велев Мл., Д.Дончев, И.Димитров, Бизнес икономика, С, Софтрейд, 2003**;** 2. Манлиев, Г. **Микроикономика,** 2008, ИК.КИНГ**;** 3. Велев, Мл., Д. Дончев и Й. Димитров, Икономика на предприятието, С., Сиела, 1998; 4.Велев, Мл.,Г. Маринов,О. Гераскова, Икономика и конкурентоспособ-ност на предприемаческата дейност, „Информаинтелект", С., 2009; 5. Samuelson,P. ECONOMICS (Nobel Prize ineconomics 1970) Massachusetts Institute of Technology & prof.William D.Nordhaus, Yale University Mc-GRAW-HILL INTERNETIONAL EDITIONS TWELFTH EDITION 1985 6.Фишер,С., Р.Дорнбуш, Р. Шмалензи ЭКОНОМИКА (ECONOMICS) "Дело "М 1993 и др.

DESCRIPTION OF THE COURSE

Name of the course: **Reliability of Mechanical Equipment**	Code: **BMEC35**	Semester: **VI**
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; SW – 2 hours	Number of credits: **6**

LECTURER:

Assoc. Prof. D-r Eng. Konstantin Dimitrov, e-mail: kosidim@abv.bg, Dept. of Mechanical Engineering, tel.: 965 3895
Technical University – Sofia

COURSE STATUT IN THE CURRICULUM:

Compulsory for the students of the specialty "Mechanical equipment" (in English) of the Faculty of Mechanical Engineering at Technical University – Sofia, for **Bachelor** educational degree.

AIMS AND OBJECTIVES OF THE COURSE:

The students should be able to obtain the necessary knowledge and to develop the general and the specific approaches, methods and techniques, applied for analysis, evaluation and decision making of reliability in mechanical equipment.

DESCRIPTION OF THE COURSE:

Introduction to reliability engineering. Reliability prediction and modelling – systems reliability models, availability of reparable systems, modular design, block diagram analysis, fault tree analysis, Petri nets, state-space analysis (Markov analysis). Reliability in design – quality function deployment (QFD), Failure modes, effects and critically analysis (FMECA). Reliability of mechanical components and systems. Reliability testing – planning reliability testing, test environments, accelerated tests. Analysing reliability data – Pareto analysis, reliability analysis of reparable systems, exploratory data analysis and proportional hazards modelling. Maintainability, maintenance and availability – preventive maintenance strategy, maintenance schedules, maintainability prediction and demonstration. Reliability management – corporate policy for reliability, integrated reliability programmes, reliability and costs, specifying reliability, contracting for reliability achievement, customer management of reliability.

PREREQUISITES: devices and equipment for measurement, equipment for control and supervision.

TEACHING METHODS:

Lecture course, supported by samples, prospects, slides and posters. The laboratory works are performed on specific experimental platforms and computer modules (specially created for the purpose) and include experiments, evaluation of the obtained data-bases, and development of decision-making procedures.

METHOD OF ASSESSMENT:

Written exam, at the end of the semester.

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY:

1. Dimitrov K.D. , D. Danchev, Reliability of Construction Equipment and Systems, Sofia, Technica, 1994, 1998. (in Bulgarian).
2. Dimitrov, K.D. L. Boullart, Fault Diagnosis and Maintenance of Industrial Systems, UG – Ghent, Belgium, 1997 (in English).
3. Ireson, W.G., etc., Handbook of reliability engineering and management.

DESCRIPTION OF THE COURSE

Name of course	Code: **BMEC36**	Semester: **6**
Automatic Regulation and Control Devices		
Method of teaching: Lectures and laboratory works	Lessons per week: L – 2 h; LW –2 h	Number of credits: 6

LECTURER:

Assoc. Prof. Plamen Petrov, Ph.D., tel.: 965 3271, email: ppetrov@tu-sofia.bg,

Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory course for the students' specialty "Mechanical Engineering" of the Bachelor Engineering program in the Faculty of Mechanical Engineering, TU Sofia

AIMS AND OBJECTIVES OF THE COURSE: The objective of this course is to develop knowledge of the use of linear and nonlinear control theory, computer tools and technical devices for analysis and design of automatic control systems. The aim of the course is to provide both the theoretical background in automatic control and practical skills in using tools such as specialized software and controllers to solve engineering problems in the area of industrial automation.

COURSE DESCRIPTION: The course focuses on basic approaches and methods concerning the analysis and design of linear and nonlinear automatic control systems, dynamic models, trajectory planning, transfer functions, dynamic characteristics, frequency-domain characteristics, controllers, stability criterions and system performance, simulation tools, logic control, specialized software and devices for designing control systems using programmable logic controllers.

PREREQUISITES: This course requires basic knowledge in the field of mathematics, physics, mechanics, and electrical engineering.

TEACHING METHODS: Multimedia presentation of lectures using slides in PowerPoint and clips. Laboratory works using methodological materials designed for Matlab/Simulink, PLC and pick-and-place manipulator - Mitsubishi, wheeled mobile robot Pioneer 3DX.

METHODS OF ASSESSMENT: Written exam with questions covering all course topics (85%) and results from the laboratory works (15%).

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:
1. Golnaraghi, F., Kuo, B., Automatic control systems, J. Wiley&Sons, INC., 2010.
2. Goodwin, G., Graeber, S., Salgado, M., Control system design, Prentice Hall, 2004.
3. Najim, K., Control of continuous linear systems, ISTE Ltd, 2006.
4. Webb, J., Reis, R, Programmable logic controllers: Principle and applications, Prentice Hall, 2002.
5. Ridley, J., Mitsubishi FX programmable logic controllers, Newnes, 2004.
6. Bhattacharyya, S., Datta, A., Keel, L., Linear control theory, Taylor&Francis Group, 2009.

DESCRIPTION OF THE COURSE

Name of the course **Logistics Engineering**	Code: **BMEC37**	Semester: **6**
Type of teaching: **Lectures (L) and Laboratory Works (LW)**	Lessons per week: L– **2** hours; LW- **2** hour	Number of credits: **5**

LECTURER :

Assoc. Prof. Ph.D. Marin Georgiev (MF) , tel.: 9653893; email: mgeor@tu-sofia.bg
Technical University – Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for the students of specialty "Mechanical Engineering" of the Faculty of Mechanical Engineering, Bachelor Engineering degree.

AIMS AND OBJECTIVES OF THE COURSE: The main objective of the discipline "Logistics Engineering" is, that, all students can obtain a necessary knowledge on material flows, logistics structures and networks, storage areas, warehouse logistics and order-picking, some typical technologies for manipulation of various goods, modelling of systems structure and introduction in the field of logistics information technologies, applied in industrial facilities.

DESCRIPTION OF THE COURSE:. The main subjects are: elements of logistics systems (conveyor elements, fork, join elements); models of material flow networks using graph theory and matrices; queuing models, simulation of logistics systems; warehousing and order-picking; transport technology chains in logistic networks; identification of handling units; logistics systems control.

PREREQUISITES: Some preliminary background knowledge in the field of the courses of lecture in engineering mathematics from the first end second year of study is needed.

TEACHING METHODS: The lecture course is developed with application of photos, tables and drawings. The laboratory practice is developed with application of typical methodologies and computer programs.

METHOD OF ASSESSMENT: Evaluation by continuous assessment based on two tests in writing form during the semester.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:

1. Arnold, D., Furmans,K. Materialfluss in Logistiksystemen, Springer Verlag 2005;
2. Петков, Г., Подемно-транспортни процеси и системи в промишлеността, Техника, 1987; 3.Gudehus,T. Logistik: Grundlagen, Strategien, Anwendungen Springer V.,Berlin,2006;
4. Ghiani at.al. Introduction to logistics systems planning and control, Wiley, NY, 2004

DESCRIPTION OF THE COURSE

Name of the course **Quality Inspection and Management**	Code **BMEC39**	Semester: 7
Type of teaching: Lectures laboratory work	Lessons per week: L – 2 hours; LW – 2 hours	Number of credits: 5

LECTURER:
assistant prof. Ph.D. Eng. V.Kamenov (FME) - tel.9652238, email: vladokamenov@tu-sofia.bg, Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Fundamental for the students of the "Mechanical Engineering" in English speciality at the Faculty of Mechanical Engineering - TU-Sofia for the Bachelor degree of Science.

AIMS AND OBJECTIVES OF THE COURSE: The aim of this course is to introduce the students in the subject of Quality Management through modern conceptions, methods and tools for quality control of products, processes, people and environment.

DESCRIPTION OF THE COURSE: The students are introduced to the general descriptions and characteristics of quality, with the modern visions for its management and the strategy for Total Quality Management (TQM). In this course are presented the types of product and process control, control methods and organization, statistical methods for control and management of the processes, as well as the basic methods and instruments for quality analysis and management. Legislation is presented and the implementation and the quality of products and management systems.

PREREQUISITIES: Basic knowledge of Metrology and Statistic is necessary.

TEACHING METHODS: Lecturers are teaching with visual materials, models, panels and slides. Laboratory works are realized with instructions from the teacher. Protocols are made by the students and then checked by a teacher. The laboratory works give the practical side of comprehension of the lectures. The experiments confirm base theoretical conclusions made in lectures.

METHOD OF ASSESMENT: A Course work and a written exam at the end of the 7th semester.

INSTRUCTION LANGUEAGE: English

BIBLIOGRAPHY:
1. Dukendjiev G., Jordanov R., Quality Control, Softtrade, Sofia, 2002
2. Jordanov R., G.Dukendjiev, Methods of Quality Control, Soft trade, Sofia, 2001
3. Dukendjiev G., Computer Aided Quality, Soft trade, Sofia, 2001, ISBN 954-9725-48-0
4. Arnold R., Bauer C., Qualitaet in Entwiclung und Konstruktion, Verlag TUV Rhainland, Koeln, 1992.
5. Dale B.G., Managing Quality. Prentice Hall., N.Y., 1994
6. Hering E., J.Jrimel, H. Blank, Qualitaetsmanagement fuer Ingenieure, VDI-Verlag, Duesseldorf, 1999
7. Juran J.M., F.M. Gryna., Quality Planning and Analysis, Mc Graw - Hill, N.Y., 1993.

DESCRIPTION OF THE COURSE

Name of the course**: Modeling and Simulation of Systems in Mechanical Engineering**	Code: **BMEC42a**	Semester: 7
Type of teaching: Lectures and laboratory work	Lessons per week: L – 3 h; LW – 2 h	Number of credits: 8

LECTURERS:

Asoc. Prof. Pancho Tomov, PhD (FME) - tel.: 965 2980, e-mail: pkt@tu-sofia.bg, Asoc. Prof. Vanya Georgieva Ph.D. (FME), tel.: 965 2549, e-mail: vgeorgieva@tu-sofia.bg

Technical University of Sofia

COURSE STATUS IN THE CURRICULUM:

Optional course for students of the Bachelor program of Mechanical Engineering, ELDE, Technical University Sofia.

AIMS AND OBJECTIVES OF THE COURSE:

Aim of this course is to provide mechanical engineering students of the Bachelor program Mechanical Engineering, ELDE with basic knowledge about the methodology, technology and methods for modeling and simulation of various production systems.

DESCRIPTION OF THE COURSE:

The course teaches: methods for formalization of information, needed in the modeling and simulation process; methods for parametrical and structural optimization; model varieties and their building; procedures for choosing optimal decisions; modern instruments for simulation modeling , e. g. Petrie's networks, neuron nets etc.; methods for static and dynamic engineering analysis and related software packages. Given are examples of modeling and simulation of production systems with the relevant software packages, which perform those processes.

PREREQUISITES:

The subject requires basic computer skills and knowledge of functional principles of production systems in order to allow their efficient design and to perform engineering analyses for their different variety.

TEACHING METHODS:

Lectures supported by visual means (multi-media applications, video- and CD films, simulation, animation, overhead projectors etc.). Laboratory work conducted in special facilities equipped specialized software and following written Guidelines.

METHODS OF ASSESSMENT:

The results from the laboratory work are taken into consideration. At terms end a written examination must be passed by all students according to a unified testing and evaluation system based on point assessment. Open tests including questions with different level complexity are also used in the assessment procedure.

INSTRUCTION LANGUAGE: English

BIBLIOGRPHY:

1. Theory of Modeling and Simulation, Second Edition Bernard P. Zeigler, Herbert Praehofer and Tag Gon Kim (Jan 24, 2000)
2. *Simulation Modeling and Analysis* (Fourth Edition) Averill M. Law, Ph.D. McGraw-Hill, 2007
3. ***Simulation Modeling and Analysis with ARENA Altiok, T. and Melamed, Benjamin Elsevier: Amsterdam, 2007 ISBN 0123705231***

Name of the course: **Non-destructive testing**	Code: **BMEC42d**	Semester: VII
Type of teaching: Lectures and laboratory work	Lessons per week: L – 3 hours; LW – 2 hour	Number of credits : 8

LECTURER:
Associate Prof. PhD Bogomil B. Yochev Technical University - Sofia, ME, department "Machine Elements and Non – Metal Materials", tel. 965 3197, e-mail: yochev@tu-sofia.bg

COURSE STATUS IN THE CURRICULUM: Subject for regular and correspondence "Mechanical Engineering" students, faculty of Mechanical Engineering – Technical University of Sofia, educational-qualification degree "Bachelor".

AIMS AND OBJECTIVES OF THE COURSE: The aim of the subject is to present the students with the modern non-destructive testing methods. The students acquire skills to choose alternative non-destructive testing methods or combination of them considering the material type, geometry considerations and exploitation conditions. Habits for reduction the influence of the subjective factors are acquired.

DESCRIPTION OF THE COURSE: The content of the lecturing material gives the students enough knowledge and skills on the basic non-destructive testing methods for initial, inter processing and final control of materials, assembly structures and equipment. The students gain specific skills in choosing the most suitable method or group of methods for the solution of a particular practical problem.

PREREQUISITES: Basic knowledge of metal science, polymer science, general material science, physics.

TEACHING METHODS: *Lectures* – with additional illustrating printed materials, tables, diagrams and modern electronic products.

Laboratory experiments – Acquire practical skills in the application of ultrasonic, radiographic, eddy current, dye penetrant and magnetic particle testing methods. Acquire practical skills in using the standardization documents and especially the EN norms.

METHOD OF ASSESSMENT: Exam at the end of term

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:

1. Крауткремер Ю. Х., Ултразвуков контрол на материалите, Шпрингер, 1983
2. Румянцев С. В., Радиационная дефектоскопия, Атомиздат, Москва, 1974
3. Лущейкин Г.А., Методы исследования электрических свойств, Москва, Химия, 1988
4. Прохоренко П.П., Мигун Н.П., Введение в теорию капилярного контроля, Минск, Наука и техника, 1988
5. Клюев В.В., Приборы для неразрушающего контроля, Москва, Машиностр.,1986
6. Скордев А., Бъчваров И., Маринов К., Безразрушителен контрол, София, Техника,1986

DESCRIPTION OF THE COURSE

Name of the course: **Automated Manufacturing Systems**	Code: **BMEC45**	Semester: **8**
Type of teaching: Lectures and laboratory work Course work	Lessons per week: L – 3 hours; LW – 2 hours	Number of credits: **6**

LECTURER:

Assoc. Prof. Ph.D. G. Hagjikossev, (MF) – tel.: 965 2766, e-mail: genoh@tu-sofia.bg, Chief Assist. Ph.D. St. Nikolov, (MF) – tel.: 965 3765, e-mail: st_nikolov2@abv.bg.
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory general trading for the student's specialty Mechanical Engineering studding in English language B Eng programme.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are accepted to know the main principles of flexible automation systems and compound subsystems and to know how to develop manually and using computers the programs for Computer Numerical Controlled (CNC) machines.

DESCRIPTION OF THE COURSE: Flexible automation, automated manufacturing systems, system approach and analysis; The main principles of Numerical Control; Programming for CNC machines, terminology and based commands; Manual programming with some base commands; Manual programming for different CNC machines; Dialog, Computer and Parametric programming; NC machines; CNC manufacturing technology: Flexible manufacturing structures.

PREREQUISITES: Knowledge of Fundamentals of Design and CAD, Machine elements, Technology of mechanical engineering and Engineering metrology.

TEACHING METHODS: Lectures, using slides and multimedia, laboratory and protocols, defence of protocols.

METHOD OF ASSESSMENT: written exam using well accepted point evaluation system.

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY: Bedwort D., P. Henderson, M. Wolf, Computer Integrated Design and Manufacturing. Mc Grow-Hall, Inc USA, 1991; Goetsch, D.L., Modern Manufacturing Processes, Delmar Publications inc., USA, 1991, Timings R.L., Manufacturing Technology, Volume 1, Longman Scientific Technical, UK, 1993, Sinumeric 802 D sl Operating and Programming Turning, 01.2005, Siemens, Erlanger, Germany, Lynch M., Parametric Programming for CNC Machine Tools and Touch Probes, SME, Michigan, USA, 2004, Smid P., CNC Programming Handbook, Industrial Pres, 2007, USA., Steve Krak, Arthur Gill, Computer Numerical Control Programming Basics, Industrial Press inc. ,New York, 1999, Suk-Hwan Suh, Seong-Kyoon Kang, Dae-Hyuk Chung, Ian Stroud, Theory and Design of CNC Systems, Springer, ISBN 978-1-84800-335-4, 2008

DESCRIPTION OF THE COURSE

Name of the course: **Logistics of Material Handling and Warehouse Processes**	Code: **BMEC46b**	Semester : VIII
Type of teaching: Lectures and laboratory work:	Lessons per week: L - 3 hours; LW - 3 hours	Number of credits: 7

LECTURER:
Assoc.Prof.D-r.Eng.Nicolay Kazakov, (FME), tel.: 965 2892,
Assoc. Prof. D-r Eng.Konstantin Dimitrov, (FME),
Technical University - Sofia,

COURSE STATUS IN THE CURRICULUM:
The discipline might to be chosen from the students, of the specialty : "Machinery and device manufacturing", from the Dept. of Mechanical Engineering", TU-Sofia, for obtaining a "**bachelor's**" degree.

AIMS AND OBJECTIVES OF THE COURSE:
All essential knowledge, concerning some particular logistics technologies and systems, applied in the domain of Storage system, warehouse equipment and warehouse technologies, strategies and management, as well as in the area of inter-plant transport systems and international warehousing are developed in this discipline. All necessary logistics activities, that must be developed during the material handling processes, delivery schedules and macro-system's interactions, financial dimensions of warehousing are also presented in the discipline.

DESCRIPTION OF THE COURSE:
The main objective of the discipline "Logistics of material handling and warehouse processes" is to provide all necessary knowledge, needed from the future engineers, which want to develop their skills in the area of design, exploitation and control of material handling and warehouse logistics systems.

PREREQUISITES:
Some preliminary background knowledge in the field of : engineering logistics, material handling and warehouse equipment is needed.

TEACHING METHODS:
The lecture course is developed with application of many photos, tables, drawings and computer models.

METHOD OF ASSESSMENT:
Written exam.

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY: Дивизиев, Вл., Ив. Коларов, М. Проданов, П. Караиванов. Подемно-транспортни машини и системи. С., Техника, 1994.Казаков Н.Логистика.С.Софтрейд.2000.Петков, Г., Подемно-транспортни процеси и системи в промишленоста, С., Т, 1994; Смехов, А.Н, Автоматизация на складах, М., М, 1996; Bowersox, D., Logistical Management, New York, Mac Milan and Co, 1998.Jessop, D., Storage and Supply of Materials, London ,Pitmann, 1993.Askin, R.G., etc., Modeling and Analysis of Manufacturing Systems, John Willey and sons., 1998. Gourgan, M. etc., Modelisation des systemes a flux discretes, UG, Grenoble, 1992

Name of the course: **Office equipment**	Code: **BMEC46c**	Semester: **8**
Type of teaching: Lectures, laboratory work	Lessons per week: L - 3 hours, LW – 3 hours	Credits: **7**

LECTURER:
Assist. Prof. Vladimir Vasilev Kamenov, Technical University of Sofia, Mechanical engineering faculty, Department of Precision Engineering and Measuring Instruments, phone: 965 2238

COURSE STATUS IN THE CURRICULUM:
Optional for the students specialty "Mechanical engineering" in English, Bachelor's degree.

AIMS AND OBJECTIVES OF THE COURSE:
The purpose of the tuition is to introduce students to contemporary office equipment, their specifications and design. On this basis the students are familiarized with different methods for practical engineering and design, using modern mechatronic approaches.

DESCRIPTION OF THE COURSE:
To familiarize students with mechatronic devices used in modern office environment. It is stressed on devices used as peripheral devices for computers. Some of them are: printers, plotters, multifunctional devices and office security systems.

PREREQUISITES:
Knowledge in mathematics, physics, mechanics, drawing, machine components, optics, theory of machines, material science.

TEACHING METHODS:
Lectures are taught using transparencies, multimedia presentations and video. During laboratory works students solve individual tasks, connected with the design and examination of typical office equipment devices, using laboratory stands and software.

METHOD OF ASSESSMENT:
Written exam at the end of the 8th semester using the official Bulgarian grading system.

INSTUCTION LANGUAGE; English

BIBLIOGRAPHY:
1. Ricoh Basic Digital Imaging and Scanning Textbook – Ricoh corporation, 2005;
2. Офис техника – лекционни записки, Каменов В., English edition, 2008;
3. Ricoh The Core Technology manual – Ricoh corporation 2007;
4. Охранителна техника – лекционни записки, Каменов В., English edition, 2010;
5. Canon - HOPE Theory Course – lectures course, Canon Corporation, 2001;
6. www.startcopy.ru ;
7. http://www.canon.com/technology/ .