DESCRIPTION OF THE COURSE

Name of the course: **Thermodynamics and Heat Transfer**	Code: **BASEe11**	Semester: **III**
Type of teaching: Lectures (L) Laboratory work (LW)/Seminars (S)	Hours per semester: L – 30 hours S – 15 hours LW – 15 hours	Number of credits: **6**

LECTURER(S):
Assoc. Prof. Konstantin Shushulov, PhD (FPEPM), tel.: 965 2239, e-mail: koko@tu-sofia.bg
Assist. Prof. Borislav Stankov, PhD (FPEPM), e-mail: bstankov@tu-sofia.bg
Assist. Prof. Momchil Vassilev, PhD (FPEPM), e-mail: momchil@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory course in the curriculum of the bachelor's degree program in Aerospace Engineering, professional orientation 5.5 Transport, Navigation and Aviation, field 5 Technical Sciences,

AIMS AND OBJECTIVES OF THE COURSE: To teach students the basic principles of classical thermodynamics, the principle of operation of common energy conversion technologies, the modes of heat transfer and the related governing equations; To train students in the use of thermodynamic and transport properties of substances; To train students to identify, formulate, and solve engineering problems involving energy conversion and transfer processes.

DESCRIPTION OF THE COURSE: The covered topics include: concepts and definitions (closed and open systems, thermodynamic equilibrium, parameters of state, concept and forms of energy, heat, work, enthalpy); the first law of thermodynamics (energy balance of control mass and control volumes); thermodynamic properties of substances (phases and phase changes, property diagrams, evaluating properties, ideal gas, real gas and incompressible substance models); entropy and the second law of thermodynamics (second law statements, reversible and irreversible processes, concept of entropy, entropy equations, entropy balances); power cycles; refrigeration and heat pump cycles; heat transfer via conduction, convection and thermal radiation (physical origins and rate equations).

PREREQUISITES: The course requires previous knowledge in mathematics (single and multivariable calculus) and general physics.

TEACHING METHODS: The lectures include slide presentations. Students have access to lecture notes and other course materials through an online learning management system (Moodle). The laboratory exercises involve the use of specialized software.

METHOD OF ASSESSMENT: Student grading is based on a points system with three components: (1) final exam including both theoretical and problem-solving questions; (2) homework assignments; (3) grades for the laboratory exercises which involve solving more complex problems by means of the specialized software.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1. Moran, M., Shapiro, H., Boettner, D, & Bailey, M. (2018). *Fundamentals of engineering thermodynamics*, 9th ed. Hoboken, NJ: Wiley; 2. Bergman, T., & Lavine, A. (2017) *Fundamentals of heat and mass transfer*, 8th ed. Hoboken, NJ: Wiley; 3. Jaffe, R., & Taylor, W. (2018). *The Physics of Energy*. Cambridge: Cambridge University Press. doi:10.1017/9781139061292.

DESCRIPTION OF THE COURSE

Name of the course: **Advanced Mathematics III**	Code: **BASEe12**	Semester: **III**
Type of teaching: Lectures (L) Seminars (S) Laboratory work (LW)	Hours per semester: L – 15 hours S – 30 hours LW – 15 hours	Number of credits: **6**

LECTURER(S):

Assoc Prof. Aleksey Nikolov, PhD (FAMI), tel.: 965 3341, e-mail: ajn@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty Aerospace Engineering, Professional orientation 5.5 Transport, shipping and navigation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are expected to be able to find extrema of a function of two variables, to calculate double and integrals, to work with numerical series and power series, to expand a function into Fourier series.

DESCRIPTION OF THE COURSE: The main topics concern: Differential and Integral calculus of functions of two variables, numerical series, power series, Fourier series.

PREREQUISITES: Mathematics I & II.

TEACHING METHODS: Traditional lectures and tutorials as well as interactive lessons using multimedia, labs using Matlab and Maple software.

METHOD OF ASSESSMENT: Continuous assessment over the self-study, coursework.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:

1. Л.Бояджиев, О.Каменов, Висша математика 3, СИЕЛА, София, 2002.
2. Т. Д. Тодоров, Учебник по висша математика втора част, ЕКС-ПРЕС, 178 стр., 2020.
3. Prodanova K., Lectures Notices in Statistics, TU-Sofia, 2008.
4. И. Проданов, Н. Хадживанов, И. Чобанов, Сборник от задачи по диференциално и интегрално смятане, СОФТЕХ, София, 2006.
5. Л. Петров, Д. Беева, Модули 4, 5, София, 2007.

DESCRIPTION OF THE COURSE

Name of the course: **Engineering Mechanics II (Dynamics)**	Code: **BASEe13**	Semester: **III**
Type of teaching: Lectures (L) Laboratory work (LW) Course work (CW)	Hours per semester: L – 30 hours S – 30 hours LW – 0 hours	Number of credits: **6**

LECTURER(S):
Prof. Eng. Ivan Kralov, PhD, DSc (FT), tel.: 965 2540, e-mail: kralov@tu-sofia.bg
Assist. Prof. Eng. Ivo Angelov, PhD (FT), tel. 965 2234, e-mail: i.angelov@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty "Aerospace Engineering in English", Faculty of Transport, Professional Field 5.5 Transport, Navigation and Aviation, Field of Higher Education 5. Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: To introduce to students the main laws of the Classical Mechanics as well as the methods for mechanical modelling, solving and analysing of the typical mechanical systems.

DESCRIPTION OF THE COURSE: The course includes main axioms and laws of the Classical Mechanics. There are proofs and explanations of the basic theorems and rules of the Statics and Kinematics. Students acquire common knowledge about the methods and their application for solving problems in Mechanics.

PREREQUISITES: Advanced Mathematics I, Advanced Mathematics II, Engineering Mechanics I.

TEACHING METHODS: Lectures, using PowerPoint slides and demo programs, seminar work and self-preparing.

METHOD OF ASSESSMENT: Two written tests during the term (each of 25% inclusion), ad final test during exam session (50% inclusion).

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY: 1. Buchvarov, S., Mechanics I – Statics, TU-Sofia, Sofia, 2007; 2. Kralov, I., Mechanics. Part I – Statics & Kinematics, 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. Kralov, I., I. iIgnatov, C. Velkova, T. Zhelyazov, Course for solving problems in Mechanics II – Dynamics, TU-Sofia, Sofia, 2015; 6. Johanson, Beer, Vector Mechanics for Engineers, part I and II, McGrawHill, USA, 1995.

DESCRIPTION OF THE COURSE

Name of the course: Aerospace Materials Science and Processing (1)	Code: **BASEe14**	Semester: 3
Type of teaching: Lectures (L) Seminars work (SW)	Hours per semester: L – 30 hours S – 30 hours	Number of credits: **6**

LECTURER(S):
Prof. Eng. Valentin Kamburov, PhD (FIT), tel.: 965 2690, e-mail: vvk@tu-sofia.bg
Assoc. Prof. Eng. Anton Mihaylov, PhD (FIT), tel.: 965 2712, e-mail: amm@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty "Aerospace Engineering in English", Faculty of Transport, Professional Field 5.5 Transport, Navigation and Aviation, Field of Higher Education 5. Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The aim of the course is to provide knowledge and skills for students about the relationships between the structure and fundamental behaviour of all classes engineering materials (metals, ceramics, polymers and composites), as well as the essence of the main manufacturing engineering and technology processes, to developed basic skills for process simulation and materials selection in aerospace design, respectively to predict the behaviour of materials depending on the impact of their environment and use them creative to solve engineering problems.

DESCRIPTION OF THE COURSE: Main topics: Atomic and molecular arrangements, crystal structures and microstructures; Mechanical properties of engineering materials; Metals and Alloys; Ceramics and glasses; Polymers and composites; Electronic and magnetic materials; Selection of materials in aerospace industry; Heat and case treatment; Casting processes; Joining processes; Forming and shaping processes; Processing polymers; Powder metallurgy; Process simulation, etc.

PREREQUISITES: Physics, Engineering Chemistry, Advanced Mathematics I, Advanced Mathematics II,

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

METHOD OF ASSESSMENT: Written exam (test) and two current assessments in the semester (70% in total), Seminars work (30%)

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY: 1. William D. Callister Jr., David G. Rethwisch, Materials Science and Engineering: An Introduction, 8th Edition, ISBN-10 0470419970; 2. Shackelford J., Muralidhara M., Materials Science for Engineers, Pearson Education, Sixth edition, 2007; 3. Kalpackjian S., Schmid S., Manufacturing Processes for Engineering Materials, Prentice Hall, Fifth edition, 2008; 4. Ashby M., Materials Selection in Mechanical Design, Cambridge University, England, 2012..

DESCRIPTION OF THE COURSE

Name of the course: **Aerospace Structures and Elements 1**	Code: **BASEe15**	Semester: 3
Type of teaching: Lectures (L) Seminar (S) Course work (CW)	Hours per semester: L – 15 hours S – 30 hours LW – 0 hours	Number of credits: 5

LECTURER(S):

Assoc. Prof. Valentin Iliev, PhD (FT), tel.: 965 2033, e-mail: v.iliev@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty "Aerospace Engineering in English", Faculty of Transport, Professional Field 5.5 Transport, Navigation and Aviation, Field of Higher Education 5. Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The aim of the course is to acquire fundamental knowledge for elements of aerospace structures, main laws of interactions between them, abilities to analysis of stress and deformable state of elements and whole structures.

DESCRIPTION OF THE COURSE: Main topics: trusses and truss frames, bending, shear and torsion of thin-walled beams, plates and shells, stability of thin-walled structures, sandwich structures, displacements in thin-walled structures, fatigue life prediction.

PREREQUISITES: Engineering Mechanics I, Engineering Mechanics II, Strength of Materials and Machine Elements Design, Aerospace Materials Science and Processing (1).

TEACHING METHODS: Lectures, using slides, case studies, seminars and course work preparation and defence.

METHOD OF ASSESSMENT: Two written test (50%), computer tests (20%), course work (30%)

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY:
1. Wijker J.J., Spacecraft Structures, Springer-Verlag Berlin Heidelberg, 2008. 2. Alderliesten R., Introduction to aerospace structures and materials, Delft University of Technology, 2018. 3. Bauchau O., Craig J., Structural Analysis with Applications to Aerospace Structures, Springer Dordrecht, 2009. 4. Flabel J.-C., Practical Stress Analysis for Design Engineers. Design & Analysis of Aerospace Vehicle Structures, Lake City Publishing Company, 1997. 5. Brown C, Elements of Spacecraft Design, AIAA, Reston, Virginia, 2002. 6. Kassapoglou C., Design and Analysis of Composite Structures.

DESCRIPTION OF THE COURSE

Name of the course: **Fluid Mechanics**	Code: **BASEe16**	Semester: 4
Type of teaching: Lectures (L) Laboratory work (LW) Seminars (S)	Hours per semester: L – 30 hours S – 30 hours	Number of credits: 6

LECTURER(S):
Prof. Eng. Angel Terziev, PhD (PEPM), tel.: 965 3443, e-mail: aterziev@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty “Aerospace Engineering in English”, Faculty of Transport, Professional Field 5.5 Transport, Navigation and Aviation, Field of Higher Education 5. Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: "Fluid Mechanics" is a basic, mandatory fundamental course for the "Aerospace Engineering" major. The main objective is to give students basic knowledge of the mechanics of continuous media (liquids and gases) necessary for mastering the subsequent theoretical and applied disciplines. The main relations of fluid mechanics are studied, including high speed compressible flows. This course covers basic topics in the fields related to aerospace engineering.

DESCRIPTION OF THE COURSE: Main topics to be covered in the course: Basic realtions of the mechanics of continuous media; Hydrostatics; Kinematics; Dynamics of ideal (viscous-free) fluids; Introduction to Compressible Flows; High speed Flows; Dynamics of viscous fluids; Boundary layer; Hydraulic losses; Aerodynamics (aerodynamic forces and coefficients); Rocket aerodynamics.

PREREQUISITES: Mathematics, Physics, Mechanics.

TEACHING METHODS: The lectures include developed multimedia materials with digital and interactive content, and via the platform (Moodle) students get access to developed lecture materials. Seminar exercises include solving various engineering tasks from the field.

METHOD OF ASSESSMENT: The evaluation is based on a pre-announced point system of two components: (1) a written exam that includes theoretical questions and problem solving; (2) assessment from exercises that involve solving practical problems

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY: 1. Munson B., and etc., *Fundamentals of Fluid Mechanics*, International Adaptation, 9. Edition (28 Jun. 2021); 2. White F., H. Xue, *Fluid Mechanics*, McGraw-Hill Higher Education; 9th edition (November 10, 2020); 3. Ames F., C. Tang, *An Introduction to Compressible Flows*, CRC Press; 2nd edition (July 15, 2021); 4. Anderson J., *Modern Compressible Flow: With Historical Perspective*, Generic; 4th Edition (January 1, 2021).

DESCRIPTION OF THE COURSE

Name of the course: **Aerospace Materials Science and Processing (2)**	Code: **BASEe17**	Semester: 4
Type of teaching: Lectures (L) Laboratory work (LW) Course work (CW)	Hours per semester: L – 30 hours S – 30 hours LW – 0 hours	Number of credits: **6**

LECTURER(S):
Prof. Ph.D. G. TODOROV (FIT), tel.: 965 2574, e-mail: gdt@tu-sofia.bg, Assist Prof. Eng. Tsvetozar Ivanov, PhD (FIT), tel. 965 2574, e-mail: ts.ivanov@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty "Aerospace Engineering in English", Faculty of Transport, Professional Field 5.5 Transport, Navigation and Aviation, Field of Higher Education 5. Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: is to provide students with knowledge of technological possibilities of the basic methods for cutting, additive and replication manufacturing; knowledge and practical skills for providing the required quality at minimum cost; to analyze and design production processes.

DESCRIPTION OF THE COURSE: In the course special attention is paid to questions connected with the main technological methods, machines, tools and processes for cutting, additive and replication technologies. Last course chapter is oriented towards contemporary systems for enterprise resource planning and lifecycle management as well as for supply chain management. The laboratory exercises are consistent with the existing facilities of the Department of PTS of Faculty of Industrial Technology (FIT)..

PREREQUISITES: Mathematics, Physics, Mechanics. Material Science..

TEACHING METHODS: Lectures are presented using slides. Also there is a corresponding regularly updated script. The laboratory work is fully computer-based with a corresponding to the given problem manual.

METHOD OF ASSESSMENT: The acquired knowledge during the laboratory work is assessed with a computer test. A written exams (by test) during the 3-rd semester..

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY:
1) Dikov A. Technology of mechanical engineering. S., ed. Softtrade, 2006

2) Todorov G., K. Kamberov, Virtual engineering, Direct Services, S., 2015

3) Todorov G., G. Nikolcheva, Computer design and rapid production of complex forming tools (injection molds) RAPID TOOLING, S., 2013

4) Todorov, G., G. Nikolcheva, P. Hadjiyski, St. Galabov, D. Daskalova. Technologies and machines for high-speed milling, Izd. TU Sofia, Sofia 2010, ISBN 978-954-438-873-7, 320 pages.

DESCRIPTION OF THE COURSE

Name of the course: **Aerospace Structures and Elements 2**	Code: **BASEe18**	Semester: 4
Type of teaching: Lectures (L) Seminar (S)	Hours per semester: L – 15 hours S – 30 hours LW – 0 hours	Number of credits: 5

LECTURER(S):

Assoc. Prof. Valentin Iliev, PhD (FT), tel.: 965 2033, e-mail: v.iliev@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty "Aerospace Engineering in English", Faculty of Transport, Professional Field 5.5 Transport, Navigation and Aviation, Field of Higher Education 5. Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The aim of the course is to acquire fundamental knowledge for materials used in aerospace structures, their loads, main structural elements, principles of design.

DESCRIPTION OF THE COURSE: Main topics: material physics, properties and types, design and safety factors, spacecraft design loads, aircraft & spacecraft structures, considering strength & stiffness, design & certification, structural joints.

PREREQUISITES: Engineering Mechanics I, Engineering Mechanics II, Strength of Materials and Machine Elements Design, Aerospace Materials Science and Processing (1), Aerospace Materials Science and Processing (2), Fluid Mechanics (+Aerodynamics).

TEACHING METHODS: Lectures, using slides, case studies, seminars and home works.

METHOD OF ASSESSMENT: Written exam (50%), computer tests (20%), home works (30%)

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY:
1. Wijker J.J., Spacecraft Structures, Springer-Verlag Berlin Heidelberg, 2008. 2. Alderliesten R., Introduction to aerospace structures and materials, Delft University of Technology, 2018. 3. Bauchau O., Craig J., Structural Analysis with Applications to Aerospace Structures, Springer Dordrecht, 2009. 4. Flabel J.-C., Practical Stress Analysis for Design Engineers. Design & Analysis of Aerospace Vehicle Structures, Lake City Publishing Company, 1997. 5. Brown C, Elements of Spacecraft Design, AIAA, Reston, Virginia, 2002. 6. Kassapoglou C., Design and Analysis of Composite Structures. With Applications to Aerospace Structures, John Wiley & Sons, Chichester, 2010.

DESCRIPTION OF THE COURSE

Name of the course: **Communication and navigation systems I (in space)**	Code: **BASEe19**	Semester: **4**
Type of teaching: Lections (L), Tutorials (T)	Hours per semester: L – 30 hours S – 30 hours	Number of credits: **6**

LECTURER(S):

Доц. д-р инж. Петър Петков (ФТК), тел.: 965 2870, , e-mail: pjpetkov@tu-sofia.bg
Гл. ас. д-р инж. Ивайло Начев (ФТК), tel.: 965 1260, e-mail: ivaylonachev@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty "Aerospace Engineering in English", Faculty of Transport, Professional Field 5.5 Transport, Navigation and Aviation, Field of Higher Education 5. Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The aim of the course is to present fundamental knowledge in the field of excitation and propagation of electromagnetic waves, antenna and transmission lines, wireless transmission of energy and information, modulations, transmitters and receivers, and their specifics in space applications for communication, remote sensing and navigation.

DESCRIPTION OF THE COURSE: Main topics: Electromagnetic spectrum and excitation of electromagnetic waves; Basic laws of propagation and refraction; Influence of the atmosphere and ionosphere on wave propagation; Transmission lines; Fundamental principles of antennas; Antenna parameters, Antennas for frequency bands used in space communications; Friis transmission equation and radar equation; Antenna arrays; Modulations, devices for transmission and reception of EM waves; Fundamental principles of satellite navigation.

PREREQUISITES: Advanced Mathematics I, Advanced Mathematics II, Engineering Computer Science I.

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

METHOD OF ASSESSMENT: Two writtens tests - mid and end of the semester (70%), seminar exercises (10%), course work (20%).

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY: 1. Dennis Roddy, Satellite Communications, Fifth Edition,5th Edition, 2024, ISBN: 978126537254; 2. G. Maral, M. Bousquet, Z. Sun, Satellite Communications Systems: Systems, Techniques and Technology, Sixth Edition, Willey, 2020, ISBN:9781119673811; 3. William Hayt and John Buck, Engineering Electromagnetics, 9th Edition, 2019, ISBN: 9780078028151; 4. T. Jade Morton et al, Position, Navigation, and Timing Technologies in the 21st Century: Integrated Satellite Navigation, Sensor Systems, and Civil Applications, 2021, ISBN: 9781119458418; 5. Teresa M. Braun, Walter R. Braun, Satellite Communications Payload and System, 2021, ISBN:9781119384311.

DESCRIPTION OF THE COURSE

Name of the course: **Circuits, Signals and Systems**	Code: **BASEe201**	Semester: 4
Type of teaching: Lectures (L) Laboratory work (LW)	Hours per semester: L – 30 hours LW – 30 hours	Number of credits: 6
Course project (CP)	Code:	Number of credits: 0

LECTURER(S):
Assoc. Prof. A. Ichtev, PhD, (FA), tel.: 965 2420, e-mail: ichtev@tu-sofia.bg
Assos. Prof. G. Ruzhekov, PhD (FA), tel.: 965 2470, e-mail: ruzhekov@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for students in the Aero-Space Engineering BEng program of the Faculty of Transport at Technical University of Sofia.

AIMS AND OBJECTIVES OF THE COURSE: The course aim is to provide students with basic knowledge of circuits; basic methods for digital signal and data processing; continuous as well as discrete system are discussed. Attention is played on the application in control systems. Several system's descriptions are provided, their discretization is performed, stability analysis is conducted; methods for digital filtering and signal modulation are discussed.

DESCRIPTION OF THE COURSE: The course "Circuits, Signals and Systems" is compulsory for the students in the bachelor program "Aero-Space Engineering". It provides a basic knowledge regarding circuits, signals and their characteristics; statistical characteristics of a signal; description of a linear systems with transfer functions as well as in state space; signals transformations in linear continuous systems; Furrier series and Furrier transform of continuous signals; discretization by time as well as by level, analog to digital and digital to analog converters and their characteristics; Z-transform; discrete linear systems; Furrier transform of discrete systems; stability analysis of continuous and discrete systems; frequency response characteristics for stability; signal modulation; digital filtering.

PREREQUISITES: General knowledge in Mathematics and Physics.

TEACHING METHODS: Lectures, using slides, laboratory exercises with reports preparation and defense.

METHOD OF ASSESSMENT: The achieved goals from the course are controlled with a final exam and based on the achieved results during the laboratories. The final exam forms 80% of the final mark. The rest 20% are based on the laboratory exercises.

The exam is written. It is composed from a test and problems solving; during the problems solving part written materials are allowed. The laboratory portion of the final mark is obtained during the defense of the laboratory reports.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1. Oppenheim, A., Willsky, A. Signals and systems, 2nd Ed., Pearson, 2003; 2. Ruzhekov G., Signals and Data processing, 2nd Ed., TU-Sofia, 2011 (in Bulgarian). 3. Ishtev, K. Automatic Control Systems, TU-Sofia, 2007, ISBN 978-954-438-641-22 (in Bulgarian); 4. Ruzhekov G., Signals and Data Processing Laboratory Manual, TU-Sofia, 2009 (in Bulgarian); 5. Ichtev, A., T. Puleva. Control Theory Part1 Laboratory Manual, TU-Sofia, 2005, ISBN 954-438-523-1(in Bulgarian); 6. Ifeachor E, B. Jerrvils, Digital Signal Processing – A practical Approach, Addison-Wesley Publishing Company 1993..