COURSE CHARACTERISTICS

Course Title **Physical Education and Sport**	Code: **FBpIEe30**	Semester: 3
Type of Teaching: seminars	Contact hours per week: S – 3 hours	Number of credits: **0**

LECTURERS:	**Telephone:**	**E-mail:**
Assoc. Prof. Valentin Vladimirov – Theory and Methodology of PE and Sports Workouts (Methodology of Remedial Exercises); Orienteering	659 646	valdesv2003@yahoo.com
Sen. Lect. Penka Meleva - Theory and Methodology of PE and Sports Workouts (Methodology of Remedial Exercises); Swimming	659 648	penk1959@abv.bg
Lect. Daniel Vladimirov - Theory and Methodology of PE and Sports Workouts (Methodology of Remedial Exercises); Orienteering	659 646	ludarabota@abv.bg
Sen. Lect. Svetoslav Tsekov - Theory and Methodology of PE and Sports Workouts (Methodology of Remedial Exercises); Volleyball	659 648	tzekovlu@abv.bg
Sen. Lect. Krassimir Djaldeti - Theory and Methodology of PE and Sports Workouts (Methodology of Remedial Exercises); Athletics	659 648	krsj@abv.bg

COURSE STATUS IN THE SYLLABUS: Compulsory for all students at both faculties of the Technical University of Sofia, Plovdiv Branch in their 1st and 2nd year (semesters 1, 2, 3 and 4).

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

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

1. General Physical Preparedness (GPP) – in these seminars the students develop a wide range of motor skill and habits; work to improve strength, speed, endurance, flexibility, structure and skill; increase resistance to unfavorable environmental factors; develop their physical qualities and experience.
2. Sports-Specific Physical Preparedness (SPP) – students improve their sport skills and habits in a specific sport and gain experience through participation in competitions; work to improve strength, speed, endurance, flexibility, structure and skill; increase resistance to unfavorable environmental factors; develop their physical qualities and experience.

PREREQUISITES: The curriculum presumes the minimum of knowledge and skills acquired during the second semester.

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

METHODS OF TESTING AND EVALUATION: Evaluation is based on functional tests at the end of semester. Lecturer's signature is required at the end of semester.

LANGUAGE OF INSTRUCTION: Bulgarian and English (only for foreign language students).

LITERATURE RECOMMENDED:

1. Владимиров В. Туризъм и ориентиране. Методическо ръководство за студентите от ТУ София, филиал Пловдив. Издателство на ТУ - София. 2010.
2. Матикова С. Методично ръководство за начално обучение по тенис за студенти (второ преработено и допълнено издание), 2012.

DESCRIPTION OF THE COURSE

Name of the course **Computer-aided Design**	Code: **BpIEe46**	Semester: **5**
Type of teaching: Lectures and laboratory work Course work	Lessons per week: L – 2 hours; LW – 1 hour	Number of credits: **5**

LECTURER:
Assoc. Prof. Eng. Hristian Panayotov, PhD (FME-Plovdiv), tel.:032/659 518,
e-mail: hristian@tu-plovdiv.bg
Technical University of Sofia, Plovdiv Branch

COURSE STATUS IN THE CURRICULUM: Compulsory basic course in the curriculum for BEng in Industrial Engineering, at the Faculty of Electronics and Automatics - Plovdiv.

AIMS AND OBJECTIVES OF THE COURSE: To provide the bachelor degree students with basic knowledge and practical skills of Computer-aided Design (CAD) systems. The course gives knowledge about principles of creating 3D models and their application in engineering documentation and other engineering activities in virtual environment.

DESCRIPTION OF THE COURSE: The main topics concern: General review of CAD systems applications, design software and main features, types of geometric models, creating and applications, feature based parametric models – basic features, plane sketches – constrains and dimensioning, degrees of freedom, 3D features, types, creating and interaction, assemblies – 3D constrains and degrees of freedom. Basics of computer-aided engineering analysis.

PREREQUISITES: Mathematics, Informatics, Applied geometry and engineering drafting, Machine elements, Structural mechanics.

TEACHING METHODS: Lectures, using slides, case studies, and computer generated presentations, laboratory exercises based on actual design and problems solving with CAD applications.

METHOD OF ASSESSMENT: Constant knowledge monitoring by tests, laboratory exercises and course work. Two test during the semester: theoretical (weight coefficient 0.33), practical (weight coefficient 0.33) and a course work (weight coefficient 0.33).

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:

1. Farid M. Amirouche , Principles of Computer Aided Design and Manufacturing (2nd Edition), Prentice Hall; 2 edition (January 22, 2004), ISBN-10: 0130646318, ISBN-13:978-0130646316, 510 p.

2. Anupam Saxena , Birendra Sahay, Computer Aided Engineering Design, Springer; Softcover reprint of hardcover 1st ed. 2005 edition (November 23,2010), ISBN-10: 9048166799, ISBN-13: 978-9048166794, 426 p.

3. SolidWorks Tutorials, https://www.solidworks.com/sw/resources/solidworks-tutorials.htm

DESCRIPTION OF THE COURSE

Name of the course **Industrial Manufacturing Systems - I**	Code: **BpIEe47**	Semester: 5
Type of teaching: Lectures and Tutorials Course work	Lessons per week: L - 2 hours; T - 1 hour	Number of credits: **5**

LECTURER:
Assoc. Prof. Dr. Iliya Angelov Chetrokov, Eng. (Faculty of Mechanical Engineering),
tel: 659 616; e-mail: chetrokov@tu-plovdiv.bg TU-Sofia, Plovdiv Branch,

COURSE STATUS IN THE CURRICULUM: Compulsory for the students from Industrial Engineering BEng programme of the English Language of Faculty of Electronics and Automation, FEA

AIMS AND OBJECTIVES OF THE COURSE: 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. A course work is also included in the study with the aim to make the students use the theoretical knowledge for developing concrete technological and design solutions.

DESCRIPTION OF THE COURSE: The main topics concern: Metal cutting. Turning and related operations. Milling. Abrasive Machining processes. Broaching. Gear manufacturing. Jigs and fixtures. Special machining processes. Numerical control. Production operations and automation strategies. Production economics. Detroit-type automation. Assembly lines and line balancing. Automated assembly systems.

PREREQUISITES: Introduction to Manufacturing and Industrial Practice, Material Science, Strength of Materials.

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

METHOD OF ASSESSMENT: Assessment at the end of the 5-th term.

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY:

1. Groover M. P. Fundamentals of Modern Manufacturing: Materials, Processes, and Systems, 4th Edition, Wiley and Sons 2010;
2. Kalpakjan, S., St. Schmid, C. Kok, Manufacturing, Engineering and Technology, 2009;
3. Niebel B. Modern Manufacturing Processes Engineering, McGraw-Hill Book Company, 1989;
4. Amstead D., Ostwald P., Begeman M., Manufacturing Processes, Wiley and Sons, 1989;
5. Wakil S., Processes and Design for Manufacturing, Prentice Hall International, 1991;
6. Lindberg R. A. Processes and Materials of Manufacturing, Allyn and Bacon, 1990;
7. Groover, M. Automation, Production Systems and CIM. Prentice Hall International Inc., 1987;
8. Wo, B. Manufacturing System Design and Analysis. Chapman & Hall, 1992;
9. Lentz Jr., K. Design of Automatic Machinery. Van Nostrand Reinhold Co., 1985.

DESCRIPTION OF THE COURSE

Course title**: Measurement Systems**	Code: **BpIEe49**	Semester: **5**
Type of teaching: Lectures Laboratory exercises	Hours per week: L - 2 hours; LE - 2 hours.	number of credits: **5**

LECTURER: Associate Prof. **Vania Io. Rangelova** Department "Electrical engineering", tel 0895 587 596, email: vaniarangelova@tu-plovdiv.bg , Technical University of Sofia, Branch Plovdiv; Associate prof. **Margarita Deneva**, Dept. "Optoelectronics and Lasers", tel. 0895 587 439, e-mail: mar.deneva@abv.bg, Technical Univercity of Sofia, Branch Plovdiv

COURSE STATUS IN THE CURRICULUM: Compulsory for the students from the specialty Industrial Engineering BEng programme of the Faculty of Electronics and Automation.

AIMS AND OBJECTIVES OF THE COURSE: To provide the students knowledge in principles and realization of the measuring systems, the application of various techniques for measurements and the improvement of the measurement systems (their metrological characteristics) as well as knowledge in basic mechanical, electronic and optical instruments and their application in the engineering metrology. At the end of the course the student will: use the basic terms in the measurement systems and some practical important approaches for actual measurement systems for various quantities; will define basic concepts, quantities, indicators and dependences in the theory of errors and will model them; will compare the accuracy and the safety for various technical realizations in the measurement systems; will solve task on metrological security of the production.

DESCRIPTION OF THE COURSE: The course is divided at two major parts. **The first one** is constructed from 4 modules. They discuss generally: Measuring systems – designation and structure. Static characteristics and generalized model of the system's elements. Dynamic characteristics and dynamic errors. Processing results from repetitive measurements. Accuracy of measurement systems in stationary mode. Opportunities to reduce errors. Load effect in measurement systems. Signals and noise. Methods for decreasing the errors due to the noise and ambient factors. Signal conditioning elements. **The second part** of the course concerns specialized measurement systems for precise measurements of geometrical sizes, measurements in mechanics – forces, intensity of sound field, measurements in optics – energetical and spectral characteristics of optical fields, introduction into applied measurements in radioactivity.

PREREQUISITES: Physics, Mathematics, Electrical engineering, Electronics, Computing, Measurement and instrumentation.

TEACHING METHODS: Lectures, using transparences and video, case studies, laboratory from laboratory manual, work in teams, protocols preparation and defense.

METHOD OF ASSESSMENT: Two-hour assessment and solving 6 tasks at the end of the semester (80%) plus laboratories (20%).

INSTRUCTIONAL LANGUAGE: English.

BIBLIOGRAPHY:

1. John Bentley. Principles of Measurement Systems, Longman, Scientific @ Technical. 1992;
2. Doebelin E.O. Measurement Systems, Application and Design, IV edition, McGraw-Hill Publishing Company, 1990, ISBN 0-07-017338-9;
3. Galyer J. F.W., C. R. Shotbolt, Metrology for Engineers., Cassel Publishers Limited, London, 1990, ISBN 0-304-31844-2;
4. Anthony D. M. Engineering metrology. Pergamon Press, Oxford, 1992.
5. M. Deneva, M. Nenchev, „Laser radiation in presentation for engineers and practicias", „Intelexpert'94" and TU-Sofia, Branch Plovdiv 2013-2015 г.

DESCRIPTION OF THE COURSE

Name of the course **Industrial Manufacturing Systems - II**	Code: **BpIEe50**	Semester: 6
Type of teaching: Lectures and laboratory work; Tutorials	Lessons per week: L - 2 hours; LW - 1 hour; T - 1 hours	Number of credits: **5**

LECTURER:
Assoc. Prof. Dr. Iliya Angelov Chetrokov, Eng. (Faculty of Mechanical Engineering),
tel: 659 616; e-mail: chetrokov@tu-plovdiv.bg TU-Sofia, Plovdiv Branch,

COURSE STATUS IN THE CURRICULUM: Compulsory for the students from Industrial Engineering BEng programme of the English Language of Faculty of Electronics and Automation, FEA.

AIMS AND OBJECTIVES OF THE COURSE: To ensure the knowledge and tools that are necessary for the design and implementation of contemporary industrial manufacturing systems. Special attention is paid to the different subsystems and elements as well as to the control of the automated manufacturing systems. The course material is illustrated with examples of the recent achievements of production system automation and CIM and their requirements.

DESCRIPTION OF THE COURSE: Main course topics: Introduction to the manufacturing systems; Interaction and interdependence between the product design and the manufacturing process; Technical resources for manufacturing; Design and structuring of manufacturing systems; Subsystems' analysis; Elements of the manufacturing systems; Levels of automation and related control requirements; Studies of examples to illustrate the components' base for the manufacturing systems; Systematic approach to the manufacturing systems; System concepts, examples, communication and control; Concurrent engineering; Examples for automated manufacturing systems of leading and home companies; Social-economic and environmental aspects from the implementation of manufacturing systems.

PREREQUISITES: Introduction to Manufacturing and Workshop Practice, Industrial Manufacturing Systems – I.

TEACHING METHODS: Lectures, using video materials, case studies, laboratory and tutorial work, problem solving, personal assignments and presentations.

METHOD OF ASSESSMENT: Mid-term test and exam at the end of semester (80%), tutorial work (20%).

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY:
1. Groover M. P. Fundamentals of Modern Manufacturing: Materials, Processes, and Systems, 4th Edition, Wiley and Sons 2010.
2. Groover, M., E. Zimmers, CAD/CAM Computer Aided Design and Manufacturing, Prentice Hall International, 1984;
3. Mitchell., F., Systems. An Introduction to Computer Integrated Manufacturing, Prentice Hall International, 1991;
4. Shah, J., M. Mantyla. Parametric and feature Based CAD/CAM. John Wiley and Sons, 1996;
5. Groover, M., Automation, Production Systems and CIM, Prentice Hall International, 1987;
6. Krafter, R., T. Cheniewski, M. Negiu. Robotic Engineering, Prentice Hall International, 1989;
7. Groover, M. Automation, Production Systems and CIM. Prentice Hall International, 1987;
8. Jackson, P., Introduction to Expert Systems. Addison Wesley. 1990.

DESCRIPTION OF THE COURSE

Name of the course **Manufacturing Design I**	Code: **BpIEe54**	Semester: 6
Type of teaching: Lectures and laboratory work, and Course project	Lessons per week: L - 2 hours; LW - 1 hour CP- 2.1h. / student	Number of credits: **5**

LECTURER:

Assoc. Prof. Dr. Iliya Angelov Chetrokov, Eng. (Faculty of Mechanical Engineering),
tel: 659 616; e-mail: chetrokov@tu-plovdiv.bg TU-Sofia, Plovdiv Branch,

COURSE STATUS IN THE CURRICULUM: Compulsory for the students from Industrial Engineering BEng programme of the English Language

AIMS AND OBJECTIVES OF THE COURSE: To provide understanding on the essentials for the product development with due consideration of design procedures and methods. This type of study will enable students to handle both upstream issues related to marketing, finance, customers, and company, and downstream issues related to manufacturing, operation, service and disposal at the design stage. An emphasis is placed upon project management and practice of engineering design.

DESCRIPTION OF THE COURSE: The main topics concern: systematic approach to design; design for manufacture; technical aspects of product and system design; design planning methods and optimization; material selection; analysis and calculations; manufacturing design – case study.

PREREQUISITES: Physics, Mechanics; Applied Geometry and Engineering Graphics; Materials Science; Strength of Materials; CAD; Industrial Manufacturing Systems;

TEACHING METHODS: Lectures, laboratory work (defence of protocols) and group course project with a public defence.

METHOD OF ASSESSMENT: A two-hours assessment at the end of semester - 70%, laboratory work – 30%. Group project – 100%.

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY: 1. Dimitrov L. Principles of Mechanical Engineering Design, Heron Press, Sofia, 2009. 2. Dimitrov L., et all. Design of Machine Elements. Laboratory work. Heron Press, Sofia, 2011. 3. Budinas R., J.K.Nisbett. Shigley's Mechanical Engineering Design, 10th ed., McGraw Hill, 2015. 4. Otto K.N., L. Kristen. Product Design: Techniques in Reverse Engineering and New Product Development. Prentice Hall, 2001. 5. Boothroyd G., P. Dewhurst. Product Design for Manufacturing and Assembly. M.Dekver 2004. 6. Orshansky M., S. R. Nassif, and D. Boning. Design for Manufacturability and Statistical Design. A Constructive Approach. Springer, 2009. 7. Whitney, D.E. Mechanical assemblies: their design, manufacture, and role in product development, Oxford Press, 2010.

Name of the course: **Thermodynamics and Heat Transfer**	Code: **BpIEe51**	Semester: **VI**
Teaching type: **Lectures, Tutorials and Laboratory work**	Lessons per week: **L - 2 hours;** **T - 1 hour;** **LW - 1 hour**	Number of credits: **5**

LECTURER: Eng. Aleksandar Georgiev Georgiev (FME), 032 659 513, Technical university of Sofia, Plovdiv branch.

COURSE STATUS IN THE CURRICULUM: Compulsory course for the students in the Industrial Engineering BEng program of the Faculty of Electronics and Automation at the Technical University of Sofia, Plovdiv branch.

AIMS AND OBJECTIVES OF THE COURSE: The course is organized 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 as well as solving of applied engineering problems.

DESCRIPTION OF THE COURSE: The course consists of four parts: Fundamentals of Thermodynamics, Application of Thermodynamics, Heat transfer fundamentals and Heat exchangers. The course program is correlated with the other subjects (inputs and outputs) related to both the Thermodynamics and the Heat transfer. The 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; non-reacting ideal gas mixtures and ideal gas water vapor mixtures; energy analysis of closed and open systems; the second law of thermodynamics and entropy. The second part of the course covers the following: air-standard cycles of internal combustion engines and gas turbines; vapor power cycles and combined cycles; refrigeration and air-conditioning cycles. 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. The fourth part of the course covers topics related to tube-in-tube heat exchangers and shell and tube heat exchangers.

PREREQUISITES: Fluid Mechanics and Physics.

TEACHING METHODS: Lectures - using PPT presentations; Solving of problems; Laboratory work - following the laboratory manual, preparation of protocols and presentations.

METHOD OF ASSESSMENT: Three hours long exam at the end of the semester.

INSTRUCTIONAL LANGUAGE: English.

BIBLIOGRAPHY:

1. Eastop TD, McConkey A. Applied Thermodynamics for Engineering Technologists, Fifth Edition. Longman Group UK Ltd, ISBN 0-582-09193-4, 1993, p.715.

2. A. Georgiev. Thermodynamics and heat transfer (Textbook), Imeon Publishing House, Plovdiv, ISBN 978-954-9449-67-9, 2013, 200 pages.

3. A. Georgiev. Thermodynamics and heat transfer (Manual for laboratory exercises), Imeon Publishing House, Plovdiv, ISBN 978-954-9449-53-2, 2012, 50 pages.