

### DESCRIPTION OF THE COURSE

Name of the course: <b>Management of Industrial Production I</b>	Code: <b>MpIEe21</b>	Semester: 1
Type of teaching: Lectures, tutorials and laboratory work	Hours per semester: L - 30 hours; LW - 15 hours	Number of credits: <b>5</b>

**LECTURER: Assoc. Prof. Boryana Pachedjieva, PhD, mob: +359 32 659 708**

**E-mail: pachedjieva@yahoo.com**

**Technical University of Sofia, Branch Plovdiv**

**COURSE STATUS IN THE CURRICULUM:** Course from the compensatory and complementary master's program is compulsory for the students specialty Industrial Engineering MEng programme of the Faculty of Electronics and Automation, FEA

**AIMS AND OBJECTIVES OF THE COURSE:** The aim of the course is to introduce the main tasks of production, service and operational management, to provide basic knowledge of basic probability concepts, modern approaches and methods of science of management and research of operations and to build basic skills for their application in analysis and taking solution related to production, service and operations management.

**DESCRIPTION OF THE COURSE:** The course considers an introduction to the functional areas and tasks in MIP; data presentation and analysis in MIP; forecasting techniques - regression analysis, moving average and exponential smoothing; decision making in case of risk - criteria of expected value and variance, method of aspiration levels, decision tree, decision in case of uncertainty - Laplace, Savage, Hurwitz criteria, minimax (maximal) criterion; Markov decision-making processes - Markov chains, established probabilities, full scan method, iteration method by strategies, Markov processes for warehouse model management; queuing models - standard Poisson models of the type (M / M / C), specification of production machines and repair management; planning and dispatching, service systems; optimal dispatching of production systems using mixed integer programming; warehouse models - deterministic static and dynamic EOQ models.

**PREREQUISITES:** Basic knowledge of mathematics, operations research, programming and industrial production systems is required.

**TEACHING METHODS:** Lectures using slides, seminars, case studies and homework preparation.

**METHOD OF ASSESSMENT:** Three homework assignments are given to students in the semester. Written test lasting 3 astronomical hours at the end of the semester.

**INSTRUCTION LANGUAGE:** English

**BIBLIOGRAPHY:** 1. Hilier/Liberman, Introduction to Operations Research, 10<sup>th</sup> ed. McGraw Hill, 2014. 2. Taha, H. A., Operation Research. An Introduction, 9<sup>th</sup> ed., Pearson Publ., 2010. 3. Evans, J., R. Applied Production and Operations Management, 4<sup>th</sup> ed., West Publishing Co., 1993 4. Heinzer, J, and B. Render. Production and Operations Management, 2<sup>nd</sup> ed. Needham Heights, 1991.5. Lecture materials available in the library.

## DESCRIPTION OF THE COURSE

Name of the course <b>Manufacturing Design I</b>	Code: <b>MpIEe22</b>	Semester: 1
Type of teaching: Lectures and laboratory work, and Course project	Hours per semester: L - 30 hours; LW - 15 hours CP- 2.1h. / student	Number of credits: <b>5</b>

### **LECTURER:**

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

**COURSE STATUS IN THE CURRICULUM:** Compulsory course from the compensatory and complementary master's program 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 defense.

**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.

## DESCRIPTION OF THE COURSE

Name of the course <b>Computer Integrated Manufacturing 1</b>	Code: <b>MpIEe23</b>	Semester: <b>1</b>
Type of teaching: Lectures and laboratory work	Hours per semester: L - 30 hours, LW - 15 hours	Number of credits: <b>5</b>

**LECTURERS:** prof. Michail Petrov Ph.D., phone: 032 659 585 e-mail: [mpetrov@tu-plovdiv.bg](mailto:mpetrov@tu-plovdiv.bg);  
Assoc. Prof. Albena Taneva Ph.D. phone: 032 659 585; e-mail: [altaneva@tu-plovdiv.bg](mailto:altaneva@tu-plovdiv.bg);

**Technical University - Sofia, Branch Plovdiv**

**COURSE STATUS IN THE CURRICULUM:** Compulsory basic course from the compensatory and complementary master's program in Industrial Engineering, at the Faculty of Electronics and Automation (FEA).

**AIMS AND OBJECTIVES OF THE COURSE:** To provide the basic knowledge about basic discrete manufacturing structures, its automation and information integration.

**DESCRIPTION OF THE COURSE:** The main topics concern: types of discrete manufacturing systems, working and layout models and metric, structures for automation of production and assembly process (orientation, transport, storage), robotics (kinematics, industrial environment, control and programming) and the identification of objects and processing data.

**PREREQUISITE S** Physics, mechanics, industrial production systems, production engineering, computer science.

**TEACHING METHODS:** Lectures using slides. Laboratory works in a computer class and / or laboratory with stands. Individual or team work with input control, preparation of eprotocols and presentations.

**METHOD OF ASSESSMENT:** Two written test (at the end of the semesters) with a duration of one academic hour, with weight in the overall assessment - 80% (up to 80 points). The remaining 20% (20 points) is formed from the current control and presentation of laboratory protocols.

**INSTRUCTIONAL LANGUAGE:** English

### **BIBLIOGRAPHY:**

1. Lectures' slides. Groover M. P., 2008, Automation, Production Systems, and Computer Integrated Manufacturing, *Pearson Education Inc.* ISBN 0-13-207073-1; 2. Assembly automation, *The international journal of assembly technology and management*, ISSN: 0144-5154, Thomson Scientific (ISD); 3. Lotter, L. Wirtschaftliche Montage. VDI Verlag, 1986; Gershwin S., B., 1994, Manufacturing systems engineering, ISBN 0-13-560-608X. 4. De Ron A., J., 1999, Performance measures for technical production systems, Eindhoven University of technology, School of industrial Engineering and management science, Syllabus; 5. Lin Zhang at all, 2014, Cloud manufacturing: a new manufacturing paradigm, *Enterprise Information Systems*, Vol. 8, 167-187. 6. Neshkov, T., 2013, Introduction to the specialty mechatronic systems, University Textbook, Heron Press Ltd, ISBN 978-954-580-329-1, *Pahl G., Beitz W., at all*, 2007, Engineering Design. A Systematic Approach, SpringerVerlag London Limited, ISBN-10: 1846283183

### DESCRIPTION OF THE COURSE

Name of the course <b>Control Engineering</b>	Code: <b>MpIEe24</b>	Semester: <b>1</b>
Type of teaching: Lectures and laboratory work	Hours per semester: L - 30 hours, LW - 15 hours	Number of credits: <b>5</b>

#### **LECTURER:**

Assoc. Prof. Ivan Ganchev Ph.D. tel. [032 659 585](tel:032659585); e-mail: [ganchev@tu-plovdiv.bg](mailto:ganchev@tu-plovdiv.bg)

Technical University - Sofia, Branch Plovdiv

**COURSE STATUS IN THE CURRICULUM:** Compulsory basic course from the compensatory and complementary master's program in Industrial Engineering, at the Faculty of Electronics and Automation, FEA.

**AIMS AND OBJECTIVES OF THE COURSE:** At the end of the course, the students must be able to apply the basic methods for continuous- and discrete-time control systems analysis and design and use them in solving relative engineering problems. The course aims at creating and developing knowledge and skills for adequately изравнителната fields by using control theory and modeling tools and methods.

**DESCRIPTION OF THE COURSE:** The main topics concern: mathematical modeling of systems; block diagrams and signal flow graphs; first-order and second-order systems; stability, steady-state error and speed of response; frequency domain analysis; analysis in the s-plane; system compensation; controllers; main blocks in the control loop; frequency domain design; control loops; PID controller design and tuning methods; common nonlinearities (nonlinear elements) in control systems. The course simultaneously extends theoretical basis and develops applied skills in control system design and implementation with analog and digital microprocessor- or PC-based, electrical, pneumatic and hydraulic elements. The course uses case studies from the process automation field in order to illustrate concepts and methods.

**PREREQUISITES:** Physics, Technical Mechanics, Control Theory, Measurements and Instrumentation, Electronics, Elements of Industrial Automation.

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

**METHOD OF ASSESSMENT:** One three-hour examination at the end of semester (80%) plus laboratories (20%)

**INSTRUCTION LANGUAGE:** English

**BIBLIOGRAPHY:** 1. Dorf, D.C. Modern Control Systems, Prentice Hall, 12 ed. 2011. 2. Norman S. Nise. Control Systems Engineering, 6th Ed. 2010. 3. Morris, N.M. Control Engineering. McGraw-Hill Book Company, 1991. 4. Sami Fadali, Antonio Visioli. Digital Control Engineering, 2 ed: Analysis and Design, 2012. 5. Astrom, K.J., Tore Hägglund. Advanced PID Control. ISA, 2006. 6. Драготинов, И., И Ганчев. Автоматизация на технологични процеси. П., УХТ, 2003. 7. Тодоров А., Енев Ст. и др. Автоматизация на технологични процеси, Ръководство за лабораторни упражнения. С., ТУ-София. 8. Фархи О., А. Тодоров, Е. Николов, Промислени системи за автоматизация, В., Изд. ВМЕИ, 1989, 1993.

### DESCRIPTION OF THE COURSE

Name of the course <b>Quality Control</b>	Number: <b>MpIEe25</b>	Semester: <b>1</b>
Type of teaching: Lectures, tutorials and laboratory work	Hours per semester: L - 30 hours; T - 15 hours; LW - 15 hours	Number of credits: <b>5</b>

**LECTURER:** Assoc. Prof. Boryana Pachedjieva, PhD, mob: +359 32 659 708

**E-mail:** [pachedjieva@yahoo.com](mailto:pachedjieva@yahoo.com), Technical University Sofia, branch Plovdiv

**COURSE STATUS IN THE CURRICULUM:** Compulsory for the students from the compensatory and complementary master's program specialty Industrial Engineering of the Faculty of Electronics and Automation, FEA.

**AIMS AND OBJECTIVES OF THE COURSE:** To give knowledge about use of techniques to achieve, sustain, and improve the quality of a product or service. It involves integrating the following related techniques and activities - specifications, design of the product or service to meet the specifications, production or installation to meet the full intent of the specifications.

**DESCRIPTION OF THE COURSE:** The course treats the Quality Control basic principles and international systems. The theory of probability and statistics, which is used in the various methods for Quality Control, is discussed. The basic experimental methods and techniques for evaluation of quality are treated.

**PREREQUISITES:** Mathematics, Measurements and Instrumentation, Measurement Systems.

**TEACHING METHODS:** Lectures with slides, supplemented by auxiliary materials and virtual labs in Moodle for self-preparation. Tutorials with problem solving and discussion on the topic. Laboratories with individual reports.

**METHOD OF ASSESSMENT:** Written examination.

**INSTRUCTION LANGUAGE:** English

#### **BIBLIOGRAPHY:**

1. D. Besterfield, Quality Control, 8-th Edition, Prentice Hall, USA, 2009;
2. E. Ott, E. G. Schilling, D. V. Neubauer, Process Quality Control, McGraw-Hill, USA 2000;
3. J. R. Evans, W. M. Lindsay, The Management and Control of Quality, Thomson, Singapore, 2005;
4. R. Deliyski, Quality Control - Problems and solutions. Student manual, Publishing house of TUSofia, 2014.

## DESCRIPTION OF THE COURSE

Name of the course <b>Industrial Manufacturing Systems - I</b>	Code: <b>MpIEe26</b>	Semester: <b>1</b>
Type of teaching: Lectures and Tutorials Course work	Hours per semester: L - 30 hours; T - 15 hours	Number of credits: <b>5</b>

### **LECTURER:**

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

**COURSE STATUS IN THE CURRICULUM:** Compulsory course from the compensatory and complementary master's program for the students from Industrial Engineering 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

Name of the course: <b>Management of Industrial Production II</b>	Code: <b>MpIEe27</b>	Semester: <b>2</b>
Type of teaching: Lectures, tutorials and laboratory work	Hours per semester: L - 30 hours; TW -15 hours; LW - 1 hour	Number of credits: <b>5</b>

**Lecturer:** Assoc. Prof. Dr. Katya Stefanva, (FEA), 0889231373;  
e-mail [docentstafanova@gmail.com](mailto:docentstafanova@gmail.com), Technical University of Sofia, Branch Plovdiv

**COURSE STATUS IN THE CURRICULUM:** Compulsory course from the compensatory and complementary master's program for the specialty Industrial Engineering of the Faculty of Electronics and Automation, FEA

**AIMS AND OBJECTIVES OF THE COURSE:** The aim of the course is to expand the acquired basic knowledge and present to students popular and modern applied aspects of production management and operations, through a number of management techniques related to quantitative analysis, optimization, simulation research in decision making, analysis of production costs, deployment and loading of production facilities, CAD / CAM / CAE computer technologies and others

**DESCRIPTION OF THE COURSE:** The course is aimed at expanding students' knowledge about production operations and developing their skills for quantitative analysis and decision-making in production activities, through modern management techniques and computer applications.

At the end of his studies the student will be able to:

- identify production costs and analyze them in order to increase production profits;
- build models and make decisions for the production of new products and relevant inventory policy;
- optimizes the load of the equipment, the replacement and the location of the production capacities.

**PREREQUISITES:** Basic knowledge of higher mathematics, operations research, computer literacy

**TEACHING METHODS:** Audio-visual means, slides, animations, built models are used, which visually present problems and modern managerial approaches from various areas of production. During the seminars, students are introduced to a variety of software products and tasks in production operations.

**METHOD OF ASSESSMENT:** The achievement of the set goal of the training is controlled by a written exam at the end of the sixth semester. The maximum number of points that each task or question in the exam brings are clearly indicated during the exam.

**INSTRUCTION LANGUAGE:** English.

### **BIBLIOGRAPHY:**

1. Vonderembse ,White, Operations Management Concepts, Methods and Strategies,Wiley,2003
2. Reid R., N. Sanders, Operations Management An Integrated Approach, Wiley, 2010
3. Russel ,B.Taylor, Operations Management Creating Value Along the Supply Chain,Wiley, 2011
4. Muller M., Essentials of Inventory Management, AMACOM, 2011
5. Geunes J., Operations Planning, CRC Press, 2014

### DESCRIPTION OF THE COURSE

Name of the course: <b>Manufacturing Design II</b>	Code: <b>MpIEe28</b>	Semester: <b>2</b>
Type of teaching: Lectures and laboratory work, Course work	Hours per semester: L - 30 hours; LW - 15 hours	Number of credits: <b>5</b>

#### **LECTURER:**

Assoc. Prof. Dr. I. Chetrokov [тел. 032 659 616](tel:032659616), [email: il\\_chetrokov@abv.bg](mailto:il_chetrokov@abv.bg)

Technical University of Sofia, Branch Plovdiv

**COURSE STATUS IN THE CURRICULUM:** Compulsory course the compensatory and complementary master's program for the students from Industrial Engineering of the Faculty of Electronics and Automation, FEA

**AIMS AND OBJECTIVES OF THE COURSE:** To give the students knowledge about the design of basic units used in modern machine-building industry and in high degree automated machinery; computer aided analysis practice, CNC programming, basic principles of machine tool design.

**DESCRIPTION OF THE COURSE:** General principles of machine design; Concurrent engineering; Functional characteristics of machine tools; Work accuracy; Stiffness; Thermal deflections; Technical performances of production machinery; Main and feed drives - requirements, kinds of drives; Spindle systems; Linear drives; Beds and bodies - materials, requirements; Guideways; Lubrication of production machines; Forms of flexible manufacturing automation; Subsystems of flexible manufacturing structures and their components; Technological design for flexible manufacturing structures; Program composition tool nose compensation, tool offset, manual programming; Canned and multiple repetitive cycles; Computer programming for CNC machines using programming languages FAPT and GEOPATH.

**PREREQUISITES:** Mechanics; Applied Geometry and Engineering Graphics; Materials Science; Strength of Materials; CAD; Industrial Manufacturing Systems; Manufacturing Design I.

**TEACHING METHODS:** Lectures, using slides, case studies, laboratory and course work from laboratory manual, work in teams, protocols and Course project description preparation and defense.

**METHOD OF ASSESSMENT:** Proportion of marks: Test - 40%; Project - 60%.

**INSTRUCTION LANGUAGE:** English.

#### **BIBLIOGRAPHY:**

1. Hadjikosev G., Automation of Discrete Production Engineering, TUS Publishing house, 2013;
2. Dimitrov L., Principles of Mechanical Engineering Design, Technical University of Sofia, 2001;
3. Shigley J., Ch. Mischke, Mechanical Engineering Design - 6th ed., McGraw Hill, 2001;
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, 1994.

Name of the course <b>Computer Integrated Manufacturing II</b>	Code: <b>MpIEe29</b>	Semester: <b>2</b>
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## DESCRIPTION OF THE COURSE

Type of teaching: Lectures and laboratory work	Hours per semester: L - 30 hours, LW - 30 hours	Number of credits: <b>5</b>
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**LECTURER: Prof. Michail Petrov Ph.D. tel. 032 659 585; e-mail: mpetrov@tu-plovdiv.bg**

**Assoc. Prof. Albena Taneva Ph.D. tel. 032 659 585; e-mail: altaneva@tu-plovdiv.bg**

**COURSE STATUS IN THE CURRICULUM:** Compulsory basic course from the compensatory and complementary master's program in the curriculum of Industrial Engineering, at the Faculty of Electronics and Automation (FEA).

**AIMS AND OBJECTIVES OF THE COURSE:** To provide the basic knowledge about basic discrete manufacturing structures, its automation and information integration.

### **DESCRIPTION OF THE COURSE:**

The main topics concern: types of discrete manufacturing systems, working and layout models and metric, structures for automation of production and assembly process (orientation, transport, storage), robotics (kinematics, industrial environment, control and programming) and the identification of objects and processing data.

**PREREQUISITES:** Physics, mechanics, industrial production systems, production engineering, computer science.

**TEACHING METHODS:** Lectures using slides. Laboratory works in a computer class and / or laboratory with stands. Individual or team work with input control, preparation of e-protocols and presentations.

**METHOD OF ASSESSMENT:** Two written tests (at the end of the semesters) with a duration of one academic hour, with weight in the overall assessment - 80% (up to 80 points). The remaining 20% (20 points) is formed from the current control and presentation of laboratory protocols.

**INSTRUCTIONAL LANGUAGE:** English

### **BIBLIOGRAPHY:**

Lectures' slides; Groover M. P., 2008, Automation, Production Systems, and Computer Integrated Manufacturing, *Pearson Education Inc.* ISBN 0-13-207073-1; Assembly automation, *The international journal of assembly technology and management*, ISSN: 0144-5154, Thomson Scientific (ISI); Lotter, L. Wirtschaftliche Montage. VDI Verlag, 1986; Gershwin S., B., 1994, Manufacturing systems engineering, ISBN 0-13-560-608X. De Ron A., J., 1999, Performance measures for technical production systems, Eindhoven University of technology, School of industrial Engineering and management science, Syllabus; Lin Zhang at all, 2014, Cloud manufacturing: a new manufacturing paradigm, *Enterprise Information Systems*, Vol. 8, 167-187. Neshkov, T., 2013, Introduction to the specialty mechatronic systems, University Textbook, Heron Press Ltd, ISBN 978-954-580-329-1, Pahl G., Beitz W., at all, 2007, Engineering Design. A Systematic Approach, Springer Verlag London Limited, ISBN-10 1846283183

## DESCRIPTION OF THE COURSE

Name of the course <b>Industrial Manufacturing Systems - II</b>	Code: <b>MpIEe30</b>	Semester: <b>2</b>
Type of teaching: Lectures and laboratory work; Tutorials	Hours per semester: L - 30 hours; LW - 15 hours; T - 15 hours	Number of credits: <b>5</b>

### **LECTURER:**

**Assoc. Prof. Dr. Iliya Angelov Chetrokov, (Faculty of Mechanical Engineering),  
tel:032 659 616; e-mail: [chetrov@tu-plovdiv.bg](mailto:chetrov@tu-plovdiv.bg) TU-Sofia, Plovdiv Branch,**

**COURSE STATUS IN THE CURRICULUM:** Compulsory course from the compensatory and complementary master's program for the students from Industrial Engineering 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: <b>Manufacturing Strategies</b>	Code: <b>MpIEe31</b>	Semester: <b>2</b>
Type of teaching: lectures, tutorials	Hours per semester: L - 30 hours; T - 30 hours	Number of credits: <b>5</b>

**LECTURER:** Elena Zlatanova, PhD, tel.032 659 714; +359 893 69 06 55

### Technical University of Sofia

**COURSE STATUS IN THE CURRICULUM:** Compulsory course from the compensatory and complementary master's program for the specialty Industrial Engineering of the Faculty of Electronics and Automation, FEA.

**AIMS AND OBJECTIVES OF THE COURSE:** To familiarize the students with the main problems and tasks of the manufacturing strategy and the ways for their solution. The course includes the interface relations between the manufacturing strategy and the marketing, R&D, F&A, management, CIS, etc. activities. It deals with the practical manufacturing strategy implementation issues, related to the business plan and strategic alternatives development.

**DESCRIPTION OF THE COURSE:** The main topics include: manufacturing strategy role and scope; manufacturing strategy development; areas of strategic manufacturing decisions; management of the material supply chain; production capacity planning strategy; production improvement strategies; interface between the manufacturing and the other functions; practical implementation of the manufacturing strategy.

**PREREQUISITES:** Industrial Manufacturing Systems, POM, Management science, Marketing, CIM.

**TEACHING METHODS:** Lectures, tutorials, case studies, personal and group presentations.

**METHOD OF ASSESSMENT:** Mid-term test (30%); exam in the end of the semester (40%); case study participation (30%).

**INSTRUCTIONAL LANGUAGE:** English.

### **BIBLIOGRAPHY:**

1. Miltenburg J. Manufacturing Strategy: How to Formulate and Implement a Winning Plan, 2<sup>nd</sup> ed. Productivity Press, 2005
2. Hill T. Manufacturing Strategies. Text and Cases 3<sup>rd</sup> ed. Palgrave Macmillan 2009.
3. Stevenson W. Production and Operations management, 11<sup>th</sup> ed., McGraw Hill, 2011.
4. Byrne A. and J. P. Womack. The Lean Turnaround: How Business Leaders Use Lean Principles to Create Value and Transform Their Company. McGraw Hill, 2012
5. Chopra S. and P. Meindl. Supply Chain Management: Strategy, Planning, and Operation. 6<sup>th</sup> ed. 2015.

### DESCRIPTION OF THE COURSE

Name of the course: <b>Human Resources Management</b>	Code: <b>MpIEe32</b>	Semester: <b>2</b>
Type of teaching: Lectures , Tutorial works	Hours per semester: L - 30 hours, TW- 15 hours.	Number of credits: <b>5</b>

**LECTURER:** Assoc. Prof. Dr. Toni Mihova, 032 659 714; e-mail: [mihova@tu-plovdiv.bg](mailto:mihova@tu-plovdiv.bg)

**Technical University Sofia, branch Plovdiv**

**COURSE STATUS IN THE CURRICULUM:** Compulsory course from the compensatory and complementary master's program for the specialty Industrial Engineering of the Faculty of Electronics and Automation, FEA.

**AIMS AND OBJECTIVES OF THE COURSE:** To explain the role of human resources as a key factor for the success of the company; to bring out the peculiarities determining the behavior of the human staff and to be able to make rational managerial decisions on problems related to the staff

**DESCRIPTION OF THE COURSE:** Basically, the course is about gaining knowledge about the role of human resources as a key factor for the success of the company; on the skills of how to recruit staff, how to invest in their skills and how to manage the number of new recruits and retirees. Skills are acquired for the planning and design of work, for the motivation of employees, for the successful management of knowledge in the organization, for stimulating an organizational culture of sharing and transferring knowledge; assessment of the performance of employees in an organization and how to successfully stimulate them.

**PREREQUISITES:** Basic knowledge of management disciplines is required.

**TEACHING METHODS:** Lectures using slides. Seminars where specific cases are solved.

**METHOD OF ASSESSMENT:** The achievement of the set goal of the training is controlled by current assessment, which is obtained from a test in the middle of the semester and written work at the end of the semester (the weight of the test in forming the final grade is 40% and the written work 60%). The test consists of 30 questions, 25 closed and 5 open, requiring an answer within 4-5 sentences. The test time is one academic hour. The assessment is formed on the basis of points obtained from the two groups of questions. The written work at the end of the semester is a solution to a specific task of the practice related to human resource management.

**INSTRUCTIONAL LANGUAGE:** English.

**BIBLIOGRAPHY:** 1. Lecture slides; 2. Additional literature: Bratton and Gold (2012) Human Resource Management: Theory and practice, Palgrave Macmillan, UK. ; Drucker, P. F. (1993) Post Capitalist Society. London: Butterworth Heinemann; Anthony W.R., P.L. Perrewe, K.M.Kacmar, Human resource Management, The Dryden Press, 1999; Becker, B. , Huselid, M.A. and Ulrich, D. (2001) The HR scorecard: Linking People, Strategy and Performance. Boston: Harvard Business Publishing; Bolton, S. (2005) Emotion Management in the Workplace. Basingstoke: Palgrave Macmillan; Burke, W. (2011) Organizational Change: Theory and Practice. Los Angeles: Sage; Harrison R., Human Resource Management, Cambridge, Addison-Wesley, 1994; Hendry C., Human resource Management, Oxford, Butterworth-Heinemann Ltd, 1995; Mullins L.J., Management and organizational behavior, L., Pitman Publishing, 1994.