

DESCRIPTION OF THE COURSE

Name of the course Process Control and Production Automation	Code: MpIEe01	Semester: 1
Type of teaching: Lectures, tutorials and laboratory work	Lessons per week: L - 30 hours; TW -15 hour; LW - 15 hour	Number of credits: 5

LECTURERS:

Assoc. Prof. Sevil Ahmed-Shieva, PhD (FEA) tel.: 032 659 583, e-mail: sevil.ahmed@tu-plovdiv.bg

Technical University of Sofia

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

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students will be able to model the processes taking place in industrial installations from the continuous and discrete production plants, to design and tune both process control and production automation systems, to apply industrial controllers and simulation techniques for investigations of the designed systems.

DESCRIPTION OF THE COURSE: Main topics: Control process classification, control objectives, configurations and strategies; Mathematical modelling of basic processes - mass or energy transportation, mixing, heating, fluid flow systems, chemical reactions, heat exchange, distillation; Feedback, feedforward, ratio, multi-loop control and cascade techniques; Smith predictor; Multivariable, adaptive, inferential and robust control systems; Application of fuzzy logic and neural networks for process control; Flow, pressure, liquid level, temperature and composition control; Boolean algebra, Automata theory; Synthesis and minimization of logical functions; Programmable logic controllers (PLC) - elements, input-output modules, programmers, programming languages, user interface, programming of logical functions, arithmetical operations, PID controller, switching logic control; SFC programming; Discrete automation systems; Queuing systems; Synchronization and optimization of the operation of production systems. SCADA and MES systems. Remote access.

PREREQUISITES: Control Engineering, Advanced Control Theory, Systems Modelling and Simulation, Computer Integrated Manufacturing.

TEACHING METHODS: Lectures, using multimedia and case studies, tutorial and laboratory work from laboratory manual, protocols preparation and defense.

METHOD OF ASSESSMENT: A three-hours written exam (70%) plus tutorials (15%) and laboratories (15%)

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1. Neshkov T., S.Yordanova and I.Topalova. Process Control and Production Automation. TU-Press, S., 2007; 2. Yordanova S., T. Neshkov and I. Topalova, Process Control and Production Automation - Tutorials. TU-Press, S., 2007; 3. Morari M. B. Zafiriou, Robust Process Control. Prentice Hall, N.J., 1989; 4. Ross T.J. Fuzzy Logic with Engineering Applications. McGraw Hill, Inc., 1995; 5. Shinskey F.G. Process Control Systems: application, design, adjustment. 2nd ed., McGraw-Hill, 1979; 6. Stephanopoulos G. Chemical Process Control. An Introduction to Theory and Practice. Prentice Hall, 1984; 7. Haykin S. Neural Networks: A comprehensive foundation. 2nd ed., Prentice Hall, 1994; 8. Cassandras C., Lafortune S. Introduction to Discrete Event Systems. 2nd ed., Springer, 2008; 9. Chrissolouris G. Manufacturing Systems: Theory and Practice. 2nd ed., Springer, 2008; 10. Kelton D., Simulation with Arena, McGraw Hill Higher Education, 4th ed., 2006; 11. Berger H, Automating with STEP 7 in LAD and FDB: SIMATIC S7-300/400 Programmable controllers, 2012; 12. Programming Guideline for S7-1200/S7-1500, SIEMENS, 2014.

DESCRIPTION OF THE COURSE

Name of the course Manufacturing Management	Code: MpIEe02	Semester: 1
Type of teaching: Lectures (L) and Tutorials (T)	Lessons per semester: L - 30 hours; T - 15 hour	Number of credits: 4

LECTURER:

Assoc. Prof. Georgi Georgiev, PhD (FME), tel.: 0888 227282, e mail: georgi@tu-plovdiv.bg,
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory course in the curriculum for MEng in Industrial Engineering, at the Faculty of Electronics and Automation (FEA).

COURSE OBJECTIVES: The aim of the course is MEng students first semester to gain knowledge on the fundamental behavior of manufacturing systems. Systematically accumulated knowledge will enable students, as future engineers and managers, to identify and work confidently with natural trends in the production environment

COURSE DESCRIPTION: The knowledge gained in this course will help students, as future engineers, to identify opportunities to optimize existing systems or build new more efficient ones, to coordinate and manage projects from various areas of manufacturing and to choose appropriate material-handling equipment.

At the end of the course the students,

- will have the ability to work with some popular at present software products for building simulation models and projects of production and storage processes;
- will be familiar with the principles of material-handling and will be able to solve problems by building computer models and performing simulations;
- will be able to handle modern methods and tools in predicting inventory levels and monitoring production;

PREREQUISITES: Production Operations Management, Calculus, Operations Research, CAD, Informatics

TEACHING METHODS: Use of audio-visual aids, computer presentations, animations, models that clearly present problems and modern trends in forecasting, identification and analysis of throughput and bottlenecks, optimization, computer modeling and simulations. During the tutorials, students are introduced to a variety of software products, problems and case studies in the manufacturing management.

METHODS OF ASSESSMENT: Achieving the course objective is monitored by a written final exam at the end of the semester. The maximum number of points for each problem or exam question are clearly indicated during the exam.

INSTRUCTIONAL LANGUAGE: English

REFERENCES:

- 1 Ray S., Introduction to Materials Handling, New Age International, 2008;
- 2 Hopp W., M. Spearman, Factory Physics, Mc-Graw-Hill/Irwin 2000;
- 3 Halevi G., Handbook of Production Management Methods, Butterworth-Heinemann, 2001;
- 4 Muller M., Essentials of Inventory Management, AMACOM, 2003;
- 5 Wilson L., How to Implement Lean Manufacturing, Mc-Graw-Hill, 2010;
- 6 Pham H., Springer Handbook of Engineering Statistics, Springer-Verlag, 2006.

DESCRIPTION OF THE COURSE

Name of the course: Management of Power System Networks	Code: MpIEe03	Semester: 1
Type of teaching: Lectures (L) Laboratory work (LW)/Seminars (S) Course work (CW)	Hours per semester: L – 30 hours S – 15 hours LW – 15 hours	Number of credits: 5

LECTURER(S):

Assoc. Prof. Eng. Stanimir Stefanov, PhD (FEA), tel.: 032659512, e-mail: glasst@tu-plovdiv.bg
Assoc. Prof. Eng. Dimitar Spirov
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Mandatory course in the curriculum for students pursuing a Master's degree, specialization in "Industrial Engineering," professional field 5.13. General Engineering, area 5. Engineering Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The goal is to master the characteristics of the electric power system (EPS) related to its management for the purpose of its operation and development as a uniquely complex and large system.

DESCRIPTION OF THE COURSE: The elements of the EPS are examined, including the specifics of electricity generation, transmission, and distribution, power quality, short circuits and stability, relay protection, key management functions in the EPS – forecasting, planning, organization, technical-economic characteristics, economic dispatching, pricing, deregulation, and the electricity market.

PREREQUISITES: Physics, Mathematics, Operations Research, Electrical Engineering.

TEACHING METHODS: The lectures are presented with slides, while the laboratory exercises are conducted using educational models. The exercises are carried out in groups, with preparation and defense of reports.

METHOD OF ASSESSMENT: A two-hour written exam at the end of the semester)

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1.Allen J. Wood, Bruce F. Wollenberg, Gerald B. Sheble, Power Generation, Operation and Control, John Wiley and Sons, Third Edition, New York, 2013; 2.Gan D., Feng D., Xie J., Electricity Markets and Power System Economics, CRC Press, 2013; 3.Charles A. Gross, Power system analysis, Wiley, 1986; 4.Kirschen D. S., G.Strbac, Fundamentals of Power System Economics, John Willey & Sons, 2004; 5.Casazza J. F. Delea. Understanding Electric Power Systems – An Overview of the Technology and the Marketplace, IEEE Press, John Wiley & Sons, Inc., 2003; 6.Hadjsaid N., Sabonnadiere J. C., Smart Grids, Wiley-ISTE, 2012; 7.Paul Breeze, Power Generation Technologies, Newnes, 2014; 8.Gilbert M., Renewable and Efficient Electric Power Systems, Wiley-IEEE Press, 2004.

DESCRIPTION OF THE COURSE

Name of the course:: Organizational Behavior (OB)	Code: MpIEe04.1	Term: 1
Type of teaching: Lectures (L), Seminar exercises (SE)	Contact hours per week: L– 30 h, SE – 15 h	Number of credits: 4

LECTURERS: Professor Dr Tony Mihova, tel.: 0888 42 45 70, email: mihova@tu-plovdiv.bg;

Assistant Anet Arabadzhieva, tel.: 0888 78 16 59, email: _anet2003@abv.bg

Sofia Technical University – Plovdiv Branch

COURSE STATUS IN THE CURRICULUM: Organizational Behavior is an academic discipline included as an elective course in the curriculum of Industrial Engineering students studying at the Faculty of Electronics and Automation (FEA), master's degree.

OBJECTIVES OF THE COURSE: Studying this discipline allows students to gain in-depth knowledge about the nature of individual and group behavior of people inside an organization. The main objective is to clarify the key concepts of organizational behavior by presenting the issues of discipline OB. The focus is on the practical application of theoretical knowledge. After completing the subject, students will acquire practical skills to manage communications in the enterprise, managerial decision-making, group behavior, conflicts and organizational culture.

COURSE DESCRIPTION: Main topics: Business Communication, Motivation, Organizational Behavior and Individuality, Management Style, Management Decisions, Groups and Teams in Organizations, Management & Leadership, Conflict Management, Negotiating, Organizational Culture.

TEACHING METHODS: Lectures using presentations, discussions with the active participation of students after prior preparation. Seminar exercises – with cases study, practical tasks and essays and small projects, self-assessment tests.

METHODS OF ASSESSMENT: ongoing assessment, resulting in a mark, consisting of two components: tests with a weight of 0,50 each and assessment of the performance during the seminar exercises with a factor of 0,50.

LANGUAGE: English

BIBLIOGRAPHY:

1. Mihova, T., Organizational behaviour, Imeon, Plovdiv, 2025
2. Carol M. Kopp, Organizational behaviour, What It Is and Why It Matters, 2024
3. Organizational behaviour, University of Minnesota Libraries, 2017
4. J. Stewart Black, David S. Bright, Organizational behaviour, 2019
5. Gert Alblas, Ella Wijsman, Organizational behaviour, 2021
6. Laurie J. Mullins, Management & Organizational behaviour, 2016

DESCRIPTION OF THE COURSE

Name of the course: Control Theory II	Code: MpIEe05.2	Semester: 1
Type of teaching: Lectures(L) Laboratory work (LW)	Hours per semester: L – 30hours LW – 30 hours	Number of credits: 4

LECTURER(S):

Assist. Prof. Eng. Vasil Popov, PhD (FEA), tel.: +359 896282030, e-mail: vasil_popov@tu-plovdiv.bg |

Technical University of Sofia, branch in Plovdiv

COURSE STATUS IN THE CURRICULUM: Optional course in the curriculum for MEng in Industrial Engineering, at the Faculty of Electronics and Automation, FEA

AIMS AND OBJECTIVES OF THE COURSE: To acquire knowledge in mechanics, control and application of robots in industry and to develop proficiency in industrial applications of robots.

DESCRIPTION OF THE COURSE: The main topics concern: Introduction in robotics; Kinematics and dynamics modeling of manipulation systems; Planning of robotic motions: in joint and Cartesian coordinates; Kinematical control of robots; Contemporary production automation; Robotized industrial operations: welding, painting, assembly, transportation, cleaning, tending of technology machines; Programming of NC machines; Teaching and programming of robots.

PREREQUISITES: Physics, Mechanics, Mathematics.

TEACHING METHODS: Lectures using transparencies and multimedia, tutorials using computer simulations, SCORBOT IX educational robot, and NC ProLight1000 machining center.

METHOD OF ASSESSMENT: Two written open-book tests assessments at mid and end of semester - 45% each, homework and participation - 10%.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1. B. Siciliano, L. Sciavicco, L. Villani, G. Oriolo, Robotics: Modelling, Planning and Control, ISBN 978-1-84628-641-4, Springer-Verlag London Limited 2009. 2. J. J. Craig, Introduction to Robotics: Mechanics & Control, ISBN: 8131718360, Pearson Prentice Hall, Upper Saddle River, NJ, 3rd ed., 2008. 3. The ZODIAC, Theory of Robot Control, C. C. de Wit, B. Siciliano, and G. Basten (Eds), ISBN 3540760547, Springer-Verlag London Limited, 1996. 4. M. W. Spong, Seth Hutchinson, and M. Vidyasagar, Robot Modeling and Control, John Wiley & Sons 2006, ISBN : 978-0-471-64990-8 5. H. Asada and J-J. Slotine. Robot Analysis and Control, Wiley, New York, 1986. 3. K.S. Fu, R. C. Gonzalez, and C.S.G. Lee. Robotics: Control, Sensing, Vision, and Intelligence, McGraw-Hill, St Louis, 1987. 6. M. Shahinpoor. Robot Engineering Textbook. Harper and Row, New York, 1987.

DESCRIPTION OF THE COURSE

Name of the course Quality Control Systems	Code: MpIEe06	Semester: 2
Type of teaching: Lectures and seminars	Lessons per semester: L - 30 hours, S - 30 hours	Number of credits: 4

LECTURERS: Professor Dr Tony Mihova, tel.: 0888 42 45 70, email: mihova@tu-plovdiv.bg;

Assistant Anet Arabadzhieva, tel.: 0888 78 16 59, email: _anet2003@abv.bg
Sofia Technical University – Plovdiv Branch

COURSE STATUS IN THE CURRICULUM: Compulsory course in the curriculum for MEng in Industrial Engineering at the Faculty of Electronics and Automation, FEA.

AIMS AND OBJECTIVES OF THE COURSE: After completing the course students shall be able to apply the approaches, methods and technical means of quality control systems. That aims to form a mindset of quality assurance and to prepare students for decisions making by determination and assessment of source data and application of modern concepts of quality management in design, production and distribution.

DESCRIPTION OF THE COURSE: The main topics concern: Concepts, philosophy, nature and strategy of quality control systems. System elements and documentation, regulatory environment and supervisory bodies. Management bodies, requirements, responsibilities and powers, and audit. Quality policy and management of human resources. Quality management in the production phase of the product (On-line control). Statistical control (SPC) and applications, causal diagrams, Pareto analysis and other approaches. Quality management at the design stage of the product (Off-line control). The method of Taguchi, parameters and criteria of the planned experiments. Deploying the function of quality (QFD), application for services. Errors and analyzes of their effects (FMEA), applications for project and for process. Total quality management, organization and planning. Just-on-time system. Cost of quality, definition and categorization of costs.

PREREQUISITES: Management of industrial production, Quality Control, Human Resource Management, Mathematics and computer skills.

TEACHING METHODS: Lectures using a digital projector and demo applications, seminars in computer class working out in teams variety of problems.

METHOD OF ASSESSMENT: Final written exam in the form of test scoring system included exercises topics in 65:35% up to 100 points.

INSTRUCTIONAL LANGUAGE: English

BIBLIOGRAPHY: 1. Vorley G. Quality Management - Principles & Practice, 5th Ed., 2012, ISBN 1 904302 02 5; 2. Hoyle D. ISO 9000 Quality Systems Handbook, 6th Ed., B-H, 2009, ISBN 9781856176842; 3. Quality Assurance and Management, Ed. Savsar M., InTech, 2012, ISBN 978-953-51-0378-3; 4. Govindarajan V. Management Control Systems, 12th Ed., McGraw-Hill, 2006, ISBN9780073100890; 5. Velge Ir. W. A. J. J., Ravok Consultancy Group - The Netherlands, Lectures, 1996; 6. Logothetis N. Managing for Total Quality, Prentice Hall, 1992, ISBN 0-13-553512-3; 7. Tannock J. D. T. Automating Quality Systems, Springer Netherlands, 1992, ISBN 9789401050449.

DESCRIPTION OF THE COURSE

Name of the course Information technologies	Code: MpIEe07	Semester: 2
Type of teaching: Lectures and laboratory work	Lessons per semester: L - 30 hours; LW - 30 hours	Number of credits: 4

LECTURER:

Assoc. Prof. Ph.D. Maria Marinova - tel.: 032 659 272, email: m_marinova@tu-plovdiv.bg
Technical University of Sofia, Branch Plovdiv

COURSE STATUS IN THE CURRICULUM: Compulsory course in the curriculum for MEng 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 are expected to be able to apply Web-based technologies for database systems, multimedia and hypermedia technologies, Internet services.

DESCRIPTION OF THE COURSE: The main topics concern: Information systems and databases, Database languages, Database management systems (DBMS), Multimedia systems and technologies, Image compression, Design and implementation of multimedia applications, Multimedia software-integration tools, global networks and information systems and services, Web and Web services, multimedia documents in Internet.

PREREQUISITES: Computing I, Computing II, Object-oriented programming.

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

METHOD OF ASSESSMENT: Exam.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1. Malay K. Pakhira, Database Management System, PHI Learning Pvt. Ltd., 2012. 2. Christopher J. Date, SQL and Relational Theory: How to Write Accurate SQL Code, O'Reilly Media, 2009. 3. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer D. Widom, Database Systems: The Complete Book, Prentice Hall, 2008. 4. Thomas Connolly, Carolyn Begg and Anne Strachan, Database Systems, A Practical Approach to Design, Implementation and Management, Addison-Wesley Publishing Company, Inc., 1996. 5. Jeffrey D. Ullman, Principles of Database and Knowledge Base Systems, Volume I, Computer Science Press, 1988. 6. Toolbox II Multimedia Guide, Asymetrix Corporation, 1996. 7. Toolbox II User Manual Guide, Asymetrix Corporation, 1996. 8. Harley Hahn & Rick Stout, The Internet Complete Reference, McGraw-Hills, 1994. 9. ISO 8879: Standard Generalized Markup Language (SGML), 1986. 10. Douglas E Comer, The Internet Book: Everything You Need to Know About Computer Networking and How the Internet Works (4th Edition) Paperback - Amazon, 2006. 11. M. Tamer Ozsu, Principles of Distributed Database Systems, 2011. 12. John Levine, Margaret Levine Young, The Internet of Dummies, 2015.

DESCRIPTION OF THE COURSE

Name of the course: Financial analysis and investments	Code: MpIEe08	Semester: 2
Type of teaching: Lectures (L) Seminar exercises (SE) Laboratory work (LW) Extra - audit employment (EAE)	Hours per semester: L – 30 hours SE – 15 hours LW – 0 hours EAE –75 hours	Number of credits: 4

LECTURER(S):

Assos. Prof. G.Georgiev, PhD, e-mail: georgi@tu-plovdiv.bg, tel.: 032/659706

Chief Assist. Prof. Mariyana Kovacheva, PhD, e-mail: marykovacheva@tu-plovdiv.bg, tel.: 032/659716
Technical University – Sofia, branch Plovdiv

COURSE STATUS IN THE CURRICULUM: Elective subject from the curriculum / curricula for training of students to obtain Master's degree, specialty Industrial engineering, Professional orientation 5.13 General Engineering, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The main educational objectives of the Master's programme are related to the formation of theoretical and practical knowledge and skills regarding the basic principles and techniques of financial analysis and investment activity in the light of the norms of the Bulgarian and European legislation. Students will know the relationship between economics, finance and investment in capital markets. They will know and understand the sources of finance. as well as the application of digital technologies in modern financial services and products.

DESCRIPTION OF THE COURSE: Some of the key topics are dedicated to financial analysis, cryptocurrencies and blockchain technology, as well as derivative financial instruments. Crowdfunding as an alternative source of raised capital for companies is discussed. The nature of the investment process, the features of investment in real assets, the elements of an investment project, methods of assessing the effectiveness of investment, the assessment of business risk and investment risk, the means of subsequent investment analysis, comparative valuations of companies when investing in shares, the valuation of businesses, etc.

PREREQUISITES: Lectures and seminar exercises using interactive learning methods such as practical problem solving and case studies, business games.

TEACHING METHODS: Lectures and seminar exercises using interactive learning methods such as practical problem solving and case studies, business games.

METHOD OF ASSESSMENT: Examination in the form of a test in attendance or in an electronic environment at the end of the semester - 60%; independent work of students during the semester - 40%.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:[1] Landström, H. (2017). Advanced introduction to entrepreneurial finance. Cheltenham [etc.]: Edward Elgar; [2]. Geoffrey, H. and Stanley Block (2011). Fundamentals of Investment Management, McGraw-Hill/Irwin, ISBN-13: 978-0078034626, [3] Frank J. Fabozzi CFA, Harry M. (2011). Equity Valuation and Portfolio Management. Markowitz, Wiley; ISBN-13: 978-0470929919 ;[4] Frank J. Fabozzi. (2012). Bond Markets, Analysis and Strategies, Prentice Hall, ISBN-13: 978-0132743549 [5] Fransis J. Clauss (2010). Corporate financial analysis with Microsoft Excel, McGraw-Hill, ISBN: 978-0-07-162885-3[6] Nenkov, D., "Finansov menidzhmant "Kratk kurs, Universitetsko izdatelstvo „Stopanstvo “, Sofiya, 2008 g.; [7] Kostova, N., „Finansov analiz“, izd. „Aktiv-K “OOD, Varna, 2020;

DESCRIPTION OF THE COURSE

Name of the course Small Business Management and Entrepreneurship	Code: MpIEe09.2	Semester: 2
Type of teaching: Lectures and tutorials	Lessons per semester: L - 30 hours; T - 15 hours	Number of credits: 4

LECTURER:

Assoc. Prof. Eng. Nikolay Katrandzhiev, PhD - telephone: 659 715, email: nkatrandzhiev@tu-plovdiv
Prof. Valentina Alexsieva, PhD email: email: valentina_nikolova@abv.bg – guest lecturer

COURSE STATUS IN THE CURRICULUM: Optional 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 acquaint students with the basic principles of starting and developing own high-technological business with potential for fast growth. The course is focused on the opportunities for development of small businesses and their consecutive transition to multinational companies. Part of the course is dedicated to business planning and the business plan as a key instrument for realisation of these goals. The business plan enables entrepreneurs evaluate financially the potential opportunities for their business and to attract capital.

DESCRIPTION OF THE COURSE: This course is focused on issues related to the management of small businesses and entrepreneurship. After completing the course students: will have general knowledge about the basic managerial principals most relevant to small business management; will know the nature and role of the entrepreneurship in market economy; will be able to develop business plans independently; will be able to analyze different case studies, relevant to entrepreneurship; will be able to evaluate potential business opportunities.

PREREQUISITES: Economics, Industrial Management, Production Management, Management of Human Resources, Management of Projects.

TEACHING METHODS: Lectures supported with power point presentations. Tutorials during which different case studies will be discussed and simulation games interpreting real situations will be done. Further each student will have to work independently on a business plan and defend it front of the lecturer and his colleagues.

METHOD OF ASSESSMENT: Written exam during the exam session (total 70%), development and defence of business plan (total 20%) and evaluation of the work during the tutorials (total 10%).

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:

1. Bessant J., Tidd J., Innovation and Entrepreneurship, John Wiley and Sons, 2011;
2. Evers N., Cunningham J., Hoholm Th., Technology Entrepreneurship: Bringing Innovation to the Marketplace, The Palgrave Macmillan, 2014;
3. Gillin L., Burshtein S., Spinelli S., New Venture Creation: Entrepreneurship for the 21 Century: A Pacific Rim Perspective, McGraw-Hill Education, 2010;
4. Hatten T., Small Business Management: Entrepreneurship and Beyond, South-Western Cengage Learning, 2011;
5. Kuratko D.F., Entrepreneurship: Theory Process Practice - 9th Edition, South-Western Cengage Learning, 2013.

DESCRIPTION OF THE COURSE

Name of course Intelligent Manufacturing Systems	Code: MpIEe10.2	Semester: 2
Type of teaching: Lectures and tutorials	Lessons per week: L - 30 hours; T - 15 hours	Number of credits: 4

LECTURERS:

Assoc. Prof. Eng. Albena Taneva, PhD (FEA), tel.: 032 659 585, e-mail: altaneva@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM:

Optional for the students specialty Industrial Engineering MEng programme of the English Language Faculty of Engineering.

AIMS AND OBJECTIVES OF THE COURSE:

The aim of the course is to teach the mechanical engineering students the originating, development and application problems of artificial intelligence in manufacturing as well as to acquaint them with rational methods of applying different techniques for the establishment of manufacturing systems.

DESCRIPTION OF THE COURSE:

The course contains: current problems of the implementation of artificial intelligence in manufacturing procedures; creation of knowledge systems in the fields of mechanical engineering, and other manufacturing areas; elements of adaptive and production control systems; application of the artificial neural networks, intelligent agents, and fuzzy logic.

PREREQUISITES:

Basic knowledge in the fields of regulation and control devices, and control systems for automated complexes obtained in the B.Sc. and M.Sc. degree course.

TEACHING METHODS:

The course will be taught as a mixture of lectures (incl. visual aids and www-sources), seminars work and tutorials based on the lectures; presentation of an individually prepared report.

METHODS OF ASSESSMENT:

Written test at the end of the 2nd semester and consideration of the written theses and seminars work results.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1. Groover, M., E. Zimmers, CAD/CAM Computer Aided Design and Manufacturing, Prentice Hall International Inc., 2010; 2. Mitchell., F., CIM Systems. An Introduction to Computer Integrated Manufacturing, Prentice Hall International Inc., 1991; 3. Shah, J., M. Mantyla. Parametric and feature Based CAD/CAM. John Wiley and Sons Inc., 1996; 4. Groover, M., Automation, Production Systems and CIM, Prentice Hall International Inc./., 2011; 5. Neshkov, T.Introduction to specialty MECHATRONIC SYSTEMS, HERON PRESS, Sofia,2013; 6. Bosevska, A., T.Neshkov, Intelligent Manufacturing systems, HERON PRESS, Sofia, 2014; 7. Krafter, R., T. Cheniewski, M. Negiu. Robotic Engineering, Prentice Hall International Inc., 1989; 8. Jackson, P., Introduction to Expert Systems. Addison Wesley, 1990

DESCRIPTION OF THE COURSE

Name of the course Product Development using MSC Adams	Code: MpIEe10.3	Semester: 2
Type of teaching: Lectures and tutorials	Lessons per semester: L - 30 hours, T - 15 hours	Number of credits: 4

LECTURER:

**Assoc. Prof. Nikolay Kakanakov Ph.D. tel. 032 959 725; e-mail: kakanak@tu-plovdiv.bg;
Technical University – Sofia, branch Plovdiv**

COURSE STATUS IN THE CURRICULUM: Optional for the students specialty Industrial Engineering, M.Sc. program of the English Language Faculty of Engineering (ELFE).

AIMS AND OBJECTIVES OF THE COURSE: Its main aim is to accomplish the transition from general scientific to design and technological knowledge and give the students the necessary knowledge about the nature of the mechanical systems and their building. ADAMS is a powerful modelling and simulation environment. It enables students to design, visualize, and improve his mechanical system model prior to building a physical prototype. Using ADAMS, students can submit simulations to ADAMS/Solver to compute the force and motion behavior of your system and to write that information to output files. The subject increases the engineering and technical culture of the students and helps for developing of the creative and inventor thinking at designing and improving of various technical means.

DESCRIPTION OF THE COURSE: The MSc Mechanical Engineering course has been designed to reflect the increasing industrial use of complex analytical tools such as Adams Mechanisms, Finite Element Analysis and Solid Modelling techniques. Adams is the most widely used multibody dynamics and motion analysis software in the world. Adams helps engineers to study the dynamics of moving parts, how loads and forces are distributed throughout mechanical systems, and to improve and optimize the performance of their products. Adams multibody dynamics software enables engineers to easily create and test virtual prototypes of mechanical systems in a fraction of the time and cost required for physical build and test. Unlike most CAD embedded tools, Adams incorporates real physics by simultaneously solving equations for kinematics, statics, quasi-statics, and dynamics. Utilizing multibody dynamics solution technology, Adams also runs nonlinear dynamics in a tiny fraction of the time required by FEA solutions. Loads and forces computed by Adams simulations improve the accuracy of FEA by providing better assessment of how they vary throughout a full range of motion and operating environments. The subject matter ranges over the problems of structural, geometrical, kinematical, force analysis and dynamical analysis and synthesis of the mechanisms and machines.

PREREQUISITES: Necessary knowledge of Mathematics (Linear algebra, Analytical Geometry, ODE, Linear differential equations), Physics, Theoretical Mechanics, Theory of Mechanisms and Machines, AutoCAD.

TEACHING METHODS: Visual aids, devices and operating models of mechanisms are using for lectures. The seminars are held in accordance with the curriculum specialized in computer class equipped with a legal copy of the program MSC ADAMS.

METHOD OF ASSESSMENT: Written test at the end of the 2-nd semester.

INSTRUCTIONAL LANGUAGE: English

BIBLIOGRAPHY:

1. Support systems: MSC ADAMS®, SolidWorks®, Autocad®, Pro/Engineer®;
2. Russell C. Hibbeler, Russell C Hibbeler, Engineering Mechanics: Dynamics (9th Edition), December 22, 1997;
3. Murilo G. Coutinho, Dynamic Simulations of Multibody Systems, Jul 1, 2001;
4. Arthur G. Erdman, George N. Sandor, Mechanism Design: Analysis and Synthesis (4th Edition), May 15, 2001;
5. Garabitov Stefan, Product Development using MSC Adams, TU Sofia, Jan, 2012.

DESCRIPTION OF THE COURSE

Name of the course: Fundamentals of design and construction	Code: MpIEell	Semester: 2
Type of teaching: Lectures, Tutorials, Course project	Lessons per semester: L - 15 hours; T - 30 hours; CP - 2,1 hours/student	Number of credits: 3

LECTURER:

**Assoc. Prof. Dr. Margarita Deneva, tel.: 9032 659 739, email: deneca@tu-plovdiv.bg
Technical University of Sofia, Branch Plovdiv**

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

AIMS AND OBJECTIVES OF THE COURSE: To give knowledge about the principles and the essence of the engineering design. Based on the systematic approach to the design, planning and organization design methods, role of real engineering calculations and assessment procedures are discussed.

DESCRIPTION OF THE COURSE: The main topics concern: Introduction to the engineering design, types of engineering projects, main goals and tasks of the design, basic input considerations; Main stages of the engineering design project - preliminary analysis, solution versions, comparison and assessments; Planning methods and organization of the entire project process - The Gant charts, PERT approach, network planning; Economic factors as part of the whole design process - fixed and variable cost components of the project; Development and investigation of the models as part of the engineering project, computer aided approach and technologies; Documentation of the engineering project - main requirements at the preliminary and final project stages; Analysis of some real engineering project examples.

PREREQUISITES: Physics, Electrical Engineering I, Electrical Engineering II, Computing, Material Science, applied Geometry and Engineering Graphics.

TEACHING METHODS: Lectures, using slides, case studies, tutorials and course project of a real electric board for a.c. motor starting unit, course project description preparation and defense. Available copies of the lectures, visualization of the tutorials with real components for the design project preparation, copies of all necessary materials for the design project preparation.

METHOD OF ASSESSMENT: Individual work during the semester (10%), plus log book (20%), plus project written report (50%), plus viva presentation (20%).

INSTRUCTIONAL LANGUAGE: English.

BIBLIOGRAPHY:

1. B. Hawkes, R. Abinett, The Engineering Design Process, Longman, London, 1990; 2. J. Corbett, M. Dooner, J. Meleka, C. Pym, Design for Manufacture Strategies, Principles and Techniques, Addison-Wesley Publishing Ltd., 1991; 3. B. Wu, Manufacturing Systems Design and Analysis, Chapman & Hall, London, 1992; 4. J. Harpool, R. Culp, R. Galehouse, Systems Analysis and Design Projects, Times Mirror/Mosby College Publishing, ST. louis, 1987.

DESCRIPTION OF THE COURSE

Name of the course: Diploma Project	Code: MpIEe13	Semester: 1, 2
	Hours per semester: 1st Semester 240 2 nd Semester 210	Number of credits: 15