|  |  |  |
| --- | --- | --- |
| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES *AGROINDUSTRIAL ENGINEERING*  |

|  |
| --- |
| Table 5.2A Course specification – Elective |

|  |  |
| --- | --- |
| Course: | **English Language**  |
| Course id: 3ОАI5I37 |
| Number of ECTS: 6 |
| Teacher: | Bojana B. Komaromi, Aleksandar M. Jagrović, Igor Đ. Cvijanović |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures: 2 | Tutorials: 2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

Acquisition, consolidation and enhancement of basic patterns of grammar, pronunciation, spoken and written language in order to educate students for formal and informal communication in General English. Introducing student to basic specialist literature, i.e. basic terms and concepts in agriculture and the relevant study programme. |
| 1. Educational outcomes

Students will be capable of active usage of General English at the elementary, pre-intermediate or intermediate level in both spoken and written medium depending on the course level they attended (A1, A2 or B1 according to the *Common European Framework of Reference for Languages*). Students will also be able to recognise and actively use basic specialist terms and concepts in agriculture and the relevant study programme.  |
| 1. Course content

*Theoretical instruction*Phonetics: Correction of students’ pronunciation, accent and intonation according to one of the standard dialects of the English language (British and/or American). Morphology: Nouns – plural, gender, genitive. Pronouns – personal, possessive, question, relative and reflexive. Adjectives – formation and comparison. Adverbs – Formation, place and comparison. Verbs – Forms, auxiliaries, modal verbs, tenses, gerund. Syntax: Word order, clauses, sentences, sentence organisation. Lexical forms – phrasal verbs, idioms, collocations and compounds. Translation – Bilingual translation: from Serbian into English and vice versa. *Practical instruction*Spoken language practice in practical everyday situations. Development of translation skills and techniques. Grammar activation in communication. Delivering specialist presentations in English.  |
| 1. Teaching methods

Lectures, tutorials, consultations. Working in small groups and pairs. Individual work with audio-visual equipment. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam  | Mandatory | Points |
| Lecture attendance | Yes/No | 10 | Written exam |  | 20 |
| Oral Exam |  | 30 |
| Test | Yes/No | 2 x 15 |  |
| Tutorials attendance | Yes/No | 10 |
| Other | Yes/No |  |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
|  | Liz and John Soars, Amanda Maris | *New Headway Elementary*, 4th Ed | Oxford University Press | 2011 |
|  | Liz and John Soars, Amanda Maris | *New Headway Pre-Intermediate*, 4th Ed. | Oxford University Press | 2011 |
|  | Liz and John Soars, Amanda Maris | *New Headway Intermediate*, 4th Ed. | Oxford University Press | 2011 |
|  | Whitby N. | *Business Benchmark – BEC Preliminary* | Cambridge University Press, 6th Printing | 2009 |
|  | Gajić Ranka, | *English in Agriculture* | Naučna knjiga KMD, Beograd | 2005 |
|  | Murphy R. | *Essential English Grammar in Use, 3rd Ed.* | Cambridge University Press | 2010 |
|  | Murphy R. | *English Grammar in Use, 3rd Ed.* | Cambridge University Press | 2010 |

|  |  |
| --- | --- |
| Course: | **Principles of Economy** |
| Course id:3ОАИ5И38 |
| Number of ECTS:6 |
| Teacher: | dr Danica Drakulić, full prof., MSc Mirela Tomaš-Simin, teaching assistant, MSc Danica Glavaš-Trbić, research associate |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures:2x15=30 | Practical classes:2x15=30 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

Introduce students to the fundamental principles of economic science. The course offers economic concepts, categories, processes and ways of thinking that apply to a modern market economy. |
| 1. Educational outcomes

Selected and key economic issues give students close interpretation of the principals of economic trends, economic developments and economic policy in general. In a theoretical frame and study of the economic concepts in the field of production, distribution and consumption of student acquires the necessary knowledge and guidance for the future economic life. |
| 1. Course content

*Lectures*On the concept and the importance of the economy. The basic components of production. Determinants of production. Enterprises and economic institutions. Economic factors (resources) of production. Specifics of agriculture and capital investment. The basic principles of economics. Principles of economics in agriculture. Markets and market relations. Pricing of goods and factors of production. Households and firms as market participants. The main economic issues and different economic systems. Money and monetary policy. The modern world development trends. Transition. Globalization.*Practical classes*The practical classes are conducted through essays with the active participation of students in the discussion. Topics on exercises are adapted to curriculum of lectures. Some of the topics: introductory categories of economics and basic concepts of economics, elements and mechanisms of classical and modern capitalist economy, the concept and history of money, basic production unit of reproduction, market, market participants and market relations, multinational and transnational companies, stock exchange operations, crises in the economy, the causes and consequences of transition and privatization, scientific-technical revolution and its impact on the world economy. |
| 1. Teaching methods

Theoretical and practical lecture are conducted in the classroom. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam  | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Oral part of the exam* | Yes | 50 |
| Test | Yes | 30 |  |
| Exercise attendance | Yes | 5 |
| Essays | No | 10 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
|  | Pejanović Radovan | Principles of Economics (In Serbian Principi ekonomije) | Faculty of Agriculture  | 2007 |
|  | Samuelson Pol | Economy (In Serbian Ekonomija) | Mate | 2000 |

|  |  |
| --- | --- |
| Course: | **Installations** |
| Course id: 3ОАИ5И39 |
| Number of ECTS: 6 |
| Teacher: | Prof. Dr. Todor Janić |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures: 2 | Practical classes: 2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

Introducing students to the basic concepts and forms of installations that are applied to processing plants processing of biomaterials. |
| 1. Educational outcomes

Training students to know and understand the problems of the basic concepts of performance installations that are applied to processing plants processing of biomaterials. The knowledge acquired on the subject are the basis for the understanding of engineering issues connecting processing plants and distribution methods of working fluids and energy plants. Knowing the essence of appropriate technological operations in the respective technology is essential in defining and designing installations in plants. |
| 1. Course content

Introduction to object definitions and classification installation. Hydro: 1. Determination of the dimensions of the pipeline. degree of safety, material characteristics, the recommended flow velocity, standard measures, control measures, dimensions and materials 2. Calculation of wall thickness in terms of internal pressure and external loads, accessories 3. Flanged connections, types, varieties, selection, and calculation of welds 4˝ in diameter. Examples of budget self-compensation with and without prestressing 5. Calculations and dimensioning of axial compensator and the budgets force without channel laid pipelines. 6. Calculations force in supports, sizing and selection of supports. Arrange supports. 7. Calculation of thermal protection, the choice of insulation - insulation characteristics of the material 8. Sizing, and materials selection, sealing components 9. Determination abducted mass flow and sizing of safety valves 10.Primeri sizing, placement and selection of control valves. Pneumatic installation: materials, lines, fittings, joints and types of compounds, elements specific purposes, commissioning, certification.Electrical installation, familiarization with basic electrical wiring. Lines, divorce, active and passive elements, elements of protection. |
| 1. Teaching methods

Exercise, Other modes of teaching, Study research workPractical teaching is consistent with theoretical instruction. In the exercises, students work methods for the calculation of the investigated technological operations in the form of material balance and the method of calculation of individual installations. At the selected theme student writes a seminar paper that consists of excerpts from the theory analyzed technological units and a budget of concrete data on the plant.Na primer: Lectures, Practice/ Practical classes, Consultations, study, research work… (izabrati) |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam  | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Theoretical part of the exam* | Yes | 80 |
| Test | Yes | 10 |  |
| Exercise attendance | Yes | 5 |
| Term paper | Yes | 10 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
|  | Adamović, Ž | Fundamentals of Hydraulics and Maintenance of Oil-Hydraulic Systems (In Serbian Osnovi hidraulike i održavanjauljno-hidrauličnih sistema) | Zavod za udžbenike, Beograd | 1997 |
|  | Bogner,M | Termotehničar (In Serbian Termotehničar) | Interklima grafika Vrnjačka Banja | 2003 |
|  | Šašić, M | Budget transport fluid and solid materials by tube (In Serbian Proračun transporta fluida i čvrstih materijala cevima) | Naučna knjiga, Beograd | 1989 |

|  |  |
| --- | --- |
| Course: | **Plants for the Production of Liquid Biofuels** |
| Course id:3ОАИ5И40 |
| Number of ECTS:6 |
| Teacher: | Prof. Dr. Milan Tomić |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures:2 | Practical classes:2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

The aim of the course is to introduce students with current technologies and solutions derived plant for the production of liquid biofuels (biodiesel and bioethanol), which will enable them to independently design facilities in all adhering to the best achievements in the technological process of their production. Introducing students to the structure and sequence design. Introducing students to the structure and sequence of technical investment activities during construction. |
| 1. Educational outcomes

Training students to create project tasks, projects and to coordinate technical activities during the decision-making and realization of investment construction of facilities for the production of liquid biofuels. |
| 1. Course content

Theoretical classesTechnical terms and definitions in the construction. Ordering investment activities. Preparation and analysis of conceptual design. Defining project task. Technical aspects of the tender for construction. The structure and sequence of investment-technical documentation. Tender for the design and construction. The main projects. Special projects. Infrastructure. Analysis of environmental and energy aspects of the investment. Internal and external control of the project. Approval for construction. Building and construction supervision. The test operation and technical acceptance. Legal regulations on investment and technical construction. Planning and evaluation of investment construction. Raw and auxiliary materials in the production of biodiesel. Description of the technological process. Process parameters for biodiesel production. The staff at the factory for the production of biodiesel. Explosion Proof factory biodiesel. Laboratory quality control of biodiesel. Choice of equipment in the factory for the production of biodiesel. Technical requirements for the execution of works in the construction of facilities for the production of biodiesel. Raw and auxiliary materials in the production of bioethanol. Description of the technological process. Process parameters of the production of bioethanol. The staff at the factory for the production of bioethanol. Explosion Proof factory bioethanol. Laboratory quality control of bio-ethanol. Choice of equipment in the factory for the production of bioethanol. Technical requirements for the execution of works in the construction of facilities for the production of bioethanol.Getting to know the regulations in the area that is studied.Practical teaching: Exercise, Other modes of teaching,Technical terms and definitions in the construction. Analysis of the sequence of examples of investment activities. Preparation and analysis of conceptual design. The budget process parameters for biodiesel production. Budget balance mass per batch. Calculation of selected equipment. Creating a situation plan plant for the production of liquid biofuels. Making scheme biodiesel plant.Calculation of process parameters in the production of bioethanol. Budget Balance mass per batch. Calculation of selected equipment. Creating a situation plan plant for the production of bioethanol. Making scheme plant for the production of bioethanol. |
| 1. Teaching methods

Lectures with the use of video presentations, demonstration exercises in laboratory and field conditions, assignments, lab and seminar work, testing under laboratory and field conditions and consultation within the lectures and exercises. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam | Mandatory | Points |
| Lecture attendance | Yes | 5 | Oral part of the exam and Written part of the exam-tasks and theory | Yes | 50 |
| Test | Yes | 20 |  |
| Exercise attendance | Yes | 10 |
| Graphic works | Yes | 15 |  |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Robert E. McCabe, Philip G. Lanckton | Metering pump handbook | Industrial Press Inc. | 1984. |
| 2. | Domingos Padula, A., Silveira dos Santos, M., Benedetti Santos, O.I., Borenstein, D. (Eds.) | Liquid Biofuels: Emergence, Development and Prospects | Springer | 2014 |

|  |  |
| --- | --- |
| Course: | **Taxation** |
| Course id: 3ОАИ6И41 |
| Number of ECTS: 6 |
| Teacher: | Nedeljko Lj. Tica |
| Assistant: | Stojan B. Kostić |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures: 2 | Tutorials: 2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | Management of Fruit and Viticultural Production, Management of Crop Production  |
| 1.Educational goalsIntroducing students to the specifics of tax accounting in agricultural production and basic accounting. |
| 2.Educational outcomesUpon the completion of the course, students are enabled to do tax accounting and follow taxing documentation. |
| 3.Course content*Theoretical instruction:*  Basics of tax system. Taxing terminology (taxpayer, taxation objects, tax base, tax rate and tax relief). The concept and characteristics of tax. Taxation principles (financial, economic, social and political, taxing and technical). Taxation capacity. Taxation system classification. Taxation monism, taxation pluralism, taxation limits. Income tax. Value-added tax. Personal income tax. Property rights transfer tax. Taxation of the use, maintenance and possession of certain assets. Income fund taxation. Stocks. The code of conduct in taxation. Enterprise financing. Tax system and policy. Tax control and revision. Managing fiscal policy. International tax and budget management. Comparative tax systems. Informational financing system. *Practical Instruction:* Basics of tax system. Determining tax duties. Object of taxation. Taxpayer. Tax base. Tax rates. Tax reliefs. Special and tax balances. |
| 4.Teaching methodsLectures, tutorials with demonstrational and practical tasks. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam  | Mandatory | Points |
| Lecture attendance | Yes/No | 15 | Written exam  | Yes/No | 40 |
| Tutorial attendance | Yes/No | 15 | Oral exam | Yes/No | 30 |
| Seminar paper (1) | Yes/No | - |  |  |  |
| Tests (2) | Yes/No | - |  |  |  |
| Other | Yes/No | - |  |  |  |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Popović, D. | Science on taxes and tax law (In Serbian Nauka o porezima i poresko pravo) | Savremena administracija, Beograd | 1997 |
| 2. | Raičević, B. | Identification and collection of public revenues (In Serbian Utvrđivanje i naplata javnih prihoda) | Viša poslovna škola, Beograd | 1977 |
| 3. | Pušara, K. | International finance (In Serbian Međunarodne finansije) | Velzal press, Beograd | 2000 |
| 4. | Dougals R. Emery, John D. Finnerty | Corporate financial managment | Prentice hall, UperSadde River, | 1998 |
| 5. | Schneeberger, K, Osborn, D, Ljutić, B. | Financial planning in agribusiness (In Serbian Finansijsko planiranje u agrobiznisu) | Pandagraf, Beograd | 1995 |

|  |  |
| --- | --- |
| Course: | **Environmental Engineering and Safety** |
| Course id: |
| Number of ECTS: |
| Teacher: | Mirko Simikić PhD, Assistant professor |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures:2 | Practical classes:2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| **Educational goal**The objective of the course is to familiarize students with environmental engineering through understanding of the human and natural environment and their way of functioning in order to understand how they may be endangered and what type of risks arise with environmental pollution. Also, students should become familiar with the hazards and protective measures at work in the agro-industry. |
| **Educational outcomes**Upon passing the exam, the student acquires knowledge and skills which enable him to protect people from the risks caused by the quality of air and water, proper waste disposal and protection from the harmful effects of all types of human activity. The student acquires knowledge and skills which enable him to recognize hazardous places in facilities and biotechnical systems for the processing of agricultural products and implementation of domestic and international standards and regulations relating to safety measures in the workplace in agro-industry. |
| **Course content***Theoretical lessons*. Introduction to ecological engineering; The system of environmental management and environmental standards; Basics of environmental engineering; Air – generation of air pollution, sources of air pollution, distribution of hazardous components, the determination of emissions of solids and gases, methods and devices for gas purification, air quality in a polluted area, air protection strategy; Water protection - resources, water pollution, water treatment; Solid waste; Hazardous waste; Specifics of the agro-industry from the standpoint of work safety; Mechanical and thermal injuries at biotechnical systems for processing agricultural products. Fire prevention and explosions in agro-industry; Noise in the agro-industry - noise sources, hearing protection, legislation.*Practical teaching*: Exercises, Other methods of teaching, Research workSafety measures against risks caused by are and water quality, proper waste disposal and protection from the harmful effects of all types of human activity. Recognition of hazardous places in agricultural facilities. Recognition of hazardous parts on biotechnical systems for the processing of agricultural products. Analysis of hazardous places and parts and defining preventive measures. Introduction to safety equipment which is used for protection when working in the agro-industry. Identifying security labels and warnings on machines and devices which are used in the agro-industry. Measurement of noise- introduction to equipment for measurement and on-site measurement of noise inside the agricultural facilities.  |
| **Teaching methods**The method of oral presentations and discussions. Methods of presentation, demonstration, simulation, drawing and illustration. Consultations and seminar papers. The method of practical work in laboratories and at the Institute. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam  | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Oral part of the exam* | Yes | 60 |
|  |
| Exercise attendance | Yes | 5 |
| Term paper | Yes | 30 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
|  | Pavlović M. | Environmental Engineering | Technical faculty "Mihajlo Pupin" Zrenjanin | 2002 |
|  | Nikolić et al | Mechanical and thermal injuries in agriculture | Faculty of agriculture Novi Sad | 2009 |
|  | Tešić et al | Safety in agriculture | NIP „Zaštita rada“, Beograd | 1995 |

|  |  |
| --- | --- |
| Course: | **Waste Materials and Environmental Protection** |
| Course id:3ОАИ6И43 |
| Number of ECTS:6 |
| Teacher: | Prof. Dr Meši Mihal |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures:2 | Practical classes:2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

Introducing students with the forms and sources of environmental pollution that are the product of the food industry. Methods and devices that are used to reduce environmental pollution. Introducing the legislation in the field of environmental protection regulations and standards. |
| 1. Educational outcomes

Ability of students to identify the forms of environmental pollution, the sources of their formation, prevention measures, methods of measuring pollution, knowledge of legislation. |
| 1. Course content

Theoretical classesIntroducing the legislation in Serbia and Europe in the field of environmental protection. Introduction to basic concepts in the field of environmental protection: emission, MDK, MDD, MDE. Noise pollution, pollution sources, allowable noise level, measurement methods and equipment, methods of preventing the spread of noise. Air pollutants (sulfur oxides, nitrogen oxides, carbon oxides, highly volatile, halogenated hydrocarbons). Sources of air pollution values allowed under applicable regulations, all measurement methods. Devices for air purification. Water pollutants (heavy metals, salts, microorganisms, thermal pollution, organochlorine products). Methods of preventing water pollution devices for wastewater treatment, methods of measurement of water pollution. Solid waste, solid waste management, solid waste harmfulness. Dealing with agricultural waste: waste collection, waste material of animal origin, waste vegetable origin, methods of utilization of agricultural waste. Recycling and hazard in environmental protection.Practical classes: Exercise, Other modes of teaching,Learn methods of measurement of certain forms of pollution according to the applicable regulations for measurements: the noise level, the concentration of polluting elements of solid and gaseous air, the concentration of polluting elements in water and solid chemical compounds. Measuring the flow of waste to be discharged from point sources in the environment. The Seminar work.  |
| 1. Teaching methods

Lectures with the use of video presentations, demonstration exercises in laboratory and field conditions, assignments, lab and seminar work, testing under laboratory and field conditions and consultation within the lectures and exercises. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | No |  | *Oral part of the exam* | Yes | 30 |
| Test | Yes | 60 |  |
| Exercise attendance | No |  |
| Seminar work | Yes | 10 |  |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
|  | Moffitt, DC, and Wilson, B. | Evaluating the design and management of wastestorage ponds - Part II. . | ASAE Paper 044072; St. Joseph, Mich.: ASAE. | 2004. |
| 2. | United StatesDepartment ofAgriculture | Laws, Regulations, Policy, and Water Quality Criteria , parts 651, Agricultural Waste Management Field Handbook | United StatesDepartment of Agriculture | 2009. |

|  |  |
| --- | --- |
| Course: | **Horticulture Production in Greenhouse Construction** |
| Course id: 3ОАИ6И44 |
| Number of ECTS: 6 |
| Teacher: | Anđelko M. Bajkin, PhD, Full professorMilivoj Radojčin, MSc |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures: 2 | Practical classes: 2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

Introduction to students with the phases of design, construction and equipping of greenhouses and applied technique and technology of production. |
| 1. Educational outcomes

Mastery the scientific and practical methods for solving specific problems in the field of design, construction and equipping of greenhouses and applied techniques and production technology. |
| 1. Course content

*Theoretical classes:* Technical characteristics of greenhouses. Materials used in the construction of greenhouses. Growing conditions of horticultural plants. Technology of production in greenhouses. Access control microclimate conditions in greenhouses (heating, ventilation, air-conditioning, shading, etc.). Machinery and equipment for the preparation of your substrate. Apparatus and equipment for disinfection land. Machines and devices of seedlings production in nutrient cubes, containers and pots. Specifics of machinery for greenhouse production. Seeding and planting. Machines for soil mulching plastic film and film in the greenhouse. Systems and equipment for irrigation and plant supplements. Systems and equipment for protection of plants. Measurement, regulation microclimate conditions in the greenhouse. Process Automation. Machinery, equipment and plants for harvest.*Practical teaching: exercise, other modes of teaching,*Tasks, laboratory and field exercises in the aforementioned lessons |
| 1. Teaching methods

Lectures, Practical classes, Consultations, study,  |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam | Mandatory | Points |
| Lecture attendance | Yes | 5  | *Oral part of the exam* | Yes | 50 |
| Exercise attendance | Yes | 5 |  |
| Term paper | Yes | 40 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
|  | Bajkin A: | Mechanization in vegetable production (in Serbian: Mehanizacija u povrtarstvu)  | University of Novi Sad,Faculty of Agriculture, Novi Sad, | 1994. |
|  | Bajkin A, Ponjičan O, Orlović S, Somer D:  | Mechanization in horticultural production  (in Serbian: Mašine u hortikulturi) | University of Novi Sad,Faculty of Agriculture, Novi Sad, | 2005. |

|  |  |
| --- | --- |
| Course: | **Agricultural Mechatronic** |
| Course id: ZOAI7I45 |
| Number of ECTS: 6 |
| Teacher: | Branislav A. Karadžić |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures: | Practical classes: | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | Mathematics, Electrical engineering and electrical machines |
| 1. Educational goal

Introducing students to the principles of functioning of mechatronic systems in the agro-industry. |
| 1. Educational outcomes

Multidisciplinary engineering knowledge required to work independently with mechatronic equipment in the agro-industrial systems. |
| 1. Course content

Introduction to Mechatronics, definition, review and distribution of mechatronic systems. The structure of mechatronic systems. The application of measurement techniques in mechatronics. Actuators mechatronic systems. Mechanical, hydraulic, pneumatic, electromechanical, electronic and optical components of mechatronic systems. The modeling of mechatronic systems. Management of mechatronic systems. Mechatronic systems applied in the agro-industry. |
| 1. Teaching methods

Lectures, Practical classes. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam  | Mandatory | Points |
| Lecture attendance | Yes/No | 5 | Written part of the exam-tasks and theory | Yes | 40 |
| Test | Yes/No | 30 |  |
| Exercise attendance | Yes/No | 5 |
| Term paper | Yes/No | 20 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
|  | Isermann R. | Mechatronic Systems | Springer-Verlag London | 2005. |
|  | Bishop R. H. | Mechatronic Handbook | CRC Press | 2002. |
|  | Munack A. | Information Technology (CIGR Handbook of Agricultural Engineering) | ASABE, MI, USA | 2006. |

|  |  |
| --- | --- |
| Course: | **Quality management** |
| Course id:3OAI7I46 |
| Number of ECTS:*6* |
| Teacher: | Prof. Dr. Jan Turan |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures: 2 | Practical classes: 2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None/navesti ako ima |
| 1. Educational goal

Introduce students to the methods of defining, implementing and maintaining quality systems in plants agroindustrial system starting from their design, construction and operation.The outcome of cases |
| 1. Educational outcomes

After completing the course and passing the exam, the student is qualified to understand the principles and the way business is conducted during the design, construction and operation of plants in agro-industry.Outline |
| 1. Course content

Theory lessonsThe concept of the modern techniques of quality management. Quality system. Quality management. Standardization. Methodology. The quality control. Quality Engineering. The quality of the environment. Quality and management: quality as a global phenomenon, the relationship of business functions in the enterprise, the importance of quality is the market position of the company and its competitive ability. The series of international standards ISO 9000: origin and evolution of standards, development of a series of standards ISO 9000: 1994 (the structure of a series of standards) version of ISO 9000: 2000.Opšte characteristics of quality management system documentation, costs, benefits from the introduction of quality management systems. Quality tools: the necessity of quality tools. The series of international standards ISO 14000: origin, evolution, applicability, implementation and certification process. The series of international standards ISO 18001: origin, evolution, applicability. HACCP: basic principles and methods of implementation, the importance for the national economy. ISO 22000: the importance of new approaches. IMS - Integrated Management Systems: Requirements, fundamentals, design. Methods of collecting, processing and analyzing data, the quality of implementation and stability of work activities. Techniques of measuring the quality of products obtained.Practical teaching: Exercise, Other modes of teaching, Study research workLaboratory and field exercises in the quoted unit. Examples from practice. Seminar or project works from the aforementioned lessons. |
| 1. Teaching methods

Methods of presentations, demonstrations, simulations and illustrations. Laboratory-experimental methodsNa primer: Lectures, Practice/ Practical classes, Consultations, study, research work… |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Theoretical part of the exam/* | Yes | 51 |
| Test | Yes | 40 |  |
| Exercise attendance | Yes | 4 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Đorđević, D., Ćoćkalo, D. | Quality management (In Serbian Upravljanja kvalitetom) | Tehnički fakultet "Mihajlo Pupin", Zrenjanin | 2007 |
| 2. | Majstorović, V | Quality systems - management strategy (In Serbian Sistemi kvaliteta – Strategija menadžmenta) | JUSK, Beograd | 1994 |

|  |  |
| --- | --- |
| Course: | **Мanagement of Installation** |
| Course id:3ОАИ7И47 |
| Number of ECTS:6 |
| Teacher: | Associate professor Mihal O. Meši |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures:2 | Practical classes:2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None/navesti ako ima |
| 1. Educational goal

Acquiring knowledge about the methods and procedures of seed processing of basic agricultural crops. |
| 1. Educational outcomes

Knowledge of seed processing related to basic principles and methods of processing, seed characteristics, the classification process technology, equipment and procedures. Knowledge of basic processing of agricultural crops. |
| 1. Course content

Introduction to the theory of assembly systems. Basic concepts and definitions. Mounting position in the overall process of designing devices and systems. Sizes that affecting the assembly process. The impact of the construction on the process of mounting. Structuring elements for assembly. Analysis of the characteristics of the elements for assembly and mounting arrangements. The choice of technologies and methods of assembly process. Workshop and field installation. Determination of the number and order of the intervention - a network diagram. The degree of division of labor. Determination of the time and cost of operations. Production of technological maps for each operation assembly. Design of technological systems for manual, mechanized and automated assembly. Secondary and primary resources for mounting. Choice of standard elements. Design of non-standard elements for assembly. Design of complex technological systems for installation. The selection system for material handling and storage. Shaping the spatial structure of the system for installation |
| 1. Teaching methods

Na primer: Lectures, Practice/ Practical classes, Consultations, study, research work…  |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam  | Mandatory | Points |
| Lecture attendance | Yes/No | 5 | *Theoretical part of the exam* | Yes | 35 |
| Test 1 and Test 2 | Yes/No | 15+15 |  |
| Exercise attendance | Yes/No | 15 |
| *Term paper* | Yes/No | 15 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
|  | Zelenović D. and Ćosić I. | Mounting systems (In Serbian Montažni sistemi) | Nauka | 1991 |
|  | Ćosić I, Radaković N, Maksimović R. | Basics of working processes in industrial systems: A guide for adjusting the processes in processing and assembly (In Serbian Osnove radnih postupaka u industrijskim sistemima: Priručnik za određivanje vremena rada u procesima obrade i montaže) | Fakultet tehničkih nauka | 1991 |

|  |  |
| --- | --- |
| Course: | **Quality Standards** |
| Course id:3OAI7I48 |
| Number of ECTS: 6 |
| Teacher: | Prof. Dr Jan Turan |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures: 2 | Practical classes: 2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

Knowledge of the concepts of standardized quality management and application field of quality management. |
| 1. Educational outcomes

Mastering standardized terminology and concepts of quality management and application field of quality management |
| 1. Course content

The concepts of quality management (terms relating to the quality of the process and terms relating to the management), quality planning terms (terms that relate to processes and those related to metrology), quality control concepts (terms relating to the propriety results of the process and terms relating to the review), quality assurance concepts or terms relating to organization, documentation and verification, terms of improving quality.Application of quality management, examples of quality planning, quality control of examples, examples of quality assurance and quality improvement examples. |
| 1. Teaching methods

Oral presentation with the use of modern equipment for visual presentation and simulation. Practical exercises -rešavanje tasks of quality managementPractice/ Practical classes |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Theoretical part of the exam* | Yes | 50 |
| Test | Yes | 30 |  |
| Exercise attendance | Yes | 15 |
|  |  |  |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
|  | Branko Z, Popović i Ljiljana Miletić | Examples of solved tasks of quality management (In Serbian Primeri rešenih зadataka iz upravljanja kvalitetom) | Akademska misao, Beograd, | 2003 |
|  | ISO 9000:2000 | Quality managment system - Fundamentals and vocabulary,  | International organization of standardization Geneve | 2000 |
|  | Pavlović M.D. et al. | Quality system - Improvement and techniques (In Serbian Sistem kvaliteta - Unapređenje i tehnike) | Fakultet tehničkih nauka, Novi Sad | 1994 |