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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***CHEMISTRY***  |
| Course id:3OFM1O01 |
| Number of ECTS: 7 |
| Teacher: | Prof. dr Dubravka Štajner, Prof. dr Boris Popović |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 4 | Practical classes: 3 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None/navesti ako ima |
| 1. Educational goal

Providing the basis for the formation of a certain view of the world, getting to know the most important principles, theories and laws of chemistry, providing theoretical basis for acquiring other skills, mastering specific skills related to the application of theoretical knowledge, the development of creative skills and practical skills necessary for the exercise of the profession. |
| 1. Educational outcomes

After completing the course of chemistry, students will train the application of theoretical and practical knowledge of chemistry both in life and in the acquisition of other knowledge (eg, biochemistry, agrochemistry, microbiology, physiology, etc.). In terms of practical knowledge and skills students will be able to compute in chemistry, handling basic laboratory equipment, perform basic volumetric determinations and basic instrumental measurements. In addition to this, students should be able to continue their studies or to apply their knowledge and understanding of the profession and to convey it to others. |
| 1. Course content

Theoretical classes:Introduction. Basic concepts and laws of chemistry. Chemical formulas and equations. Atomic structure and arrangement of electrons in an atom. The structure of atoms and the periodic table of elements. The structure of the molecule. Electron theory of chemical bonding. The main types of inorganic compounds. Intermolecular interactions and states. Basics of thermochemistry, chemical kinetics and chemical equilibrium. The solutions. Electrolytic dissociation and equilibrium in electrolyte solutions. Acids and bases. Hydrolysis and buffers. Oxidation-reduction processes. The redox potential. Colligative properties. Koliodi. Chemical properties of biogenic elements. The most important compounds of biogenic elements and their significance. Structure and classification of organic compounds. Hydrocarbons. Halogen, hydroxy and carbonyl hydrocarbons. Carboxylic acids and carboxylic acid derivatives of biologically important. Amines. Heterocyclic compounds. Carbohydrates. Simple and complex lipids. The peptides and proteins. The nucleic acids. Secondary biomolecules of plants and their significance.Practical teaching: Methods for separation and purification of substances. The stoichiometry. Quantifying the composition of the solution. Electrolytic dissociation and pH. Acid-base titration. Permanganometry. Potentiometric titration. Spectrophotometry. Hydrocarbons and for all their reaction. Chemical reactions of individual groups of organic compounds (alcohol, phenol, carbonyl compounds, carboxylic acids and acid derivatives). Chemical reactions of primary biomolecules. |
| 1. Teaching methods

Theoretical classes and practical exercises. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes | 3 | *Theoretical part of the exam/Oral part of the exam/Written part of the exam-tasks and theory* | Yes | 55 |
| Test | Yes | 20 |  |
| Exercise attendance | Yes | 2 |
| colloquium | Yes | 20 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
|  | Gorzynski Smith, J. | General, Organic &Biological Chemistry | Published by McGraw-Hill, New York. | 2010. |
|  | Štajner, D., Kevrešan, S. | Chemistry | Faculty of Agriculture, Novi Sad | 2006. |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***PRINCIPLES OF ECONOMICS*** |
| Course id:3OFM1O02 |
| Number of ECTS:6 |
| Teacher:Exercises: | Radovan V. Pejanović, PhD, full professor, Danica M. Drakulić, PhD, full professorMirela J. Tomaš-Simin, Msc, Teaching Fellow, Danica B. Glavaš-Trbić, MSc, Research Assistant |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures:3x15=45 | 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 exercises are conducted through essays with the active participation of students in the discussion. Topics on exercises are adapted curriculum 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 social 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 | Principi ekonomije | Poljoprivredni fakultet, Novi Sad  | 2007 |
|  | Samuelson Pol | Ekonomija | Mate, Zagreb | 2000 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***MICROBIOLOGY***  |
| Course id: ZOHK1O03 |
| Number of ECTS:6 |
| Teacher: | Ass. Prof. Simonida Djuric, PhD  |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures:45 | Practical classes:30 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

To acquaint students with basic characteristics and strains of microorganisms and their role in the cycling of matter, the creation and maintenance of soil fertility, role in crop production and the possibilities of their application. |
| 1. Educational outcomes

Acquired knowledge in microbiology are the basis for understanding and monitoring teaching of agrochemicals, plant physiology, plant protection, general husbandry, farming, and forage crops |
| 1. Course content

Lectures:General part: Morphology of microorganisms. Ecology of microorganisms, systematic groups – viruses, bacteria, algae, protozoa, fungi, lichen. Microbial metabolism – absorption of nutrients, growth and reproduction, variability of microorganisms. Special part: Soil natural habitat for microorganisms. Diversity of microorganisms in soil. Relationships between microorganisms and between microorganisms, fauna and plants. Formation and composition of organic matter in soil. Microbial transformation of C, N, P, S, K, Fe and Mn. Microorganisms involved in synthesis and mineralization of humus. Effect of agrotechnical measures on microorganisms. Application of microorganisms in plant production. Biofertilizers, biopesticides, biostimants, bioremediation of soil.Practical classes:Microscopic techniques. Morphology and determination of protozoa, algae, fungi and bacteria. Methods for isolations and getting pure culture of microorganisms. Estimation of abundance and determination of microorganisms in soil. Microorganisms involved in cycles of N, C, F and S. Effect of pesticides on microorganisms. Characterization of microorganisms used in biopreparates production |
| 1. Teaching methods

Lectures and Practical classes, Consultations if needed. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam  | Mandatory | Points |
| Lecture attendance | No |  | *Written part of the exam-tasks and theory* *Oral part of the exam* | YesYes | 3040 |
| Test | No |  |  |
| Exercise attendance | Yes | 2 - 10 |
| *Test* | Yes | 20 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Prescott, L. M | Microbiology, 5th edition | 5th edition, McGraw Hill, NY | 2002 |
| 2. |  | Free Microbiology Books | http://www.wsmicrobiology.com/alcamos-fundamentals-of-microbiology/ | 2014 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***METEOROLOGY***  |
| Course id:3OFM1004 |
| Number of ECTS: 6 |
| Teacher:  | D.T. Mihailovic |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 3 | Practical classes: 2 | Other teaching types: 0 | Study research work: 0 | Other classes: 0 |
| Precondition courses | None |
| 1. Educational goal

The course aims to provide students with the basic concepts to understand the physical characteristics of the Earth's atmosphere and how these properties affect fundamental processes of importance to agriculture.  |
| 1. Educational outcomes

The course is designed to provied fundamental information to enable students to have reasonable understanding of meteorological problems related to agriculture and to extrapolated this knowledge to new situations related to organisation of agricultural production from farm to regional level. |
| 1. Course content

LecturesPart I: Physical backgroundIntroduction. Short description of meteorology. Meteorological elements. Weather and climate. Organization of weather observation (2). 2. The composition of the atmosphere. Origin and the physical structure of the atmosphere. Atmospheric density and pressure - vertical profile (3). 3. The Atmosphere and Earth radiation fluxes. Global radiation. Earth and atmospheric longwave radiation. Atmospheric UV radiation. Soil and water energy balance. Energy balance of the Atmosphere. Atmospheric pressure (8). 4. Atmospheric water. Evaporation. Evapotranspiration. Condensation and sublimation of water vapor in the atmosphere. Cloud precipitation. (8). 5. Atmospheric circulation. Wind. Fronts and cyclones. Local winds. General atmospheric circulation (5). Part II: Impact of climate and weather on plantsAbout climate. Climate elements and factors. Climate classification (4). 7. Climate change. Climate change impact on agriculture. Natural and anthropogenic causes of climate change. Recent climate change trends. Potential climate change impact on agriculture (4). 8. Selected chapters of agrometeorology. Role of agrometeorology. Impact of weather and climate on plants. Impact of weather and climate on pest and disease developments. Adverse weather conditions in agriculture - forecasting and protection. Agrometeorological analysis and forecasting (7).Practical classes: CalculusIntroduction. Weather observation and data management (2). Duration of shortwave radiation - measurement and calculation (2). Intensity of shortwave and longwave radiation - measurement and calculation (2). Atmospheric humidity - measurement and calculation (2). Evaporation - measurement and calculation (2). Transpiration - measurement and calculation (2). Precipitation - measurement and calculation (2). Soil temperature - measurement and calculation (2). Air temperature measurement. Sum of active temperatures - methods of calculation (2). Effective sums of air temperature. Calculation of acummulated dagree-days and degree-hours (2). Drought. Calculation of hydrothermic coefficient of Selyaninov (2). Radiation frost forecasting (2). Forecasting meteorological conditions for plant disease and pests appereance (2). New techniques in weather data measurements and analysis (2). |
| 1. Teaching methods

Lectures,Practical classes/Calculus, Consultations |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes | 0 | *Written part of the exam-tasks and theory* | Yes | 50 |
| Test - lectures | No | 30 |  |
| Exercise attendance | Yes | 0 |
| Test - exercise | Yes | 20 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Milosavljevic M. | Climatology | Scientific book | 1963 |
| 2. | Milosavljevic M. | Meteorology | Scientific book | 1967 |
| 3. | Mihailovic, D.T., Lalić, B., Arsenić, I. | Meteorological observations and data management | Faculty of Agriculture | 2008 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***SOCIOLOGY*** |
| Course id: 3ОФМ2О05 |
| Number of ECTS: 5 |
| Teacher: | Assistant professor: Dejan R. Janković, Ph.D.Assitants: M.Sci. Marica D. Petrović, M.A. Marina D. Novakov |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 2 | Practical classes: 1 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

The sociology course will introduce students to the basic theoretical and methodological standpoints in relation to agriculture and rural areas, social changes that affect rural areas, as well as the interaction between rural and urban social phenomena. Changes of traditional social structures and patterns of behaviour are the starting point for the analysis of social change of peasantry and rural areas, agriculture and its functions, as well as various functions and transformations of social groups and institutions in the process of rural development. |
| 1. Educational outcomes

This course will provide students with: knowledge of the basic sociological categories and methods of research in (rural) sociology; ability to analyze social phenomena in terms of social (agrarian and rural) structure and social relations; understanding of the basic principles of traditional peasant economy and transformation of traditional structures in relation to social groups, institutions, cultural patterns; understanding of complexity of rural development process. |
| 1. Course content

Meaning and tasks of the sociology as a discipline. Development of sociology and rural sociology. Methods in (rural) sociology. Basic theoretical and methodological approaches in rural sociology. Meaning, dimensions and elements of social structure. Meaning and types of social change. Global development processes as agents of change of agrarian and rural structures. Ecological problems of agriculture and rural areas. Peasant economy and changes in the agrarian structure. The old agrarian relations in Europe and Balkans and recent changes in the agrarian structure in Balkans. Family farms and features of rural areas in Serbia in present time. Rural settlements and rural population. Rural development and rural policy. The peasantry as a social class and as a political-historical factor. The social organization of local rural communities. Social groups in rural areas. Social institutions and organizations in rural areas. Rural culture - between tradition and innovation. Diffusion of innovation in agriculture and rural areas. |
| 1. Teaching methods: Lectures, Discussions, Group work, Research work, Consultations
 |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam | Mandatory | Points |
| Lecture attendance | Yes | 10 | *Theoretical part of the exam/Oral part of the exam/Written part of the exam-tasks and theory* | Yes | 30 |
| Test | Yes | 40 |  |
| Exercise attendance | Yes | 10 |
| *Term paper and students’ involvement in classroom activities* | Yes | 5 + 5 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
|  | Шљукић, С и М. Шљукић | Земља и људи. Сељаштво и друштвена структура. | Mediterran Publishing. Нови Сад | 2012 |
|  | Стојанов М | Социологија сеоских колектива.  | Матица српска. Нови Сад | 2004 |
|  | Митровић, М.  | Социологија села | СДС. Београд | 1998 |
|  | M. Haralambos i M. Holborn.  | Sociologija: teme i perspektiveInternet sources; scientific journals | Golden marketing. Zagreb | 2002 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification

|  |  |
| --- | --- |
| Course:  | ***BOTANY*** |
| Course id: **3ОФМ2О06** |
| Number of ECTS: **7** |
| Teacher: | **Ljiljana Nikolić, Ph.D., Dejana Džigurski, Ph.D** |
| Course status | **Mandatory** |
| Number of active teaching classes (weekly) |
| Lectures: **4** | Practical classes: **3**  | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None/navesti ako ima |
| 1. Educational goal

Acquiring the necessary knowledge concerning the structure of plants, their function, the systematics of plants with emphasis on taxa relevant for students of Phytomedicine, as well as the relationships of plants to environmental conditions, which is a prerequisite for the proper and successful cultivation of plants. |
| 1. Educational outcomes

The knowledge obtained within the course of Botany is the basis for the study of other fundamental and applied scientific disciplines, as well as the basis for a proper understanding of plants and their use for human needs. |
| 1. Course content

*Lectures*:Organization of wildlife and the basic characteristics of life. Botany and Agronomy. Plant cell, plant cell components: protoplasm, products of protoplasmic activity, cytoplasmic organelles. Autotrophic based diet. The morphology and anatomy of cormus.Metamorphosis of vegetative organs. Reproduction of plants. Flower, blossom, flowering, pollination, fertilization. Seed. Fruit. Taxonomic categories and their hierarchies.Classification of vascular macrophytes. Phytoecology. Autecology. Synecology. Practical classes: Exercise, Other modes of teaching, Study researchThe microscope and microscopic techniques. Plant cells. Cytoplasmic membranes. The cell organelles. Products of protoplasmic activity. Meristematic tissues. Premanent tissues. Anatomical structure of vegetative organs. Systematics of cormophytes. Field exercise. |
| 1. Teaching methods

Lectures - verbal-textual and illustrative demonstrative methodsPractical classes - management of students’ individual work and demonstrative-illustrative methods |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes | 0-5 | *Oral part of the exam* | Yes | 0-50 |
| Exercise attendance | Yes | 0-5 |  |  |  |
| Colloquium | Yes | 0-10 |  |
| Term paper | Yes | 0-5 |
| Tests | Yes | 0-20 |
| Herbarium | Yes | 0-5 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1 | Kojić M., Pekić S., Dajić Z. | Botanika | Romanov, Banja Luka | 2003 |
| 2 | Janjatović, V. | Botanika | Naučna knjiga, Beograd | 1994 |
| 3 | Knežević, A., Stojanović, S., Lazić, D. | Botanika – udžbenik za praktičnu nastavu | Poljoprivredni fakultet, Univerzitet u Novom Sadu | 2007 |
| 4 | Mauseth, J.D. | Botany - an introduction to plant biology. | University of Texas, Austin, USA. | 2003 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***SOIL SCIENCE*** |
| Course ID: 3ОФМ2О07 |
| Number of ECTS: 6 |
| Teacher: | Milivoj Dj. Belic PhD, full professor; Ljiljana M. Nesic PhD, associate professor; Vladimir I. Ciric PhD, assistant professor |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 4 | Practical classes: 2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

This course is designed to introduce students with properties of soil, processes of genesis, evolution, causes of variability and laws of geographical distribution of land cover, as well as classification of soil.  |
| 1. Educational outcomes

After passing this course, students will expand knowledge of soil science that will allow them to understand problems related to soil in intensive agriculture. |
| 1. Course content

*Theoretical lectures*: Introduction lecture, Minerals and rocks as a material for soil forming, Morphological properties of soil, Physical properties of soil, Chemical properties of soil, Soil as a dispersion system, Mechanical composition of soil, Clay, Organic matter, Soil colloids, Organo-mineral complex, Porosity, Water and water properties of soil, Heat and thermal properties of soil, Air and air conditions of soil, Elements that are part of pedosphere, Sorption capacity, Soil solution, Reaction (pH), Acidity and alkalinity of soil, Buffer capacity and oxidation-reduction potential, Biological properties of soil, Genesis of soil, Systematisation and classification of soil*Practical lectures*: Primary– petrogene and secondary minerals, Igneous rocks, Sedimentary rocks, Metamorphic rocks, Field research of soil, Soil density, Mechanical composition of soil, Water permeability and capillary rise, Soil plasticity, Determination of humus in soil, Determination of CaCO3, Determination of active soil acidity, Determination of potential soil acidity and required amount of lime agent for improvement of acidic soils, Determination of characteristic of adsorption complex, Determination of easily soluble salts in soil and required amount of gypsum for improvement of alkaline soils *Field work*: Introduction of different parent materials and profiles of the most common soil types in Vojvodina. |
| 1. Teaching methods

 Lectures, Practice/ Practical classes, Consultations, study |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam  | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Written part of the exam/Oral part of the exam* | Yes | 60 |
| Test | Yes | 20 |  |
| Exercise attendance | Yes | 5 |
| Colloquium | Yes | 10 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Aleksandar Kukin, Vladimir Hadžić, Ljiljana Nešić, Milivoj Belić | Agrogeologija | Poljoprivredni fakultet, Novi Sad | 2007 |
| 2. | Nikola Miljković | Osnovi Pedologije | Prirodno-matematički fakultet, Novi Sad | 1996 |
| 3. | Nikola Miljković | Meliorativna Pedologija | Poljoprivredni fakultet, Novi Sad | 2005 |
| 4. | Miodrag Živković, Aleksandar Đorđević | Pedologija (prva knjiga) geneza , sastav i osobine zemljišta | Poljoprivredni fakultet,Beograd | 2003 |
|  | Milivoj Belić, Ljiljana Nešić, Vladimir Ćirić | Praktikum iz pedologije | Poljoprivredni fakultet Novi Sad | 2014 |
|  | Husnija Resulović i Hamid Čustović | Pedologija- Opći dio (Knjiga 1) | Univerzitet u Sarajevu, Sarajevo | 2002 |
|  | Goran J. Dugalić, Boško A. Gajić | Pedologija  | Univerzitet u Kragujevcu, Agronomski fakultet u Čačku | 2012 |
|  | Robert E. White | Principles and practice of soil science | Blackwell publishing | 2006 |
|  | M.R. Ashman and G. Puri | Essential soil science | Blackwell publishing | 2006 |
|  | Hillel, D. | Introduction to En. Soil Physics | Elsevier, Amsterdam, Netherlands. | 2004 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***PLANT BIOCHEMISTRY*** |
| Course id: *različit na svakom smeru* |
| Number of ECTS: 6 |
| Teacher: | Prof. dr Đorđe Malenčić |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 3 | Practical classes: 3 | Other teaching types: student`s papers (seminar) | Study research work: yes | Other classes: - |
| Precondition courses | None |
| 1. Educational goal

To gain knowledge on molecular aspects of biochemical processes and interactions in plants. Study on primary and secondary biomolecules in plants and their metabolism.  |
| 1. Educational outcomes

The contribution of new knowledge in the field of Plant biochemistry. |
| 1. Course content

Theory: Chemical composition of plant organs and tissues. Primary biomolecules – properties, structures and function in plants (amino acids, peptides and proteins, enzymes, coenzymes, vitamines, phytohormones, carbohydrates, lipids and nucleic acids). Metabolism of primary biomolecules and bioenergetics (metabolism of amino acids and proteins, metabolism of carbohydrates, lipids and nucleic acids). Plant membranes and transport of metabolites. Respiratory electron-transport chain and oxidative phosphorilation. Secondary biomolecules - properties, structures, function and metabolism in plants. Practical classes: Proteins (qualitative reactions, determination of isoelectrical point of amino acids and proteins); Enzymes (effect of temperature, pH, substrate and enzyme concentration on enzyme activity, kinetics of enzyme reactions, antioxidant enzymes activity); Carbohydrates (qualitative reactions, determination of aldoses in plant material); Оrganic acids (determination of total acidity in apple fruit); Lipids (detemination of saponification and iodine number of plant oils); Vitamins and provitamins (determination of vitamin C in kiwi and paprika fruits, and carotenoids in carrot roots); Isolation of essential oils from plant herba and separation of compounds using thin-layer chromatography, TLC); Glycolysis and alcoholic fermentation. |
| 1. Teaching methods

Lectures, Practical classes, Consultations, research work (optional) |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam | Mandatory | Points |
| Lecture attendance | Yes | 5 | Oral part of the exam-tasks and theory | Yes | 60 |
| Exercise attendance | Yes | 5 |  |
| Test, Term paper | Yes | 30 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Dr Milan Popović | Biohemija biljaka(Plant biochemistry) | Poljoprivredni fakultet, Novi Sad(Faculty of agriculture, Novi Sad) | 2008. |
| 2. | Dr Đorđe Malenčić, dr Milan Popović | Praktikum iz Biohemije biljaka (Plant biochemistry handbook) | Poljoprivredni fakultet, Novi Sad(Faculty of agriculture, Novi Sad) | 2011. |
| 3. | P.M. Dey & J.B. Harborne | Plant biochemistry | Academic Press, London | 1997. |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***FIELD AND VEGETABLE CROPS PRODUCTION*** |
| Course id: 3ОФМ3О09 |
| Number of ECTS: 6 |
| Teacher: | Ph.D. Jovan Crnobarac, Ph.D. Žarko Ilin; contributors: Ph.D. Dragana Latković, Ph.D. Goran Jaćimović, M.Sc. Boris Adamović |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 3 | Practical classes: 2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

The aim of the course is that students learn how to in conditions of Serbia can achieve higher and stable yields of good quality with satisfactory profitability and conservation of agro ecosystems. |
| 1. Educational outcomes

After completion of lectures and exercises student will be qualified and informed with the basic elements of growing technology of field and vegetable crops. After passing the exam, the candidate will be qualified to lead the production of cultivated plants and to be successful in this production; and will be trained to combine the knowledge, ability and skills with the given environmental and edaphic conditions. |
| 1. Course content

***Theoretical teaching***: In the part of field crops will be studied the next plant species: wheat, barley, corn, beans, soybeans, peas, sunflower, canola, hemp, sugar beets, potatoes, tobacco and alfalfa. From vegetable crops will be studied: carrots, parsley, celery, parsnip, beetroot, radish, onion, garlic, leek, shallot, welsh onion, cabbage, kale, cauliflower, broccoli, brussels sprouts, collards, cabbage, Chinese and Peking cabbage, lettuce, spinach, endive, tomatoes, peppers, eggplant, cucumber, melon, watermelon, pumpkin, green peas, green beans, asparagus, artichokes, rhubarb, horseradish. At each crop will be studied the following: 1. General characteristics: economic importance, area and yields in the world and in our country, geographic distribution and origin of the species. 2. Biological characteristics and requirements for growing conditions in the vegetation period and phonological stages. 3. Production Technology: crop rotation, selection of preceding crops and suitability of each crops for the next crop, tillage and seedbed preparation; fertilization (manner, time, relation of N:P:K, quantity of this nutrients and some specificity of crops); sowing (varieties and hybrids, seed quality and seed preparation, sowing time and method of planting, ie, sowing rate and density of crops with emphasis on varietal specificity) and depth of sowing; crop care (fight against weeds, pests and diseases, fertilization with nitrogen – topdressing and specific measures of care); harvest (physiological and technological maturity, moment and way of harvesting, machines for harvest and storage). Through teaching of the production technology will be constantly emphasizes the role and importance of timely and quality of performance of all agro-technical measures and the possibility of rationalization of production processes by using the latest achievements of science and practice.***Practical exercises***: Introduce students to the botanical division, morphological characteristics and developmental stages of the plants specified, using slides, and fresh and dry material from the laboratory. |
| 1. Teaching methods: Lectures, Practice/ Practical classes, Consultations
 |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam | Mandatory | Points |
| Activity during lectures | Yes | 6 (field crops) + 4 (vegetable crops) | *Oral part of the exam* | Yes | 42 (field crops) + 28 (vegetable crops) |
| Colloquium | Yes | 12 (field crops) + 8 (vegetable crops) |  |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Bharat P. Singh | Industrial Crops and Uses | Fort Valley State University, Fort Valley, Georgia, USA, CAB International  | 2010 |
| 2. | John H. Martin, Richard P. Waldren, David L. Stamp | Principles of Field Crop Production | Pearson Education Inc., Upper Saddle River, New Jersey, Columbus, Ohio, USA | 2006 |
| 3. | Robert G. Hoeft, Emerson D. Nafziger, Richard R. Johnson and Samuel R. Aldrich | Modern corn and soybean production | MCSP Publications; 1st edition | 2000 |
| 4. | Internet sources; Thematic domestic and international journals |
| 5. | Lecture notes of professors and assistants |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***AGRICULTURAL ZOOLOGY WITH ECOLOGY*** |
| Course id: 3ОФМ3О10 |
| Number of ECTS: 5 |
| Teacher: | **Dragana Rajković, PhD., Aleksandar Jurišić, PhD., Aleksandra Petrović, MSc** |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 3 | Practical classes: 2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None/navesti ako ima |
| 1. Educational goal

Well trained and educated students in determination and identification of bioecological features of particular animal groups in the given natural conditions that could cause damage to crop production and other agricultural activities. Acquiring the necessary knowledge concerning application of appropriate control measures in accordance with good agricultural practices. |
| 1. Educational outcomes

The student is qualified for further education through master's and PhD studies. Students who acquire theoretical and practical knowledge in the identification and determination of given animal groups, determining the threshold, the type and degree of the damage in crop and animal production, as well as ability to adequately select and apply appropriate control measures. |
| 1. Course content

*Lectures*: The importance and the task of agricultural zoology. Cells, tissues and organology. Copmarative anatomy of animal groups. Modern zoological classification. Protozoa - Metazoa. Mastigophora, Amoeboida, Sporozoa; Cnidosporidia, Ciliophora. Platyhelminthes, Trematodes; Cestodes. Nematoda - general features, life cycles, behaviour, parasites of plants and animals. Annelida: Oligochaeta, Chirudinea. Arthropoda: general organization and taxonomy. Chelicerata – Araneae, Scorpiones, Pseudoscorpiones, Opiliones, Acarina. Branchiata, Tracheata - Myriapoda. Mollusca - structure and systematics - Gastropoda. Chordata - Vertebrata - embryonic development. Agnatha (cyclostome), gnathostome: Pisces, Amphibia, Reptilia, Aves, Mammalia. Ecological factors (abiotic and biotic, population ecology, ecosystem and agroecosystem.*Exercise*: The microscope and microscopic techniques. Protozoa - infuzum. Cells, Tissues, Organs. Plathelminthes, Trematodes, Cestodes. Nematodes – phytoparsites and parasites of animals. Annelida, Crustacea, Myriapoda, Mollusca, Pisces, Amphibia, Reptilia, Aves, Mammalia - determination by the keys. |
| 1. Teaching methods

Lectures – oral, textual and illustrative / demonstrative methods.Practical classes - management of students’ individual work and demonstrative / illustrative methods |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Oral part of the exam* | Yes | 30 |
| Test | Yes | 30 |  |
| Exercise attendance | Yes | 5 |
| Colloquium | Yes | 30 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Ratajac R. | Zoologija za studente poljoprivrednog fakulteta | Univerzitet u Novom Sadu, Prirodno-matematički fakultet, Novi Sad | 1995 |
| 2. | Đukić, N., Horvatović, A., Kataranovski, D., Maletin, S., Matavulj, M., Pujin, V., Sekulić, R. | Poljoprivredna zoologija sa ekologijom, I: Filozofija prirode, Opšta zoologija i Sistematika životinja | Poljoprivredni fakultet, Novi Sad | 2005 |
|  | Rajković, D., Kostić, D. | Praktikum iz poljoprivredne zoologije | Univerzitet u Novom Sadu, Prirodno-matematički fakultet, Institut za biologiju, Novi Sad | 1995 |
|  | Đukić, N., Maletin, S. | Poljoprivredna zoologija sa ekologijom II, Zooekologija | Poljoprivredni fakultet, Novi Sad | 1998 |
|  | Poleksić, V. i sar | Zoologija | Poljoprivredni fakultet, Univerzitet u Beogradu | 2003 |

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| Course: | ***SOIL FERTILITY AND FERTILIZERS*** |
| Course id:3ОВВ3О09 |
| Number of ECTS: 6 |
| Teacher: | Prof. dr Darinka M. Bogdanović, mr Ranko R. Čabilovski |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures:3 | Practical classes:2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None/navesti ako ima |
| 1. Educational goal

The acquisition of basic knowledge of soil fertility and fertilizer application. |
| 1. Educational outcomes

The student is qualified for further education through master's and PhD studies. Students will also be able apply the acquired knowledge, about soil fertility and fertilizer application, in agricultural practice.  |
| 1. Course content

***Theoretical instruction***Subject *SOIL FERTILITY AND FERTILIZERS* consists of several thematic units: Nitrogen in the soil. Phosphorus in the soil. Potassium in the soil. Other essential microelements. Useful elements. Microelements in the soil. Heavy metals in the soil. Soil properties and processes related to plant nutrition and fertilizer application. Fertilizers. Nitrogen fertilizers. Phosphorus fertilizers. Potassium fertilizers. The complex fertilizers.Organo-mineral fertilizers. Liquid fertilizers. Fertilizers with pesticides and trace elements. Organic fertilizers. Principles of fertilization. The control system of soil fertility and fertilizer application ***Practical instruction***Laboratory exercise: Soil fertility. Determining the need for fertilization. The system of soil fertility control and fertilizer application. Soil sampling. Determination of total nitrogen in the soil. Determination of mineral nitrogen in the soil. N-min method. Phosphorus in the soil. Potassium in the soil. Trace elements in soil. Field trials. Basic physical and chemical properties of fertilizers. Regulation of fertilizers and soil improvers. Principles for determining the dose of fertilizer application.***Field exercises:***Visit the experimental field of Institute of field and vegetable crops. . Visit the factory of mineral fertilizers. |
| 1. Teaching methods

Lectures and Practical classes |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes | 0 | *Oral part of the exam* | Yes | 30-70 |
| Tests | Yes | 30+30=60 |  |
| Exercise attendance | Yes | 0 |
| Colloquium | Yes/No | 6-10 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Ubavić, M., Bogdanović, D.: | Agrohemija | Poljoprivredni fakultet, Novi Sad | 2001. |
| 2. | Jakovljević, M., Pantović, M. | Hemija zemljišta i vode. | Poljoprivredni fakultet, Zemun, Beograd | 1991. |
| 3. | Ubavić, M., Bogdanović, D. | Praktikum iz agrohemija | Poljoprivredni fakultet, Novi Sad | 1995. |
| 4. | Westerman R.L. | Soil testing and plant analysis, SSSA Book series 3 | Madison, USA,  | 1990 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***PLANT PHYSIOLOGY*** |
| Course id: | 3OFM3O12 |
| Number of ECTS: | 5 |
| Teacher: | Ivana V. MaksimovićMarina I. Putnik- Delić |
| Course status | Mandatory/Elective : Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 4x15=60 | Practical classes: 45 | Other teaching types  | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

The aim of the course is to provide students with knowledge about the functioning of the organism of higher plants, as well as on the impact of environmental factors on physiological processes. Also, students will learn how and to what extent certain physiological processes can be controlled, which is important for agricultural production. |
| 1. Educational outcomes

The outcome is knowledge about physiological processes in higher plants and abiotic and biotic factors affecting them, with the aim to apply this knowledge in practice.  |
| 1. Course content

LecturesPhysiology of plant cells: types, structure, compartimentality. Biomembranes. Organelles, microbodies, cytoskeleton. Chemical and physical properties of plant cells. Tissue culture or cells. Water regime: features, uptake, transport and transpiration. Factors affecting water regime. Plant water requirements, the impact of the lack of water, mineral nutrition: Content, classification and physiological role of essential and useful elements in plants. Mechanism of the uptake and transport of mineral nutrients and organic compounds. Mineral nutrition and yield. Photosynthesis: importance, photosynthetic pigments, absorption and transformation of light. Photophosphorilation. C3, C4 and CAM photosynthetic paths. Photorespiration. Transport of assimilates. Photosynthesis and yield. Respiration: Glycolysis, Krebs cycle, oxidative phosphorylation, energy balance. Alternative pathways and ecology of respiration, growth and differentiation: phytohormones, cell growth and development. Biological rhythms, differentiation, correlations, abscission, senescence and death. Seed physiology: Pollen, pollination, fertilization. Regulation of seed and fruit development. Seed germination and factors affecting it. Practical workContents of practical work accompanies lectures (Physiology of the cell, water regime, mineral nutrition, photosynthesis, respiration and enzymes, growth and development) |
| 1. Teaching methods: Lectures
 |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Written entrance-exam | Yes | 20 | *Theoretical part of the exam/Oral part of the exam* | Yes | 40 |
| Test | No | 2x15 |  |
| Exercise attendance | Yes |  |
| *Term paper* | No | 10 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1 | Kastori R, Maksimović I  | Ishrana biljaka | Vojvođanska akademija nauka | 2008 |
| 2 | Maksimović I, Pajević S.  | Praktikum iz fiziologija biljaka | Poljoprivredni fakultet i Prirodno-matematički fakultet, Novi Sad | 2002 |
| 3 | Lincoln Taiz and Eduardo Zeiger | Plant Physiology, Fifth Edition | Sinauer Associates | 2010 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***GENERAL PHYTOPATHOLOGY*** |
| Course id: 3OFM4013 |
| Number of ECTS: 6 |
| Teacher:  | Dr Vera B. StojšinDr Dragana B. Budakov |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 4x15=60 | Practical classes: 2x15=30 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | Microbiology |
| 1. Educational goal

Achievement of basic knowledge and techniques in the field of plant pathology. |
| 1. Educational outcomes

The training of students for further education in professions considering plant health. |
| 1. Course content

*Theory lessons -* Concept and definition of plant diseases, the subject of general phytopathology, historical development of plant pathology. Damages caused by plant diseases, division of plant diseases depending on the type of causal agent. Parasitic diseases: basic concepts of parasites, types of parasites and parasitic diseases, pathogenicity, virulence, pathogenesis, pathogenicity testing. The basic characteristics of the causal agents of plant diseases, parasites: fungi-like organisms, fungi, bacteria and viruses, phytoplasmas and vascular bacteria, semi-parasitic and parasitic plants. Mycotoxicogenic fungus. Pathogenesis, ecology, epidemiology of plant diseases. Fundamentals of phytopathology (cytological, morphological, biochemical, physiological and genetic changes caused by plant pathogens). Fundamentals of general prophylaxis and treatment (plant quarantine, the impact of cultivation technology, mechanical and physical measures, biological measures, plant resistance to diseases and chemical measures).  *Practical teaching: Exercises, Other modes of teaching, Study research work*General techniques of laboratory work with phytopathogenic microorganisms. Identification of pathogens, the detection of pathogens. Types of symptoms of plant diseases caused by: fungi-like organisms, fungi, bacteria and viruses, phytoplasmas and vascular bacteria, semi-parasitic and parasitic plants. Fundamentals of morphology and systematics of the causal agents of plant diseases. |
| 1. Teaching methods

Lectures, Practical classes, Consultations, Seminars given by students. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Written or oral part of the exam-tasks and theory* | Yes | 50 |
| Test regarding material from practical classes (colloquium) | Yes | 30 |  |
| Exercise activity | Yes | 5 |
| *Term paper* | No | 10 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Stojšin, V., Bagi, F., Balaž, F. | Plant pathology textbook- mycosis and pseudomycoses of field and vegetable crops (in Serbian) | Faculty of Agriculture Novi Sad | 2008 |
| 2. | Balaž, F., Balaž, J., Tošić, M., Stojšin, V., Bagi, F.  | Phytopathology. Diseases of crops and vegetables (in Serbian) | Faculty of Agriculture Novi Sad | 2010 |
| 3. | Babović, M. | Basics of plant pathology (in Serbian) | University of Belgrade, Faculty of Agriculture | 2003 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***ACAROLOGY AND NEMATOLOGY*** |
| Course id: 3ОФМ4О14 |
| Number of ECTS: 6 |
| Teacher: | **Dragana Rajković, PhD., Aleksandar Jurišić, PhD., Aleksandra Petrović, MSc** |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 4 | Practical classes: 2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None/navesti ako ima |
| 1. Educational goal

Well trained and educated students in identification of mites, ticks and nematodes in the given natural and laboratory conditions, and determination their importance for agriculture, human medicine and veterinary medicine. Acquiring the necessary knowledge concerning application of appropriate control measures in accordance with good agricultural practices, veterinary and medical ethics. |
| 1. Educational outcomes

The student is qualified for further education through master's and PhD studies. Students who acquire theoretical and practical knowledge in the identification and determination of mites, mites, ticks and nematodes, determination of the vector potential, threshold, type and degree of damage in agriculture, veterinary medicine and medicine, as well as ability to adequately select and apply appropriate control measures. |
| 1. Course content

*Lectures*: The importance and the task of acarology and nematology. General characteristics, morphology and anatomy of mites and ticks. Reproduction and development. Ecological factors that influence the emergence and maintenance of populations. Systematics: Eriophyidae, Tetranychoidae, Tarsonemoidea, Acaroidea, Glycyphagidae, Acaroidea, Oribatuloidea – determination of thresholds, vectors and potential control measures. Acarines - predatory species. Ixodidae, Argasidae and Nuttalliellidae - vectors of pathogens significant for human and veterinary medicine, monitoring and control. Introduction to Nematology. The morphology and anatomy of nematodes. Evolution, systematics and taxonomy of nematodes. Biology, ecology, reproduction and life cycles. Parasitism and trophic relationships of nematodes. Sedentary and migratory, endoparasites and ectoparasites. Systematics, monitoring and control fitoparazitnih nematodes. Quarantine species of mites and nematodes. Phytosanitary regulations.*Exercise*: methods of collection, preparation and of mites and ticks. Identification of mites and ticks: Eriophyidae, Tetranychidae, Bryobidae, Tenuipalpidae, Tarsonemidae, Acaridae (Tyroglyphidae), Glycyphagidae, Acaridae (Tyroglyphidae), Oribatulidae, Phytoseidae, Ixodidae, Argasidae and Nuttalliellidae. Collection and preparation of nematodes. Identification of nematodes by the keys. |
| 1. Teaching methods

Lectures – oral, textual and illustrative / demonstrative methods.Practical classes - management of students’ individual work and demonstrative / illustrative methods |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Oral part of the exam* | Yes | 30 |
| Test | Yes | 30 |  |
| Exercise attendance | Yes | 5 |
| Colloquium | Yes | 30 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Petanović, R. | Atlas – štetne grinje ukrasnih biljaka | Beografik, Beograd | 2004 |
| 2. | Krantz G.W., Walter D.E. | A Manual of Acarology, 3rd edition | Texas Tech University press | 2009 |
| 3. | Helle W., Sabelis M.W. | Spider Mites, their biology, natural enemies and control | Elsevier | 1985 |
| 4. | Eds: Jongejan F., Reuben Kaufman W. | Ticks and Tick-Borne Pathogens | Kluwer Academic Publishers | 2003 |
| 5. | Krnjajić, Đ., Krnjajić, S. | Fitonematologija. Štetne nematode u biljnoj proizvodnji i suzbijanje | Nolit, Beograd | 1987 |
|  | Chen, Z. X., Chen, S.Y., Dickson, D.W. (eds) | Nematology - Advances and Perspectives. Volume II: Nematode Management and Utilization | Tsinghua University Press China & CABI Publishing UK/USA | 2003 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***Fruit Growing and Viticulture*** |
| Course id: |
| Number of ECTS:5 |
| Teacher: | Zoran Ž, Keserović, Mira I, Medić |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures:3 | Practical classes:2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

Introducing students into fruit and vine species, as well as the technology of their cultivation |
| 1. Educational outcomes

The acquisition of basic knowledge about cultivation of fruit trees and vines which will serve as the basis for successful protection of fruit trees and vines. |
| 1. Course content

Theory lessonsLectures from viticulture.The significance of viticulture. Classification of family vitaceae-genus Vitis. Morphology of grape vine. Physiological cycle of development of the vine. Ecology and propagation of the vine. Raising (planting) vineyards. Support in the vineyard. Pruning of vineyards and cultivated varieties of vines. Summer pruning in the vineyard. Nutrition in the vineyard. Soil tillage in the vineyard. Grape harvest. Classification and general characteristics of grapevine varieties. Lectures from Fruit growingThe importance of fruit production. Fruit production in the world and Serbia. Integrated and biological concept of production. Fruit growing areas in Serbia. Classification of fruit trees. Reproduction of fruit trees. Ecology of fruit trees. Orchard establishment. Agricultural management practices. Characteristics of the major varieties of fruit trees. Harvesting, storage and packaging of fruits.Practical classesContents of practical classes in viticultureVegetative and generative organs morphology of the vine. Methods of propagation of vine and grafting techniques. Retracts and tearing branches. Pruning and tying vines. Showing important vines growing forms. Classification of grape vines varieties. Visiting the experimental farm of Faculty of Agriculture in Sremski Karlovci. Contents of exercises from Fruit growingBotanical and pomological classification. Morphology of fruit trees organs. Determination of fruit seed. Organogenesis of fruit trees. Grafting fruit trees. Orchard establishment. Pruning fruit trees. Pomological description of fruit species, varieties and rootstocks. |
| 1. Teaching methods

Lectures, practical work in classroom, laboratory and in the experimental fields. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Oral part of the exam* | Yes | 30 |
| Test | Yes | 5 |  |
| Exercise attendance | Yes | 20 |
| Seminar | Yes | 40 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Kuljančić, I. (2008): Vinogradarstvo. Prometej, Novi Sad |
| 2. | Todić Slavica, Bešlić, Z. (2010): Proizvodnja loznog sadnog materijala. Monografija, Beograd |
| 3. | G. D. Bisztray, P. Cindrić, Edit Hajdu, D. Ivanišević, Nada Korać, J. Lázár, Mira Medić, E. Szegedi: Sorte vinove loze, sadni materijal i bolesti (sorte mađarsko-srpskih pograničnih vinogorja i čišćenje od patogena), groinform, 2011, Budapest |
| 4. | Keserović Z., Korać N., Magazin N., Grgurević V., Gvozdenović D., Bijelić S., Vračević B. Proizvodnja voća i grožđa na malim površinama. Poljoprivredni fakultet, Novi Sad, 2008 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***ABIOTIC DISEASES*** |
| Course id: 3OFM4016 |
| Number of ECTS: **4** |
| Teacher:  | Dr Vera B. Stojšin Dr Dragana Budakov |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: | **Practical classes**: | Other teaching types: | Study research work: | Other classes: |
| Precondition courses:  | None |
| 1. Educational goal

Acquiring knowledge on diseases caused by the influence of abiotic factors. |
| 1. Educational outcomes

Enabling students to identify abiotic plant diseases and protection measures. |
| 1. Course content

*Theory lessons -* Non-infectious diseases of important cultivated plants caused by abiotic factors (harmful effects of weather factors, soil factors, lack or excess of nutrients, damage from chemical substances used in agriculture). Diagnostics of symptoms of abiotic diseases with simultaneous displays symptoms of biotic diseases.*Practical teaching: Exercises, Other modes of teaching, Study research work*Symptoms of abiotic diseases |
| 1. Teaching methods

Lectures, Practical classes, Consultations, Seminars given by students. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Written or oral part of the exam-tasks and theory* | Yes | 50 |
| Test regarding material from practical classes (colloquium) | Yes | 30 |  |
| Exercise activity | Yes | 5 |
| *Term paper* | No | 10 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Stojšin, V., Bagi, F., Balaž, F. | Plant pathology textbook- mycosis and pseudomycoses of field and vegetable crops (in Serbian) | Faculty of Agriculture Novi Sad | 2008 |
| 2. | Balaž, F., Balaž, J., Tošić, M., Stojšin, V., Bagi, F.  | Phytopathology. Diseases of crops and vegetables (in Serbian) | Faculty of Agriculture Novi Sad | 2010 |
| 3. | Babović, M. | Basics of plant pathology (in Serbian) | University of Belgrade, Faculty of Agriculture | 2003 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | *Basic Herbology* |
| Course id:3OFM4O17 |
| Number of ECTS: 6 |
| Teacher: | Branko I. KonstantinovićBojan B. Konstantinović |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 60 | Practical classes: 30 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | The conditions for taking both the preliminary and the exam are in accordance with the ECRS system. Each student has to write at least one seminar paper and pass the exam Field and Vegetable Crop Growing prior to taking the exam. |
| 1. Educational goal

Recognition of economically significant weed species in the conditions of field, vegetable crop growing, in aquatic ecosystems and ruderal habitats, and the possibility of their extinction by the means of mechanical, physical and chemical measures.  |
| 1. Educational outcomes

The students who have passed the subject Basic Herbology will be able to determine the way of extinction and the right time for its application, according to their knowledge of the conditions of field and crop growing, based on the recognition of weed species and their economic significance, as well as the moment for the application of the measures of extinction. |
| 1. Course content

*Theoretical classes*: Historical significance and damage caused by weeds, the notion, definition and division of weeds. Propagation of weed. The dornancy of seeds and „the bank“ of seeds in the soil. Allelopathy. Phytocenology. Classification of measures of weed control. Significance of the integral measures of weed control. Indirect and direct measures of weed control. Biological weed control. Weed control by the application of herbicides. The contents and distribution of herbicides. Periods of the intervention with herbicides. Herbicide modes of action. Physiological and biochemical activities of herbicides. Selectivity of herbicides. Selectivity and distribution and absorption. Persistence of herbicides. Phenomenon of resistance and tolerance. Anti-resistance strategy. Herbicides, soil and the phenomenon of degradation. Microbiological degradation. Herbicides in the atmosphere. Development of genetical engineering. Weed control by the application of herbicides in stubble wheat. Weed control by the application of herbicides in row crops (sugar beet, sunflower), in forage crops. Weed control by the application of herbicides in vegetable, fruits and grapes. Weed control in ruderal areas. Weed control in forestry. Weed control in water. Weed control on railway and embankment. *Practical classes - Exercises*: Familiarizing with the most important species of weed. Familiarizing with the seedlings of economically significant weed species. Characteristics of the weed seeds. Methods of studying weed species and weed flora. Establishing the basic characteristics of weed communities. Familiarizing with the methods of phytocenological studying of weeds. Sorting out the phytocenological tables and establishing the syntaxonomical belonging of weed phytocenoses. Methods of mapping weed vegetation and the ways of its interpretation. |
| 1. Teaching methods: Lectures,Practical classes, Consultations, research work
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| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes | 10 | Oral part of the exam | Yes | 30 |
| Test | Yes | 40 |  |
| Exercise attendance | Yes/No |  |
| Practical exam | Yes | 20 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Konstantinović, B. | Poznavanje i suzbijanje korova | Univerzitet u Novom Sadu, Poljoprivredni fakultet | 1999 |
| 2. | Konstantinović, B. | Biologija, ekologija i suzbijanje korova | Univerzitet u Novom Sadu, Poljoprivredni fakultet | 2005 |
| 3. | Konstantinović, B. | Korovi i njihovo suzbijanje | Univerzitet u Novom Sadu, Poljoprivredni fakultet | 2008 |
| 4. | Konstantinović, B. | Osnovi herbologije i herbicidi | Univerzitet u Novom Sadu, Poljoprivredni fak. | 2011 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***Outlines of Entomology*** |
| Course id: 3ОFM5О19 |
| Number of ECTS: 6 |
| Teachers: | Dušan Petrić, PhD, Professor; Aleksandra Ignjatović Ćupina, PhD, Assistant Professor |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 4 | Practical classes: 2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

Acquiring knowledge of the insect biology, morphology, anatomy and physiology, with special attention given to the aspects of body structure and function that are important for the control of population density |
| 1. Educational outcomes

Acquiring the basics for further specialized courses of Entomology. Qualification for the participation in research teams dealing with insect studies and determination of control strategies. |
| 1. Course content

*Theoretical lessons*Importance of entomology and study objectives. Insects and man. Integument, body segmentation and body regions of insects. Muscular system, locomotion. Circulation system. Feeding, digestive system. Excretion system. Respiratory system. Nervous system. Sensorial organs and perception. Glands and secretion organs. Reproductive system, reproduction of insects, embryonic and postembryonic development, metamorphosis, hormonal control of insect growth, molting and metamorphosis. *Practical classes: laboratory exercises* Based on individual work related to the detailed morphological and anatomical studies. Students are trained in dissection of external and internal insect organs. Studies of the insect integument structure, sutures and sclerites. Morphology of antennae, mouth parts, thorax, legs, wings and abdomen. Anatomy of digestive, circulatory, reproductive organs and nervous system. |
| 1. Teaching methods

The lessons and preparation for tests are performed by the use of modern teaching tools. Check of theoretical knowledge includes 9 tests related to study units, 2 tests which require the combining of acquired knowledge and 1 final test. Individual work by use of the binocular/microscope and dissection tools. Check of practical knowledge. Consultations related to theoretical/ practical lessons and preparation of seminars, research work and projects. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam  | Mandatory | Points |
| Lecture attendance (9 tests) | Yes | 18 | Written part of the exam Oral part of the exam | Yes | 3010 |
| Tests (2 combined tests) | Yes | 10 |  |
| Exercise attendance | Yes | 12 |
| Colloquium | Yes/No | 20 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Davies, R.G. | Outlines of entomology | Chapman & Hall, London, UK. | 1988 |
| 2. | Petrić D, Ignjatović-Ćupina A, Vuković M. & Srdić Ž. | General entomology, book, CD (in Serbian, free delivery for students)  | University of Novi Sad, Faculty of Agriculture | 2007 |
| 3. | Petrić D, Ignjatović-Ćupina A, Vuković M. & Srdić Ž. | General entomology, *practicum*, CD (in Serbian, free delivery for students) | University of Novi Sad, Faculty of Agriculture | 2007 |
| 4. | Štrbac P.& Ignjatović Ćupina A. | Entomologija, poznavanje, praćenje, sakupljanje i suzbijanje štetnih insekata (in Serbian) | Poljoprivredni fakultet u Novom Sadu, štamparija Pet-Pak Novi Sad | 2000 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***Insect Systematics and Medical Entomology*** |
| Course id: 3ОFM5О20 |
| Number of ECTS: 5 |
| Teachers: | Dušan Petrić, PhD, Professor; Aleksandra Ignjatović Ćupina, PhD, Assistant Professor |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 3 | Practical classes: 2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

Acquiring knowledge of systematics and etology of the class *Insecta*, the role of insects in rural and urban habitats, insects which affect human and animal health, pathogens and parasites transmitted by insects, basic concepts of their control. |
| 1. Educational outcomes

Acquisition of skills for identification of insects belonging to different orders, especially insect groups which affect human and animal health; Skills for inventorying the entomofauna composition in biodiversity studies; Qualifications for participation in teams dealing with recommendation and determination of control measures, as well as verification of the control results; Acquisition of fundaments necessary for the attendance to specialized courses in entomology; Qualifications for the participation in teams dealing with insect research and conception of control strategies. |
| 1. Course content

*Theoretical lessons*Basic insect characteristics and division of Arthropods. Taxonomy, systematics, biology and behavior of different insect taxa. Estimation and regulation of population density, competition. Parasite/parasitoid – host and predator-host relations. Diversity, equilibrium and succession of insect communities. Insect orders of medical and veterinary importance. Diseases generated or transmitted by insects. Pathogens and parasites, mechanisms of disease transmission and modes of insects spreading. Venoms, defense secretions and allergens. *Other forms of classes: laboratory exercises* Laboratory exercises are based on individual work on identification of immature and adult insect stages. Methods of insect collecting (application in corresponding natural habitats), preserving and storing of insect collections |
| 1. Teaching methods

The lessons and preparation for tests are performed by the use of modern teaching tools. Check of theoretical knowledge includes 6 tests related to study units, 2 tests which require the combining of acquired knowledge and 1 final test. Individual work is based on the use of the binocular/microscope and identification keys. Check of practical knowledge. Consultations related to theoretical/ practical lessons and preparation of seminars/ research work and projects. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam  | Mandatory | Points |
| Lecture attendance (6 tests) | Yes | 12 | Written part of the exam Oral part of the examInsect collection | Yes | 201010 |
| Test (2 combined tests) | Yes | 10 |  |
| Exercise attendance | Yes | 15 |
| Colloquium | Yes | 23 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Davies, R.G. | Outlines of entomology | Chapman & Hall, London, UK. | 1988 |
| 2. | Petrić D, Ignjatović-Ćupina A, Vuković M. & Srdić Ž. | General entomology, book, CD (in Serbian, free delivery for students)  | University of Novi Sad, Faculty of Agriculture | 2007 |
| 3. | Petrić D, Ignjatović-Ćupina A, Vuković M. & Srdić Ž. | General entomology, *practicum*, CD (in Serbian, free delivery for students) | University of Novi Sad, Faculty of Agriculture | 2007 |
| 4. | Ignjatović-Ćupina A. & Petrić D.  | Keys for families of the superclass Hexapoda, CD (in Serbian, free delivery for students) | University of Novi Sad, Faculty of Agriculture | 2012 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***PLANT MYCOLOGY 1*** |
| Course id:3ОFM5О21 |
| Number of ECTS: 6 |
| Teacher: | Stevan N. Masirevic |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 60 | Practical classes: 30 | Other teaching types: / | Study research work: / | Other classes: / |
| Precondition courses | Passed examination of the basics phytopathology |
| 1. Educational goal

The knowledge of the most economically important field and vegetable crops mycoses and their control. |
| 1. Educational outcomes

Theoretical and practical knowledge about field and vegetable cropsmycoses. Students training for application of appropriate control measures in accordance with good agricultural practices. |
| 1. Course content

Lectures:Fungi similar organisms, real fungi and parasitic flowering: Genera: *Plasmodiophora, Spongospora, Polymixa, Aphanomyces, Pythium, Phytophthora, Sclerospora, Plasmopara; Peronospora; Pseudoperonospora; Albugo,Synchytrium; Erysiphe; Leveillula, Sphaerotheca; Gibberella; Claviceps, Diaporthe; Cochliobolus; Setosphaeria; Pyrenophora; Leptosphaeria; Pleospora; Sclerotinia; Pseudopeziza, Botriotinia; Verticillium; Cercospora; Cladosporium; Alternaria; Rhynchosporium, Pseudocercosporella; Fusarium; Colletotrichum; Phoma, Phomopsis; Septoria; Rhizoctonia; Ascochyta, Macrophomina; Ustilago; Tilletia, Urocystis; Puccinia; Uromyces; Cuscuta,Orobanche*. From the above-mentioned genera of economically important diseases of field and vegetable crops will be elaboratedoccurrence, distribution, harmfulness, symptoms of the disease, characteristics of the pathogen, the cycle of development and protection measures.Practical classes:Fungi similar organisms, fungi and parasitic flowering: Genera: *Plasmodiophora, Spongospora, Polymixa,Pythium, Phytophthora; Plasmopara; Peronospora, Albugo, Synchytrium; Erysiphe; Leveillula, Sphaerotheca; Gibberella; Claviceps, Diaporthe; Cochliobolus, Setosphaeria; Pyrenophora, Leptosphaeria; Pleospora, Sclerotinia; Pseudopeziza, Botriotinia, Verticillium; Cercospora, Cladosporium, Alternaria; Rhynchosporium, Pseudocercosporella; Fusarium; Colletotrichum, Phoma, Phomopsis; Septoria, Rhizoctonia; Ascochyta, Macrophomina; Ustilago, Tilletia; Urocystis, Puccinia; Uromyces*.Practical work on the herbarized and vitl material - identifying the causal agent. Individual work on the microscope, making microscopic preparations, drawing the reproductive organs of pathogens, cycle and the development of symptoms. |
| 1. Teaching methods

Teaching is carried out using modern techniques. Visual - didactic methods with the use of modern teaching aids and laboratory equipment.Practical classes - management of individual work of students and demonstrative - illustrative methods. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (choose) | Mandatory | Points |
| Lecture attendance | Yes | 5 | Oral part of the exam | Yes | 70 |
| Exercise attendance | Yes | 5 |  |
| Colloquium | Yes | 20 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Ivanovic M., Ivanovic D. | Mikoze i pseudo mikoze biljaka | Faculty of Agricultural, Belgrade | 2001 |
| 2. | Balaz F., Balaz J., Tosic M., Stojsin V., Bagi F. | Fitopatologija – Bolesti ratarskih i povrtarskih biljaka | Faculty of Agricultural, Novi Sad | 2010 |
| 3. | Stojanovic S. | Poljoprivredna fitopatologija | Serbian Biological Society, Kragujevac | 2004 |
| 4. | Stojsin V., Bagi F., Balaz F. | Praktikum iz fitopatologije – Mikoze i pseudo mikoze ratarskih i povrtarskih biljaka | Faculty of Agricultural, Novi Sad | 2008 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***SPECIAL ENTOMOLOGY 1*** |
| Course id: 3OFM6О25 |
| Number of ECTS:6 |
| Teacher: | Pero M. Štrbac, Radmila S. AlmašiAleksandra M. Konjević, Aleksandra M. Popović |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures:4 | Practical classes:2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | Outlines of Entomologycourse and Insect Systematics and Medical Entomology course passed |
| 1. Educational goal

Introduction to insect pest species in field crops and storage houses. Knowing of insect morphology and anatomy, stages of development, taxonomy and development cycle. Recognition of certain stages which makes damages to field plants (and stored products), including phenophases of plantsare basic for timely pest reduction or suppression to tolerant level.  |
| 1. Educational outcomes

This course will provide the basis for recognizing the most important insect pests species in crop production and storage products, which are the most important for monitoring and reduction of their abundance in filed production and storage houses as well.  |
| 1. Course content

*Theory lessons* Introduction to the polyphagous, harmful, economically most important pests and in production of field crops, cereals, industrial plants (sugar beet and oily plants), forage crops (alfalfa, clover, etc.), pests of vegetative and generative organs of plants. The most important pest of stored products in storagehouses. Insects distribution, importance, biology, ecology, non-chemical treatments and possibilities of integrated pest management. *Practical teaching: Exercises, Other modes of teaching, Study research work* Special attention will be paid to morphology of insects, use of keys for identification of live and preserved material, recognition of the most important pest species feeding symptoms. Practical teaching units include polyphagous pest species, pests of corn, cereals, sugar beet, oil and industrial plants, forage crops, meadows and pastures.Determination of primary and scondary stored pests of wheat, grain legumes, dried fruitsmeat and dairy products. Identification of adults and larvae familiae Scarabeidae, Elateridae and Noctiudae. Gender determination of adults familiae Carabidae, Curculionidae and Chrysomelidae. Entomophagous insects - predators and parasites. |
| 1. Teaching methods

Lectures, Practice/ Practical classes, Consultations, study, research work |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam  | Mandatory | Points |
| Colloquium 1 | Yes | 20 | *Oral part of the exam* | Yes | 30 |
| Colloquium 2 | Yes | 10 | *Oral part of the exam* | Yes | 30 |
| Term paper | Yes | 10 |  |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Čamprag, D., Kereši, T., Štrbac, P. | Seed pests of field crops in fields and storagehouses. (in Serbian)  | Faculty of Agriculture Novi Sad  | 2001 |
| 2. | Štrbac, P. | Pests in field and vegetable crops (in Serbian) | Faculty of Agriculture Novi Sad | 2012 |
| 3. | Štrbac, P., Thalji, R., Toskano, B. | Homoptera, Sternorrhyncha, Aphidoidea, economic most important species in plant production | Faculty of Agriculture Novi Sad | 2009 |
| 4. | Štrbac, P., Čamprag, D. | Integrated pest management (Cultural Practices) and Pests in field crops (in Serbian). | Faculty of Agriculture Novi Sad | 2013 |
| 5. | Vukasović, P., Stojanović, T, Šenborn | Stored Product Pests (in Serbian) | Faculty of Agriculture Novi Sad | 1972 |
| 6. | Kljajić P. | Protection of stored plant products against harmful organisms | Institute of Pesticides and Environmental Protection, Belgrade | 2008 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***BASIS OF PHYTOPHARMACY*** |
| Course id: | 30FM6026 |
| Number of ECTS: | 5 |
| Teacher: | Sanja D. LazićVojislava P. Bursić |
| Course status | Mandatory/Elective : Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 3x15=45 | Practical classes:2x15=30 | Other teaching types  | Study research work: | Other classes: |
| Precondition courses | None/navesti ako ima |
| 1. Educational goal

Introduction to the means for plant protection, forms of their production, physico-chemical properties, toxicity, behaviour in the environment, pesticide handling, insecticides, fungicides and herbicides. |
| 1. Educational outcomes

The acquired-applicable knowledge of pesticide formulations, measures of precaution at handling and the application method which provides minimum residues in agricultural products. |
| 1. Course content

History of pesticide application, classification, production methods, non-pesticide matters in compounds, physico-chemical properties. Pesticide behaviour in plants, water and soil, PHI, tolerance, working PHI. Pesticide toxicology: Organochlorine insecticides, organophosphorus insecticides, carbamates, pyrethroids, obtaining, effect, decomposition and toxicity (12 hours). Fumigants, fungicides: inorganic copper salts, dithiocarbamates, phthalimides, benzimidazoles, herbicides: MCPA, 2,4-D, triazines, paraquat, glyphosate, impurities by product of manifacture and industrial impurities. Other teaching forms – laboratory exercises: wet sieve test, detrminaton of tap density, compact volume. Determination of specific gravity, density and weight per millitre. Determination of absorptive capacity. Determination of water content, looseness and hygroscopicity. Determination of acidity and alkalinity. Determination of viscosity and surface tension. Determination of HLB, suspension stability and emulsion stability. Production of pesticide compounds. Testing of physico-chemical properties of produced preparations. Determination of the active ingredient content in produced preparations by thin-layer chromatography. Detrmination of active matter content by UV spectrophotometry. Determination of sulphur content. |
| 1. Teaching methods

Lectures  |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes/No | 5 | *Theoretical part of the exam/Oral part of the exam/Written part of the exam-tasks and theory* | Yes | *Written part of the exam 35* + 50 *Oral part of the exam*  |
| Test | Yes/No |  |  |
| Exercise attendance | Yes/No |  |
| *Term paper* | Yes/No | 10 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1 | Šovljanski, R., Lazić, S. | Osnovi fitofarmacije | Univerzitet u Novom Sadu, Poljoprivredni fakultet | 2007 |
| 2 | Šovljanski, R., Klokočar Šmit, Z., Lazić S. | Praktikum iz opšte fitofarmacije | Univerzitet u Novom Sadu, Poljoprivredni fakultet. | 2002 |
| 3 | Vitorović S., Milošević M. | Osnovi toksikologije sa elementima ekotoksikologije | Univerzitet u Beogradu | 2002 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course:  | ***Fungicides*** |
| Course id: 3ОФМ7О28 |
| Number of ECTS: 6 |
| Teacher: | Dušanka V. InđićSlavica M. Vuković |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 4 x 15 = 60 | Practical classes: 2 x 15 = 30 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | Plant Micology 1, Plant Micology 2, Basics of Phytopharmacy |
| 1. Educational goal

The aim of the course is to provide students with knowledge about: fungicide properties (physical-chemical, biological spectrum of action, side effects, risk assessment of resistance), the assessment of biological effects (toxicity, efficacy, phytotoxicity) and strategies in the application of fungicides. |
| 1. Educational outcomes

Acquired knowledge will contribute to training of individuals for work in the field of contemporary applications of fungicides in the production of crops, vegetables, fruits and wine and horticulture. |
| 1. Course content

*Theoretical classes*: fungicides - the history, significance, systematization and application, inorganic fungicides for plant treatment (copper, sulphuric, mercury compounds). Synthetic fungicides – physical-chemical and biological properties of diazoles, benzimidazoles, imidazoles, strobilurins, dithiocarbamates, dicarboximides, acilalanins, anilinopirimidins, phthalimides, guanidins, urea, anilides, benzotriazins, cyclohexane carboxanilides, dinitrophenols, phenylimidazolinons, phenilpyrols, phosphonates, quinones, carbamates, morpholins, oxazolidindions, piperazines, pyrimidines, spiroketalamines, sulphamids, thioureas; Monitoring of resistance of phytopathogenic fungi to fungicides, causes and strategies to overcome resistance, with emphasis on prophylactic measures; Plant protection programs against diseases of small grains, maize, industrial plants, vegetables; stone fruit, grapes, berries and nuts, medicinal, ornamental and forage crops, stored products. Possibilities of preparing fungicide preparations by mixing several compounds.*Other forms of teaching - laboratory exercises*: Methods of fungicide application; fungicide efficacy assessment; toxicity-LD50 or LC50, LT50 of fungicides; probyt analysis (p-ld, lc-p lines and the level of toxicity), effects of preparations for seed treatment; testing the difference of effects of fungicides, a systemic effect of fungicides, soil fungicides, prophylactic and curative effects of fungicides in fruit; phytotoxicity tests, development of programs for protection of cultivated plants from diseases; caution measures when working with fungicides. |
| 1. Teaching methods

Lectures, Practical classes, Research work |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (choose) | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Oral part of the exam* | Yes | 30 |
| *Written part of the exam* | Yes | 20 |
| Test (colloquium) | Yes | 20 |  |
| Exercise attendance | Yes | 5 |
| Term paper | Yes | 20 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Inđić, D., Vuković, S. | Praktikum iz Fitofarmacije (fungicidi, zoocidi) | University of Novi Sad, Faculty of Agriculture | 2012 |
| 2. | Janjić, V., Elezović, I | Pesticidi u poljoprivredi i šumarstvu u Srbiji 2010 | Plant Protection Society of Serbia, Belgrade  | 2010 |
| 3. | Tomlin, C. (Ed) | The Pesticide Manual (14th ed) | British Crop Protection Council, Farnham | 2006 |
| 4. | Copping, L.G. | The Manual of Biocontrol Agents | BCPC, UK | 2009 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***SPECIAL ENTOMOLOGY 2*** |
| Course id:3ОFM7О30 |
| Number of ECTS:6 |
| Teacher: | Tatjana B. KerešiAleksandra M. Konjević, Aleksandra M. Popović |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures:4 | Practical classes:2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | Outlines of Entomologycourse and Insect Systematics and Medical Entomology course passed |
| 1. Educational goal

Introduction to insect pestsofvegetables, ornamental and medicinal plants and integrated pest management.  |
| 1. Educational outcomes

The ability of identification and knowledge in biology and ecology of ornamental plant pests and vegetables pests.Solving theoretical and practical problems related to the identification, monitoring and control of pest insects by applying the concept of integrated crop protection. Detection of new harmful species, preventing their occurrence and spread. |
| 1. Course content

*Theory lessons*: Introduction and significance of poliphagous insect species.Basic morphological properties, distribution, damage and importance, biology, ecology of harmful insectsof vegetables, flowers, trees, shrubs, lawns and medicinal plants and integrated measures of struggle against the economically most important pests.The influence of environmental factors on the occurrence of quarantine and invasive species of insects, preventing their introduction, settlement and spread to new areas.*Practical teaching: Exercises, Other modes of teaching, Study research work:*Morphology, biology and symptoms of damages of vegetables, flowers, ornamentalshrubs and trees pests (in the collections, atlases, images, recognition in the field, etc.). Overview and identification of stuffed and preserved specimens and their damages. |
| 1. Teaching methods

Lectures, Practice/ Practical classes, Consultations, study, research work |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam  | Mandatory | Points |
| Activity during lectures | Yes | Up to 5 | *Written part of the exam* |  |  |
| Practical classes attendance | Yes | Up to 5 | *Oral part of the exam* | Yes | 30 |
| Colloquium  | Yes | 20 |  |  |  |
| Seminar | Yes | 20 |  |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Sekulić, R., Spasić, R, Kereši, T. | Pests of vegetables and their chemical control (in Serbian)  | Faculty of Agriculture Novi Sad  | 2008 |
| 2. | Mihajlović, Lj. | Forest Entomology | Faculty of Forestry | 2008 |
| 3. | Kereši, T. | Entomofauna of Field and Vegetable Crops  | Faculty of Agriculture, Novi Sad | 2010 |
| 4. | Štrbac, P. | Pests in crop and vegetable production (in Serbian) | Faculty of Agriculture Novi Sad | 2005 |
| 5. | Alford, V.D. | A Color Atlas of Pests of Ornamental Trees, Shrubs and Flowers | Timber Press, Portland, Oregon, USA | 2003 |
| 6. | Iževskij, S.S., Ahatov, A.K. et al | Zaščita tepličnih i oranžerejnih rastenij ot vreditelej | KMK Scientific Press Ltd., Moskva | 2004 |
| 7. | Maceljski, M. | Agricultural Entomology | Čakovec: Zrinski | 1999 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***SPECIAL ENTOMOLOGY 3*** |
| Course id: 3OFM7О30 |
| Number of ECTS:5 |
| Teacher: | Radmila S. Almaši, Pero M. ŠtrbacAleksandra M. Konjević, Aleksandra M. Popović |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures:4 | Practical classes:2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | Outlines of Entomologycourse and Insect Systematics and Medical Entomology course passed |
| 1. Educational goal

The acquisition of knowledge about the pests of fruit trees and grapevines in order to take adequate measures to protect these plants in time. Long and short term forecasts, i.e. signaling to take adequate measures to protect plants, that has its own environmental and economic justification. |
| 1. Educational outcomes

The acquired knowledge in this course is the basis for monitoring pest, forecasting their occurrence and abundance correction in production of fruit and grapevina. |
| 1. Course content

*Theory lessons*The most economically important pest of pome, stone fruits, nuts, berries and grapevine. Lectures include: economic importance, distribution, symptoms of damage, morphological characteristics, biology of the species. Methods of determining the pests in orchards: winter examination, method of visual examination, method of punches, method of funnel, ect. Forecasts of major pest in orchards and vineyards. Forecasts types of pests in crop production: poliphagous insects, pests of small grains and corn, sugar beet, oil crops and other industrial plants, as well as pests of forage crops. Monitoring the intensity of harmful species in vegetable production (outdoors and in greenhouses).*Practical teaching: Exercises, Other modes of teaching, Study research work* Entomology-Specific methods of detection of pests in orchards and vineyards. Identification of harmful insects species, morphology, symptoms of damages, short biology and harmfulness -individual examination of live and preserved specimens and symptoms of damages. Basic methods of determination of pests in crop and vegetable production: pest identification by inspection of soil. Examination of soil surface and plant residues and forecast of cereal bug emergence. Methods of collecting and monitoring of pest outbreaks: herbal baits and hunting plants, hunting glasses, hunting channels, colored water baits, adhesive tape and boards, suction traps, light traps, pheromone traps, entomological network, the method of the square, etc. |
| 1. Teaching methods

Lectures, Practice/ Practical classes, Consultations, study, research work |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam  | Mandatory | Points |
| Colloquium (insects) | Yes | 10 | *Oral part of the exam (Entomology)* | Yes | 30 |
| Colloquium (symptoms) | Yes | 10 | *Oral part of the exam (Forcaste)* | Yes | 30 |
| Colloquium (forcaste) | Yes | 10 |  |
| Seminar paper (forcaste) | Yes | 10 |  |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Almaši, R., Injac, M., Almaši, Š. | Harmful and Useful Organisms of Pomes | Novi Sad: Alex print. | 2004 |
| 2. | Tanasijević, N., Simova-Tošić, D. | Special entomology |  Belgrade: Book of Science | 1987 |
| 3. | Collective authors | Pests in Crop Production, special part II | Belgrade: Zavod za izdavanje udžbenika RS. 1-598. | 1967 |
| 4. | Štrbac, P. | General Methods of Forecasting of Pests in Plant Production | Faculty of Agriculture, Novi Sad | 2005 |
| 5. | Collective authors | Handbook of reporting and forecasting services to protect agricultural crops | The Alliance ofcompanies for Plant Protection of Yugoslavia, Belgrade | 1983 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***STATISTICS*** |
| Course id:3ОСТ7О31 |
| Number of ECTS: |
| Teacher: | Dr Beba Mutavdžić |
| Course status | Mandatory/Elective Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: | Practical classes: | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None/navesti ako ima |
| 1. Educational goal

The program of this course allows students to become familiar with the use of modern statistical methods in solving problems in the field of agricultural and biological sciences. Students should familiarize themselves with descriptive methods and methods of analysis of experimental results. |
| 1. Educational outcomes

Through the teaching process, students should acquire the ability to use statistical methods and their application in agricultural, biological and related fields. Acquired abilities and appropriate use of statistics and its methods allow students to successfully solve problems in the future work and in obtaining an education. |
| 1. Course content

Theoretical lessonsBasic Statistics. The concept and importance of statistics. Statistical population. Statistical units and observation characteristics. Statistical series. Types of statistical series. Presenting statistical data. Making a frequency distribution. Measures of central tendency. Measures of variability. Measures of distributional shape. Theoretical distributions. Discrete and continuous probability distributions. Sampling methods. Population and sample*.* The selection of sample units. Basic sample plans. Characteristics of distribution of sample parameters. Principles of parameter estimation. Confidence interval. Determination of sample size. Hypothesis testing. Principles of hypothesis testing. Hypothesis testing for a population mean and a population proportion. Analysis of variance and assumptions for its implementation. The basic principles of the experiment in agriculture. Linear regression and correlation. Basic concepts. A scatter plot. Choice of regression methods and methods of analysis.Practical classesAnalysis of numerical series. Theoretical distributions. The sampling distribution. The point and the confidence interval estimation of the population mean and proportion. Statistical inference. Hypothesis testing. Regression and correlation. |
| 1. Teaching methods
 |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes | 10 | *Theoretical part of the exam/Oral part of the exam/* | Yes | 40 |
| Test | Yes | 40 |  |
| Exercise attendance | Yes | 10 |
| Other | No |  |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Hadživuković, S. | Statistical Methods | Agricultural faculty, Novi Sad | 1991. |
| 2. | Lozanov-Crvenković Z. | Statistics | Faculty of Sciences, Novi Sad | 2012. |
| 3. | Чобановић К | Examples and exercises in Statistics | Agricultural faculty, Novi Sad | 2003. |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***ADVANCED HERBOLOGY*** |
| Course id:3OFM8O32 |
| Number of ECTS: 4 |
| Teacher: | Branko I. KonstantinovićBojan B. Konstantinović |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 30 | Practical classes: 30 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | The conditions for taking both the preliminary and the exam are in accordance with ECRS system. It is predicted for student to write one seminar paper. |
| 1. Educational goal

The acquired knowledge of this course represents an upgrade of the previously gained knowledge from the field of herbology, necessary for choice of measures for control of resistant, invasive and quarantine weeds.  |
| 1. Educational outcomes

The students who have passed the subject Advanced Herbology will be able to choice mesures for weed control and the right time for its application, according to the conditions of field and crop growing, based on the recognition of weed species and their economic significance. |
| 1. Course content

*Theoretical classes*: Notion and definition of weeds. Damage caused by weeds. The potential benefits of weeds. Basic biological features of weed species. Division of weeds. Propagation of weed seed. Vegetative propagation of weed. Ways of spreading weeds. Knowledge of basic biological characteristics of weed plants from the point of application of herbicides. Medicinal and poisonous plants. Weed seeds in the soil. Basic biological characteristics of the major weed species from the families: *Equisetaceae, Ranunculaceae, Rosaceae, Fabaceae, Papaveraceae, Fumariaceae, Brassicaceae, Violaceae, Polygonaceae, Portulacaceae, Caryophyllaceae, Chenopodiaceae, Amaranthaceae, Convolvulaceae, Verbenaceae, Boraginaceae, Lamiaceae, Solanaceae, Scrophulariaceae, Plantaginaceae, Rubiaceae, Sambucaceae, Asteraceae, Poaceae, Cyperaceae, Liliaceae, Alliaceae, Asparagaceae*. Research work includes training in recognizing and determining the taxonomy of the weed species by using the keys to their determination.*Practical classes - Exercises*: Familiarizing with the most important species of weed. Familiarizing with the seedlings of economically significant weed species. Characteristics of the weed seeds. Methods for weeds determination. Methods of studying weed species and weed flora. Establishing the basic characteristics of weed communities. Familiarizing with the methods of phytocenological studying of weeds. Sorting out the phytocenological tables and establishing the syntaxonomical belonging of weed phytocenoses. Methods of mapping weed vegetation and the ways of its interpretation. Methods to determine herbicide efficacy on weeds. Methods for determination the weed resistance on herbicide. The influence of herbicides on the important physiological process in weeds. Methods of determining the efficacy of herbicides. Other forms of teaching: seminar papers, field work, interactive forms of teaching. |
| 1. Teaching methods

 Lectures,Practical classes, Consultations, research work |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes | 10 | Oral part of the exam | Yes | 30 |
| Test | Yes | 40 |  |
| Exercise attendance | No |  |
| Practical exam | Yes | 20 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Konstantinović, B. | Poznavanje i suzbijanje korova | Univerzitet u Novom Sadu, Poljoprivredni fakultet | 1999 |
| 2. | Konstantinović, B. | Biologija, ekologija i suzbijanje korova | Univerzitet u Novom Sadu, Poljoprivredni fakultet | 2005 |
| 3. | Konstantinović B., Bošković J. | Biotehnologija u zaštiti bilja | Univerzitet u Novom Sadu, Poljoprivredni fakultet | 2001 |
| 4. | Konstantinović, B. | Korovi i njihovo suzbijanje | Univerzitet u Novom Sadu, Poljoprivredni fakultet | 2008 |
| 5. | Konstantinović, B. | Osnovi herbologije i herbicidi | Univerzitet u Novom Sadu, Poljoprivredni fakultet | 2011 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***AGRICULTURAL ENGINEERING AND PESTICIDE APPLICATION*** |
| Course id:3OFM8O33 |
| Number of ECTS:*4* |
| Teacher: | Bugarin Rajko, Sedlar Aleksandar |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 4 | Practical classes: 2 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None/navesti ako ima |
| 1. Educational goal

Theoretical and practical knowledge related to the technique for the application of pesticides in greenhouses, storage facilities in agriculture. products and in production in the open field. |
| 1. Educational outcomes

The knowledge obtained in this course should enable the proper selection, configuration and usage of existing machines in the application of pesticides in the production of certain plant species, with emphasis on the efficient and economical use of machinery and the impact on the environment. |
| 1. Course content

The importance of agricultural techniques in plant protection. Tractors, classification and characteristics. Equipment for the utilization of agricultural tractors. The use of tractors in different conditions.Basic Principles of hydraulics. Hydrostatic transmission, hydrodynamic power transmission and torque. Application of hydraulic systems of tractors and machinery for pesticide application. Machines for plant protection: sprinklers, sprayers, foggers, dusts, improved spraying machines, aircraft equipped with devices for the treatment of air. Machines for disinfection and disinfestation of seed. Safety at work.Using the machine for the application of pesticides within the combined aggregates for sowing, planting, fertilization, tillage and mowing.Facilities and equipment for storage of agricultural products. The preparation of seed material for storage. The principles of operation of grain. The requirements for proper storage and preservation of seed material. |
| 1. Teaching methods

Getting to know the purpose of the basic parts, the principle of operation, configuration, maintenance, ongoing operation and protection measures at work machine and oppreme according to the curriculum of lectures.Lectures, Practice/ Practical classes |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes/No | 5 | *Theoretical part of the exam/Oral part of the exam/Written part of the exam-tasks and theory* | Yes | 60 |
| Test | Yes/No | 30 |  |
| Exercise attendance | Yes/No | 5 |
| *Ovde se mogu pojaviti i kolokvijumi i seminarski rad (npr. Test, Term paper)* | Yes/No |  |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Bošnjaković A | Mašine za zaštitu bilja | Poljoprivredni fakultet Novi Sad | 1994 |
| 2. | Bugarin, R. Bošnjaković, A.Sedlar, A. | Mašine u voćarstvu i vinogradarstvu | Poljoprivredni fakultet, Novi Sad | 2014 |
| 3. | Bugarin, R., A.Sedlar, A | Fitomedicina | Univerzitet u Novom Sadu, Poljoprivredni fakultet | 2014 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***ZOOCIDES*** |
| Course id:3OFM8034 |
| Number of ECTS:5 |
| Teacher: | Prof. Marija Zgomba, Msc Dusan Marinkovic |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures:4 | Practical classes:2 | Other teaching types:- | Study research work:- | Other classes:- |
| Precondition courses | Basics of Phytopharmacy, Agricultural Zoology and Ecology, Outlines of Entomology, Entomofauna of Field and Vegetable Crops, Entomofauna of Fruit Trees and Grapevine, Insect Systematics and Medical Entomology |
| 1. Educational goal

Acquiring knowledge on the planned program in the field of chemical insecticides, acaricides, nematocides, avicides, limacides, rodenticides repellents and attractants. Biological control agents, Integrated approach to controlling pests in plant protection  |
| 1. Educational outcomes

Recognition and accomplishment of the main characteristics of the different groups of zoocides. Identification the advantages and disadvantages of the use of each group of zoocides based on understanding of their efficacy against pests as well as their good and weak toxicological and ecotoxicological properties. Impact of zoocides on non-target biota and food chain within agro-eco systems. Implementation of selection/choice of compounds for sound and environmentally acceptable control. |
| 1. Course content: *Theoretical programme*: inorganic compounds, chlorinated hydrocarbons and persistence. Mode of action of insecticides: dinitrophenoles, carbamates, organophospahes, Pyretrum and Pyrethroides, Insect Growth Regulators (chitin synthesis inhibitors, juvenoids). Neonicotinoides-mode of action. Sterile insect techniques. Bioinsecticides. Prerequisites for effective insect control, mode of action. Causes and ways of resistance development. Acaricides, relationship: predators and mites. Nematocides. Molluscides. Rodenticides. Avicides. Attractans and repellents.

*Practical programme*: Biological evaluation of insecticides (determination of compound LD50 in the powder formulation, LD50 for digestive intake (feeding tests). Verification of LT50 and LD50 after topical insecticide application. The speed of insecticide action depending on chemical group and mode of ingestion. Verification of insecticide effectiveness of various formulations in soil pests. Verification of insecticidal impact on synanthropic insects. Toxicity and side effects on non-target insects and beneficial entomofauna. Application of different rodenticides classes and their mode of action. The choice of monitoring/surveillance pest methods and their relevance to the control method and the effectiveness degree of chosen suppression treatment. |
| 1. Teaching methods

Lectures, Practice/ Practical classes, Demonstrations, Consultations |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Theoretical part of the exam Oral* | Yes | 60 |
| Exercise attendance | Yes | 10 |  |
| Test | Yes | 25 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Tomlin, [C.D.S.](http://www.google.rs/search?tbo=p&tbm=bks&q=inauthor:%22Clive+Tomlin%22&source=gbs_metadata_r&cad=7)  | The Pesticide Manual: A World Compendium | BCPC | 2013 |
| 2. |  [Stenersen](http://www.google.rs/search?tbo=p&tbm=bks&q=inauthor:%22J%C3%B8rgen+Stenersen%22), J. | Chemical Pesticides Mode of Action and Toxicology | CRC Press | 2004 |
| 3. | Kerkut G. A., Gilbert L.  | Comprenhensive Insect Physiology, Biochemistry and Pharmacology, I-XII,  | Pegamon Press,  | 1986 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course:  | ***HERBICIDES*** |
| Course id: 3ОФМ8035 |
| Number of ECTS: 6 |
| Teacher: | Branko I. KonstantinovićMaja U. Meseldžija |
| Course status | Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 4 x 15 = 60 | Practical classes: 2 x 15 = 30 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | Basics Herbology, Advanced Herbology, Basis of Phytopharmacy  |
| 1. Educational goal

Familiarizing the sudents with the basic characteristics of herbicides, formulations, application and the way they take action. Classification of this chemical group of organisms according to their mechanisms of taking action, residues of herbicides, standardization and health aspects. Law regulations important for safe application of herbicides. Ecological exposure to herbicides and monitoring. |
| 1. Educational outcomes

Passing this exam students acquire the knowledge about the chemical group of herbicides, the way they take action and their destiny on the soil, in order to be used for the practical application, or for giving the recommendations about the use of herbicides, all in accordance with the law regulations.  |
| 1. Course content

*Theoretical classes*: Basic characteristics of herbicides. Formulations of herbicides. Technology of the application of herbicides. The destiny of herbicides in the environment. Basic application of herbicides. The ways they take action. Harmful effects of using herbicides. Inorganic formations with the herbicidal activity. Anilines and their derivatives. Ethers and their derivatives. The derivatives of alyphatic carboxylic acids. The derivatives of aromatic carboxylic acids. Amides. Anilides. The derivatives of phenoxy carboxylic acids. The derivatives of carbamic acid. The derivatives of dithiocarbamic acid. The derivatives of urea and tiourea. Organic formations of phosphorus. Heterocyclic formations with one heteroatom in the ring. Sulfonylurea herbicides. Imidazolinones. Other organic formations. Transgenic plants and herbicides. The position and significance of herbicide as a type of poison for people. Acute and chronic exposure to herbicides. Chronic and genotoxic influence of herbicides. Residues of herbicides, standardization and health aspects. Ecological exposure to herbicides and monitoring. Law regulations significant for safe application of herbicides. Biological effects on water organisms. Effects of microorganisms in the soil. *Practical lessons: Exercises*: familiarizing with the basic contents of herbicides. Methods of studying the residues of herbicides in the soil. Washing out herbicides. Selectivity of herbicides and the scale for establishing phytotoxicity. Methods of biotest. Establishing the resistance of weeds to herbicides. Familiarizing with the laboratory analyses and methods of establishing active substances and validity of herbicides. |
| 1. Teaching methods

Lectures, Practical classes, Research work |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (choose) | Mandatory | Points |
| Lecture attendance | Yes | 10 | *Oral part of the exam* | Yes | 30 |
| *Written part of the exam* | Yes |  |
| Test  | Yes | 40 |  |
| Exercise attendance | Yes |  |
| Colloquium | Yes | 20 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Janjić, V. | Mehanizam delovanja pesticida | Društvo za zaštitu bilja Srbije, Beograd, Akademija Nauka i umjetnosti Republike Srpske, Institut za pesticide i zaštitu životne sredine, Zemun-Beograd | 2009 |
| 2. | Janjić, V., Elezović, I | Pesticidi u poljoprivredi i šumarstvu u Srbiji 2010 | Društvo za zaštitu bilja Srbije, Beograd  | 2010 |
| 3. | Tomlin, C. (Ed) | The Pesticide Manual (14th ed) | British Crop Protection Council, Farnham | 2006 |
| 4. | Janjić, V. | Fitofarmacija | Društvo za zaštitu bilja Srbije, Beograd Institut za istraživanja u poljoprivredi Srbija,Poljoprivredni fakultet, Banja Luka | 2005 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***ECOTOXICOLOGY AND ENVIRONMENTAL PROTECTION*** |
| Course id:3OFМ8036 |
| Number of ECTS:5 |
| Teacher: | Sanja D. Lazic, Ivana V. MaksimovićVojislava P. Bursić, Marina I. Putnik- Delić |
| Course status | Mandatory/Elective : Mandatory |
| Number of active teaching classes (weekly) |
| Lectures: 3x15=45 | Practical classes:15 | Other teaching types  | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

The knowledge about the pollution sources and types of pollutants in ecosystems and the measures to be taken in the process of agriculture production in order to prevent pollution of ecosystems.  |
| 1. Educational outcomes

The acquired-applicable knowledge in the field of ecotoxicology and environmental protection. |
| 1. Course content

Definition of ecotoxicology, circulation of matter and energy in nature, toxicity, toxicity testing, mutagens, cancerogenic, teratogenic, reproduction effects. Human expose to the toxic compounds and risk assessment. Pesticides – organochlorine insecticides, polychlorinated biphenyls, dioxins, polycyclic aromatic hydrocarbons. Concept, causes, types, level of pollution. Goals and assignments of agro-ecosystem protection. Basic characteristics and peculiarities of agro-ecosystem. Pollution and protection of air, water and soil– sources and classifications of pollutant, effects of pollution, possibilities of reducing negative effects in plant production. *Other teaching forms – laboratory exercises*: Determination of organochlorine insecticides, polychlorinated biphenyls and polycyclic aromatic hydrocarbons content in the environment. The determination of SO2, CO2, NH3 excess in air. Determination of inorganic and organic chemical pollution in water. Determination of heavy metals content in water, soil and plants and rebuilding polluted soil. Determination of nitrate content in plant material. |
| 1. Teaching methods: Lectures
 |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes/No | 5 | *Theoretical part of the exam/Oral part of the exam/Written part of the exam-tasks and theory* | Yes | 85 |
| Test | Yes/No |  |  |
| Exercise attendance | Yes/No |  |
| *Term paper* | Yes/No | 10 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1 | Kastori, R. | Zaštita agroekosistema | Feljton, Nov Sad | 1996 |
| 2 | Alloway, B., J. | Heavy metals in soil | Blackie, Glasgow | 1990 |
| 3 | Walker, C.H., Hopkin, S.P., Siblz, R.M., Peakall, D.B. | Principes of Exotoxicology | Tajlor&Francis, New York | 2006 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***MATHEMATICS*** |
| Course id: 3ОFM1I39; |
| Number of ECTS: 6 |
| Teacher: | **Snežana J. Matić-Kekić, Nebojša M. Dedović** |
| 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

Mastering the skills and knowledge of subject content, which provides the basis for mathematical modeling of agro-economic phenomena and their exploitation in practice. |
| 1. Educational outcomes

Student qualifies for mathematical modeling of agro-economic phenomena and actively pursuing them. |
| 1. Course content

Real functions. Linear, quadratic, exponential, logarithmic, trigonometric functions and degrees. Sequences and limits of the functions. Asymptote of the functions. Derivative of the function (first and higher order). Local extreme values and intervals of monotonicity. Concave and convex functions. Graphic of the functions. Economic functions: interval of profitability, profits, demand, supply, revenues, costs, flexibility in the point and its interpretation. Integral calculus: primitive functions, method of substitution, partial integration and the integration of rational functions. Application of definite integrals. |
| 1. Teaching methods: Lectures
 |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam  | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Written part of the exam-tasks and theory* | Yes | 45 |
| Test | Yes | 45 |  |
| Exercise attendance | Yes | 5 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Konjik S., Dedović N. | Mathematics - a collection of tasks for the students of Faculty of Agriculture (in Serbian) | Faculty of Agriculture, University of Novi Sad | 2011. |
| 2. | Hadzić O., Takači Đ. | Mathematics for students of natural sciences (in Serbian) | University of Novi Sad, university textbooks - Edition 76 | 1998. |
| 3. | Matić-Kekić S. | Economic mathematics for students of biological sciences (in Serbian) | Faculty of Agriculture, University of Novi Sad | 2006. |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***APPLIED MATHEMATICS*** |
| Course id: 3ОFМ1I40 |
| Number of ECTS: 6 |
| Teacher: | **Snežana J. Matić-Kekić, Nebojša Dedović** |
| 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

Mastering the skills and knowledge of subject content, which provides the basis for mathematical modeling of agro-economic phenomena and their exploitation in practice. |
| 1. Educational outcomes

Student qualifies for mathematical modeling of agro-economic phenomena and actively pursuing them. |
| 1. Course content

Financial mathematics: percentage and promil calculus, compounded interest rate, fixed-term and continuous savings, loans payment. Proportion, direct and inverse proportion, mixing calculus, chain calculus, division calculus, time series. Matrix calculus: operations on matrices, determinant of matrices, elementary transformation, regular matrices. Gaussian elimination method, Cramér's theorem, inverse matrix, simplex method, Vogel’s and MODI method. Formulation and solution of mathematical models. Combinatorial principles, combinations, variations and permutations, binomial coefficients.  |
| 1. Teaching methods: Lectures
 |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam  | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Written part of the exam-tasks and theory* | Yes | 45 |
| Test | Yes | 45 |  |
| Exercise attendance | Yes | 5 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Konjik S., Dedović N. | Mathematics - a collection of tasks for the students of Faculty of Agriculture (in Serbian) | Faculty of Agriculture, University of Novi Sad | 2011. |
| 2. | Hadzić O., Takači Đ. | Mathematics for students of natural sciences (in Serbian) | University of Novi Sad, university textbooks - Edition 76 | 1998. |
| 3. | Matić-Kekić S. | Economic mathematics for students of biological sciences (in Serbian) | Faculty of Agriculture, University of Novi Sad | 2006. |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***INFORMATICS*** |
| Course id:3OFM2I41 |
| Number of ECTS: 6 |
| Teacher: | **Bojan M. Srdjevic, Tihomir S. Zoranovic (Teachers) / Bosko D. Blagojevic (Assistant)** |
| 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

Acquiring base knowledge in informatics and information technologies for agriculture. |
| 1. Educational outcomes

Skills in informatics and using information technologies in agriculture. |
| 1. Course content

*Theory*Introduction. Discrete information and data. Digital computers. Hardware platforms (mainframes, supercomputers, personal computers). Hardware and software. Algorithms. Programming languages. Digital computers in agriculture. Information and communication technologies. Networks and protocols. Internet and services. Databases. Database management systems. Information systems in agriculture. Application software (linear programming, statistical methods and packages, transportation models, networks and resources allocation, decision making etc.).*Practice*Measuring quantities of information (Shannon' formula and Hartley's theorem). Numerical, alphabetical and alphanumerical environments of personal computers and systems (examples). Algorithms - examples. Computer languages overview. Web search and e-mail. Excample information systems in agriculture. Data organization (entities, classes, attributes and data, domains). Logical and physical organization of data in databases. Database management systems - overview. Software tools in agriculture with example applications. |
| 1. Teaching methods

Lectures, Practical classes |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam | Mandatory | Points |
| Lecture attendance | Yes | 5 | Oral part of the exam | Yes | 40 |
| Exercise attendance | Yes | 5 |  |  |  |
| Colloquium x 2 | Yes | 2x25=50 |  |  |  |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Srdjevic B. | Informatics | Textbook, 226 pages  | 1996 |
| 2. | B.Srdjevic, T. Zoranovic | Informatics | Lectures posted at the web (selected topics); regularly updated |  |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***APPLIED INFORMATICS*** |
| Course id:3OFM2I42 |
| Number of ECTS: 6 |
| Teacher: | **Bojan M. Srdjevic, Tihomir S. Zoranovic (Teachers) / Bosko D. Blagojevic (Assistant)** |
| 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

Acquiring base knowledge in applied informatics. |
| 1. Educational outcomes

Skills in applying knowledge of informatics in professional career. |
| 1. Course content

*Theory*Measuring quantities of information in one or more messages (Shannon' formula and Hartley's theorem). Discrete information. Mainframes, supercomputers, and personal computers. Operating systems, utilities and application software for PCs. Solving the problems with computer. Programming languages (procedural, descriptive, artificial intelligence, internet languages). Information technologies and multimedia. Computer networks. Internet, protocols and services. Databases. Cryptography. Identification of users and personal data protection. Information systems in agriculture (purposes, development and architectures). Functionalities. Database management systems and software. Application software in agriculture. Examples of utility services, application software, expert systems etc.*Practice*Application of Shannon' formula. Hartley's theorem and applications. PC architecture and characteristics. Discrete values and numeric (base numeric systems). Solving problems with computers. Algorithms (examples). Methods and procedures for solving typical engineering problems. Word processing and spreadsheets. Advanced software tools in agriculture. Examples of application: utilities, linear programming, statistical packages, transportation models, network models for resources allocation, decision support software. |
| 1. Teaching methods

Lectures, Practical classes |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam | Mandatory | Points |
| Lecture attendance | Yes | 5 | Oral part of the exam | Yes | 40 |
| Exercise attendance | Yes | 5 |  |  |  |
| Colloquium x 2 | Yes | 2x25=50 |  |  |  |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Srdjevic B. | Informatics | Textbook, 226 pages  | 1996 |
| 2. | B.Srdjevic, T. Zoranovic | Informatics | Lectures on applied informatics posted at the web (selected topics); regularly updated |  |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course:  | ***GENETICS*** |
| Course id: 3ОFM3I43 |
| Number of ECTS: 6 |
| Teacher: | prof. dr Sofija R. Petrović , prof. dr Miodrag D. DimitrijevićBorislav M. Banjac, MSc |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures: 2 x 15 = 30 | Practical classes: 2 x 15 = 30 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses |  |
| 1. Educational goal

The course covers the fundamentals of genetics, aiming to general principles of inheritance, principals of vertical and horizontal genetic information transfer, cell divisions, mode of inheritance and gene interactions, novel genetic variability creation, structure and function of the genes and genomes, the basics of population and quantitative genetics. |
| 1. Educational outcomes

The course is to give a foundation for further scholar improvement through master and doctoral studies, for the assistance in breeding programs and research projects, for participation in all practical activities, where the understanding of basics of inheritance processes, as well as, genotype by environment interaction is required. |
| 1. Course content

*Theoretical lectures:* Introduction; Organism and the Environment; Cell and chromosome structures; The structure and functioning of genetic material; Cell divisions, gametogenesis and fertilization; Mendelian genetic – independent gene segregation (monohybrids, dihybryds, polyhybrids); Multiple allelism; Epistasis – non-allelic gene interactions; Gene linkage and crossing over; Quantitative traits (minor gene action and the components of phenotypic variability); *Species* and *genus* hybridization (distant crosses); Mutations; Polyploidy and chromosomal aberrations; The principles of population (genetic drift, gene flow and transfer); The principle of small population and inbreeding; extranuclear inheritance, The fundamentals of genetic engeneering; *Practical teaching*: PT is conducted through practical exercises and seminars that follow TL. |
| 1. Teaching methods

Teaching is done using modern techniques. Theoretical part of the training is conducted in a Faculty lecture halls. All lectures are computer processed and presented. The practical part of the course takes place in cabinetmaking work in adapted air-conditioned room, with individual seats for students (40 seats), which is equipped with a computer, video beam, overhead projectors and microscopes. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (choose) | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Oral part of the exam* | Yes | 30 |
| *Written part of the exam* | Yes | 30 |
| Test (colloquium) | Yes | 3x10 |  |
| Exercise attendance | Yes | 2,5 |
| Term paper | Yes | 2,5 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Borojević Slavko, Borojević, Katarina | Genetika | Poljoprivredni fakultet, Novi Sad | 1976 |
| 2. | Kraljević-Balalić Marija, Petrović Stevan , Vapa Ljiljana | Genetika – teorijski osnovi sa zadacima | Poljoprivredni fakultet, Institut za ratarstvo i povrtarstvo i PMF, Novi Sad | 1991 |
| 3. | Dimitrijević Miodrag, Petrović Sofija | Genetika populacije. Adaptabilnost i stabilnost genotip | Poljoprivredni fakultet, Novi Sad, Naučni institut za ratarstvo i povrtarstvo, Novi Sad | 2005 |
| 4. | Klung, S.W., Cummings, R., M., Spencer, A. Charlotte, Palladino, A.M. | Concepts of Genetics 10th Edition | Pearson Education, Inc., publishing as Pearson Benjamin Cummings, California, USA | 2012 |
| 5. | Klung, S.W., Cummings, R., M., Spencer | Concepts of Genetics 8th Edition | Pearson Education, Inc., NJ, USA. | 2006 |
| 6. | Marinković, M., Tucić, N., Kekić, V. | Genetika | Naučna Knjiga, Beograd | 1982 |
|  | Dimitrijević, Miodrag, Petrović, Sofija | Genetički modifikovani organizmi – pitanja i dileme.  | Zelena mreža Vojvodine, Novi Sad | 2004 |
|  | Bošković, Jelena, Isajev, V. | Genetika | Megatrend univerzitet, Beograd | 2007 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| 5.2 Course specification Table |

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| --- | --- |
| Course:  | **GENETICS WITH PLANT BREEDING FUNDAMENTALS** |
| Course id: 3ОFM3I44 |
| Number of ECTS: 6 |
| Teacher: | prof. dr Sofija R. Petrović , prof. dr Miodrag D. DimitrijevićBorislav M. Banjac, MSc |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures: 2 x 15 = 30 | Practical classes: 2 x 15 = 30 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses |  |
| 1. Educational goal

The course is designed as a logical combination of general genetics and plant breeding fundamentals and aims to familiarize participants with the general principles of inheritance, transfer of genetic information and the creation of new genetic variability through general genetics fundamental studies, as well as the practical application through the basic principles and methods of plant breeding. |
| 1. Educational outcomes

Student should be given a basis on which could be able to upgrade their abilities through the master's and doctoral programs for scientific work, participation in breeding programs of organisms and for the economy, in all the jobs that require understanding of the functioning of the hereditary basis of organisms, as well as, genotype by environment interactions in order to obtain new economically exploitable genetic variability within breeding programs. |
| 1. Course content

*Theoretical lectures:* Introduction; Cell division; Modes of reproduction and fertilization systems in plants; Chromosomes and chemical bases of heredity; The mechanism of inheritance and hybridization; Changes in the number and structure of chromosomes; Mutations in plant breeding; Inbreeding and heterosis; Chromosomal and genetic engineering; The genetic base of breeding self-pollinated and cross-pollinated plants; The genetic base of breeding for resistance to pathogens and insects; Methods of selection of plants; Novel varieties releasing and production of certified seed*Practical teaching: Exercise, Other modes of teaching, Study research work:* Cell division and fertilization; The life cycle of eukaryotes and prokaryotes; Chromosomes; The structure and function of the gene; Gametogenesis; Independent gene segregations; The gene interactions; Genetic linkage and crossing over; *Species* and *genus* hybrids; Changes in the number of chromosomes; Changes in the structure of chromosomes; Inbreeding and heterosis; Population and quantitative genetics |
| 1. Teaching methods

Teaching is done using modern techniques. Theoretical part of the training is conducted in a Faculty lecture halls. All lectures are computer processed and presented. The practical part of the course takes place in cabinetmaking work in adapted air-conditioned room, with individual seats for students (40 seats), which is equipped with a computer, video beam, overhead projectors and microscopes. |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (choose) | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Oral part of the exam* | Yes | 30 |
| *Written part of the exam* | Yes | 30 |
| Test (colloquium) | Yes | 3x10 |  |
| Exercise attendance | Yes | 2,5 |
| Term paper | Yes | 2,5 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Borojević Slavko, Borojević, Katarina | Genetika | Poljoprivredni fakultet, Novi Sad | 1976 |
| 2. | Kraljević-Balalić Marija, Petrović Stevan , Vapa Ljiljana | Genetika – teorijski osnovi sa zadacima | Poljoprivredni fakultet, Institut za ratarstvo i povrtarstvo i PMF, Novi Sad | 1991 |
| 3. | Dimitrijević Miodrag, Petrović Sofija | Genetika populacije. Adaptabilnost i stabilnost genotip | Poljoprivredni fakultet, Novi Sad, Naučni institut za ratarstvo i povrtarstvo, Novi Sad | 2005 |
| 4. | Marinković, M., Tucić, N., Kekić, V. | Genetika | Naučna Knjiga, Beograd | 1982 |
| 5. | Dimitrijević, Miodrag, Petrović, Sofija | Genetički modifikovani organizmi – pitanja i dileme.  | Zelena mreža Vojvodine, Novi Sad | 2004 |
| 6. | Bošković, Jelena, Isajev, V. | Genetika | Megatrend univerzitet, Beograd | 2007 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***ENGLISH LANGUAGE I*** |
| Course id:3ОFM5I45 |
| 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

Acquiring and consolidating basic patterns of grammar, pronunciation, spoken and written language in order to educate students for the formal and informal communication in General English. Introducing students 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 *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 instructionSpoken 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**Oral exam* | Yes | 2030 |
| Test | Yes/No | 2 x 15 |  |
| Tutorials attendance | Yes/No | 10 |
|  | 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 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course:  | ***PREDICTING WEED SPECIES OCCURENCE*** |
| Course id: 3ОФМ5I46 |
| Number of ECTS: 6 |
| Teacher: | Maja U. MeseldžijaBojan B. Konstantinović |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures: 2 x 15 = 30 | Practical classes: 2 x 15 = 30 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | Basics Herbology |
| 1. Educational goal

to establish causal relationship between the occurrence of weed species, their biological properties and the influence of abiotic and biotic factors, primarily anthropogenic impacts through the different methods of weed control in certain croplands. |
| 1. Educational outcomes

Students possibility on the basis of knowledge of the occurrence of weed species in a particular area, its distribution, the influence of environmental factors and implementation of all measures of weed control in the previous period, to predict the occurrence of weed species in the next growing season and therefore the timely implementation of appropriate measures for their effective suppression. |
| 1. Course content

*Theoretical classes*: The influence biological properties of weeds on their occurrence and distribution. The geographical distribution of weed species and microclimate influences on their distribution. Horizontal and vertical distribution of weeds and their seeds (organ for vegetative propagation). Mapping weed species. Influence of indirect and direct measures of weed control on their regeneration and the emergence of the next growing season. Economic threshold of harmfulness and the ability to predict the occurrence of weeds by using software programs. Weed control management for the next growing season.*Practical lessons: Exercises*: Introduction to the biological and ecological weed species. The morphology and structure of seed and organs for vegetative reproduction of weed species. Determining the number and coverage of weed species; seed quantity and organs for vegetative reproduction of weeds in arable soil layer (seed bank). Methods for determining the efficiency of weed control. Methods of weed mapping. Determining the economic threshold. Creating a program for weed control based on defined parameters. |
| 1. Teaching methods

Lectures, Practical classes, Research work |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (choose) | Mandatory | Points |
| Lecture attendance | Yes | 10 | *Oral part of the exam* | Yes | 30 |
| *Written part of the exam* | Yes |  |
| Test  | Yes | 40 |  |
| Exercise attendance | Yes |  |
| Colloquium | Yes | 20 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Konstantinović, B., Stojanović, S., Meseldžija, M. | Biologija, ekologija i suzbijanje korova | Univerzitet u Novom Sadu, Poljoprivredni fakultet Novi Sad | 2005 |
| 2. | Janjić, V., Elezović, I | Pesticidi u poljoprivredi i šumarstvu u Srbiji 2010 | Društvo za zaštitu bilja Srbije, Beograd  | 2010 |
| 3. | Konstantinović, B. | Osnovi herbologije i herbicidi | Univerzitet u Novom Sadu, Poljoprivredni fakultet Novi Sad | 2011 |
| 4. | Zimdahl, R | Fundamentals of Weed Science | Elsevier, Academic Press | 2007 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***ECOLOGICAL BIOCHEMISTRY*** |
| Course id: 3ОFМ5I47 |
| Number of ECTS: 6 |
| Teacher: | Prof. dr Đorđe Malenčić |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures: 2 | Practical classes: 2 | Other teaching types: student`s papers (seminar) | Study research work: - | Other classes: - |
| Precondition courses | None |
| 1. Educational goal

To gain knowledge on molecular aspects of ecological characteristics of cultivated and wild growing plants. Study on secondary biomolecules in plants and their metabolism. |
| 1. Educational outcomes

The contribution of new knowledge in the field of Ecological Biochemistry. |
| 1. Course content

Theory: Biochemical adaptations of plants to environment. Plant toxins and their effect on herbivores and pathogens. Hormonal interactions between plants and animals. Secondary biomolecules which attract and repell insects. Plant-vertebrates relationship, including humans. Static and induced plants defence mechanisms from predators. Defence substances: terpenoids, alkaloids, phenolics and quinones. Alelopaty. Biochemistry of the host-parasite relation. Higher plants-lower plants interaction. Biochemical basis of plant resistance to diseases. Phytoalexins and phytotoxins. The role of chemical signals in the intra- and inter-cellular communication. Reactive species of oxygen and nitrogen. Antioxidant systems in plants and oxidative stress. Molecular mechanisms of plant resistance to abiotic stress (radiation, extreme temperatures, water stress, drought, salination, heavy metals and pesticides). Resistance mechanisms of plants to biotic stress. Induced plant stress resistance. Practical classes: Determination of content and composition of essential oils from aromatic plants. Methods of identification of essential oils. Antimicrobial properties of essential oils. Isolation i determination of total alkaloids from fruits and seeds of hot paprika. Total carotenoids determination from carrot roots. Isolation and determination of the total phenolics and tannins from different plant species. Determination of the total flavonoids using metal complex with AlCl3. Determination of phenolic pigments anthocyanins from flower petals. Hypersensitive response of plants to pathogen attack – determination of reactive oxygen species and lipid peroxidation. Field trip (collection of plant material for experimental work). |
| 1. Teaching methods

Lectures, Practical classes, Consultations, research work (optional) |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes | 5 | Written part of the exam-tasks and theory | Yes | 60 |
| Exercise attendance | Yes | 5 |  |
| Test, Term paper | Yes | 30 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Dr Đorđe Malenčić, dr Milan Popović | Praktikum iz Biohemije biljaka (Plant biochemistry handbook) | Poljoprivredni fakultet, Novi Sad(Faculty of Agriculture, Novi Sad) | 2011. |
| 2. | Milan Popović, Đorđe Malenčić | Aktivni principi ukrasnog bilja (Active principles of ornamental plants) | Poljoprivredni fakultet, Novi Sad(Faculty of Agriculture, Novi Sad) | 2006. |
| 3. | Jeffrey B. Harborne | Introduction to Ecological biochemistry, 4th edition | Elsevier, London | 1994. |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

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| --- | --- |
| Course: | ***ENGLISH LANGUAGE II*** |
| Course id: 3OFM6I48 |
| 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

Enhancing and perfecting basic patterns of grammar, pronunciation, spoken and written language in order to educate students for the formal and informal communication in General English. The consolidation, enhancement and activation of 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 in English Language 1 (A1, A2 or B1 according to *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**: Cnsolidation and perfection of the accent and intonation according to one of the standard dialects of the English language (British and/or American). **Morphology**: Verbs – Tenses, gerund, passive, conditional. 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 instructionSpoken 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**Oral exam* | Yes | 2030 |
| Test | Yes/No | 2 x 15 |  |
| Tutorials attendance | Yes/No | 10 |
|  | Yes/No |  |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Liz and John Soars, Amanda Maris | *New Headway Elementary*, 4th Ed | Oxford University Press | 2011 |
| 2. | Liz and John Soars, Amanda Maris | *New Headway Pre-Intermediate*, 4th Ed. | Oxford University Press | 2011 |
| 3. | Liz and John Soars, Amanda Maris | *New Headway Intermediate*, 4th Ed. | Oxford University Press | 2011 |
| 4. | Whitby N. | *Business Benchmark – BEC Preliminary* | Cambridge University Press, 6th Printing | 2009 |
| 5. | Gajić Ranka, | *English in Agriculture* | Naučna knjiga KMD, Beograd | 2005 |
| 6. | Murphy R. | *Essential English Grammar in Use, 3rd Ed.* | Cambridge University Press | 2010 |
| 7. | Murphy R. | *English Grammar in Use, 3rd Ed.* | Cambridge University Press | 2010 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***PARASITIC FLOWERING PLANTS*** |
| Course id:3ОFМ6I49 |
| Number of ECTS: 6 |
| Teacher: | Stevan N. Masirevic; Mila S. Grahovac |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures: 30 | Practical classes: 30  | Other teaching types: / | Study research work: / | Other classes: / |
| Precondition courses | Passed exams from plant mycology 1 |
| 1. Educational goal

Introduction to appearance, prevalence and importance of parasitic flowering plants (roots and stems of cultivated plants) in the world and in our country. |
| 1. Educational outcomes

The acquired knowledge will provide the basis for determining the presence of parasites, implementing and management of various measures for their control. Resulting knowledge form the basis for further scientific and research work. |
| 1. Course content

Lectures:Getting known the types of parasitic plants (root and stem parasites); morphological characteristics of parasitic flowering plants; evolutionary development of parasitism at the parasitic flowering plants; interactions with host plants; distribution; modes of spread of parasitic flowering plants; economically important species (host range, morphology, biology, distribution, protection measures).Practical classes:Morphological characteristics and biology of the most economically important species of parasitic flowering plants, independent work of students and the application of laboratory techniques in order to determine the presence of parasitic flowering plants in soil and plant material. |
| 1. Teaching methods

Theoretical classes - oral presentation with visual presentation method using a computer; use of other didactic equipment (demonstrations, presentations and illustrations on the board). Exercises - visual presentation method using a computer, practical individual work, consultations  |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (choose) | Mandatory | Points |
| Lecture attendance | Yes | 10 | Oral part of the exam | Yes | 50 |
| Test | Yes | 20 |  |
| Colloquium | Yes | 20 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Maric A., Camprag D., Masirevic S.  | Bolesti i stetocine suncokreta i njihovo suzbijanje | Nolit, Belgrade | 1988 |
| 2. | Gulya T., Rashid K., Masirevic S. | Sunflower diseases. In: Sunflower Technology and Production (Schneiter, A., ed.) | Madison, American Society of Agronomy, Wisconsin, USA | 1997 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***ANALYTICAL METHODS FOR PESTICIDE ANALYSIS*** |
| Course id:30FM7I51 |
| Number of ECTS:4 |
| Teacher:Assistant | Sanja D. Lazic Vojislava P. Bursić |
| Course status | Mandatory/Elective : 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/navesti ako ima |
| 1. Educational goal

Introduction to the methods for the analysis of pesticides by gas and liquid chromatography, volumetric and spectrophotometric methods, as well as methods for the determination of pesticides residues in agricultural products, soil and water. |
| 1. Educational outcomes

Acquired-applicable knowledge of the techniques for the analysis of pesticides and their residues |
| 1. Course content

Partition and adsorbtion chromatography. Ion exchange chromatography, gel filtration chromatography, affinity chromatography, thin-layer chromatography and paper chromatography. Spectrophotometry, atomic absorption spectrophotometry. Potentiometric titration. Volumetric analyses. Sampling and sample preparation for content of active substance analysis in preparations. Determination of pesticide residues ,sampling methods, extractions and purifications. *Other teaching methods – laboratory exercises*: Determination of organophosphorus insecticide in formulations by thin-layer chromatography. Determination of 2,4 D and MCPP in formulations by thin-layer chromatography. Determination of phenmedipham and desmedipham in formulations by thin-layer chromatography. Determination of malathion in formulations by thin-layer chromatography. Determination of acochlor in formulations by gas chromatography. Determination of 2,4 D in formulations by liquid chromatography. Spectrophotometric determination of triflularin in formulations. Spectrophotometric determination of gliphosate in different formulations.  |
| 1. Teaching methods

Lectures  |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes/No | 5 | *Theoretical part of the exam/Oral part of the exam/Written part of the exam-tasks and theory* | Yes | *Written part of the exam 35* + 50 *Oral part of the exam*  |
| Test | Yes/No |  |  |
| Exercise attendance | Yes/No |  |
| *Term paper* | Yes/No | 10 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1 | Marjanović, N., Krstić, B. | Instrumentalne metode u biološkim istraživanjima | Univerzitet u Novom Sadu, Tehnološki I Prirodno matematički fakultet | 1998 |
| 2 | Šovljanski, R., Lazić, S. | Osnovi fitofarmacije | Univerzitet u Novom Sadu, Poljoprivredni fakultet | 2007 |
| 3 | Šovljanski, R., Klokočar Šmit, Z., Lazić S. | Praktikum iz opšte fitofarmacije | Univerzitet u Novom Sadu, Poljoprivredni fakultet. | 2002 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course:  | ***BIOLOGICAL EFFECTS OF PESTICIDES*** |
| Course id: 3ОFM7I52 |
| Number of ECTS: 6 |
| Teacher: | Dušanka V. InđićSlavica M. Vuković |
| Course status | elective |
| Number of active teaching classes (weekly) |
| Lectures: 2 x 15 = 30 | Practical classes: 2 x 15 = 30 | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

The aim of the course is to provide students with basic knowledge about biological effects of pesticides, to master methods and evaluation methods, calculation of data and analysis of results. |
| 1. Educational outcomes

Acquired knowledge will contribute to training of professionals to work in the field of plant protection-application of pesticides, assessment of the effects, analysis of the results and presentation of valid data. |
| 1. Course content

*Theoretical classes*: Toxic effects of pesticides and their importance, rating and/or evaluation and comparability of data. Ratings and biological effects, data analysis (results). Standard methods for determination of pesticide efficacy in field (production) conditions, principles and basic conditions. Testing, analysis and presentation of data (results).*Other forms of teaching - laboratory exercises*: Determination of pesticide toxicity (probyt analysis). Translocation of systemic fungicides and insecticides (zoocides). Biological determination of herbicide residues in soil. Detection of insecticides on seed, standards and methods for pesticide testing under field conditions. The biological compatibility of pesticides, analysis of significance of difference of insecticide effects. |
| 1. Teaching methods

Lectures, Practical classes, Research work |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Activity during lectures | Yes | 10 | *Oral part of the exam* | Yes | 30 |
| *Written part of the exam* | No | - |
| Test (colloquium) | No | - |  |
| Practical classes | Yes | 10 |
| Term paper | Yes | 50 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
| 1. | Inđić, D., Vuković, S. | Praktikum iz Fitofarmacije (fungicidi, zoocidi) | University of Novi Sad, Faculty of Agriculture | 2012 |
| 2. | Janjić, V., Elezović, I | Pesticidi u poljoprivredi i šumarstvu u Srbiji 2010 | Plant Protection Society of Serbia, Belgrade  | 2010 |
| 3. | Anonimus | EPPO Standards Vol. 1-4 | European and Mediterranean Plant Protection Organization, Paris, France | 2004 |
| 4. | Мелеховой, О.П., Егоровой, Е. И. | Биологический контрол окружающей среди. Биоиндикация и Биотестирование | Академия, Москва | 2007 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationUNDERGRADUATE ACADEMIC STUDIES PHYTOMEDICINE |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | ***CONTROL OF SYNANTHROPIC INSECTS*** |
| Course id:3OFM7I53 |
| Number of ECTS:6 |
| Teacher: | Prof. Marija Zgomba, Msc Dusan Marinkovic |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures:3 | Practical classes:2 | Other teaching types:- | Study research work:- | Other classes:- |
| Precondition courses | Basics of Phytopharmacy, Insect Systematics and Medical Entomology |
| 1. Educational goal The control of arthropod pests is an important part of the maintainance of hygiene and sanitation in any society. The students will be able to learn about association of insects and men, role of insects as vectors of pathogens, and the environmental acceptable approach in selection and controlling of insects |
| 2. Educational outcomesThe students will acquire knowledge of basic biological characteristics,, ecology and behavior of insects, the selection of appropriate methods of suppression, efficient and safe insecticide applications in combating synanthropic insects in urban areas. |
| 3. Course content: Theoretical aspects: Synanthropic insects, association of insects and men. Cockroaches, ants, flies, flees, bed bugs. Hematophagus insects, and their role as vectors of pathogens and causative of diseases. Antropohylic and zoophylic preference. Prerequisites (building planning, urban sanitation) for low synanthropic insect populations (bellow economic/medical threshold). Integrated control: physical, mechanical control and personal protection. Insecticides: Chlorinated hydrocarbons, organophosphates, pyrethroides). Insect Growth Regulators (Chitin synthesis inhibitors and juvenoids). Attractants and repellents. Biological agents (viruses, fungi and bacteria). Biocides mode of action and legislative. *Practical aspects*: Biological evaluation of insecticides (determination of compound LD50 in the powder formulation, LD50 for digestive intake (feeding tests). Verification of LT50 and LD 50 after topical insecticide application. The speed of insecticide action depending on chemical group and mode of ingestion. Evaluation of insecticide effectiveness of various formulations. Verification of insecticidal impact on synanthropic insects. Toxicity and side effects on non-target insects and beneficial entomo-fauna. Application of different rodenticides classes and their mode of action. The selection monitoring method and surveillance procedure fornuisance and vector insects. Control approaches and selection of method and rate of biocides. |
| 4. Teaching methodsLectures, Practical classes |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam (izabrati) | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Theoretical part of the exam Oral* | Yes | 60 |
| Exercise attendance | Yes | 10 |  |
| Test | Yes | 25 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
|  |  Petrić, D**.**, Zgomba, M., Bellini, R. and Becker N. | Surveillance of Mosquito Populations: A Key Element to Understanding the Spread of Invasive Vector Species and Vector-Borne Diseases in Europe.  | *Nova Science Publishers* | 2012 |
|  | Becker N., Petrić D**.**, Zgomba M., Boase C., Madon M., Dahl C. and Kaiser A | Mosquitoes and their control. Second Edition | Springer Verlag | 2010 |

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| Znak univerziteta | UNIVERSITY OF NOVI SADFACULTY OF AGRICULTURE 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 8 | Znak fakulteta2 |
| Study Programme AccreditationBACHELOR STUDIES *(Phytomedicine)* |
| Table 5.2 Course specification |

|  |  |
| --- | --- |
| Course: | *Turfgrasses* |
| Course id: |
| Number of ECTS: 6 |
| Teacher: | Prof. Dr Branko Ćupina, Dr Djordje Krstić |
| Course status | Elective |
| Number of active teaching classes (weekly) |
| Lectures: 2(30) | Practical classes: 2(30) | Other teaching types: | Study research work: | Other classes: |
| Precondition courses | None |
| 1. Educational goal

Theoretical and practical aspects of turfgrass establishment and maintaining  |
| 1. Educational outcomes

Acquiring knowledge in order to establish and maintain turfgrass in accordance with ecological principles |
| 1. Course content

*Lectures*Turfgrass basic principles. Significance and prevalence (distribution). General and agroecological importance. Grass taxonomy.Natural grasslands basic terms and melioration measures. Anthropological grasslands basic terms and establishment. Species ratio in mixtures. Turfgrass maintenance. Turfgrass evaluation.*Research work*Laboratory, field and practical exercises of students. Work with fresh and herbarium material. |
| 1. Teaching methods

Lectures, Practice/ Practical classes, Consultations, study, Seminar  |
| Knowledge evaluation (maximum 100 points) |
| Pre-examination obligations | Mandatory | Points | Final exam | Mandatory | Points |
| Lecture attendance | Yes | 5 | *Oral part of the exam* | Yes | 55 |
| Test | Yes | 2x10=20 |  |
| Exercise attendance | Yes |  |
| *Colloquium, Seminar* | Yes | 20 |
| Literature  |
| Ord. | Author | Title | Publisher | Year |
|  | Turgeon, A. J. | Turf grass management (sixth edition) | Copyright by Pearson Education, Inc. Uppere Saddle River, New Jersey 07458 (USA) | 2002 |
|  | Beard, J. B. | Turf Management for Golf Courses, 2nd Ed.  | Ann Arbor Press,  Chelsea, MI.  | 2002 |