

Study Programme: Phytomedicine		
Course Unit Title: Herbicides		
Course Unit Code: 19.FT1009		
Name of Lecturer(s): Maja Meseldžija		
Type and Level of Studies: undergraduate academic studies		
Course Status (compulsory/elective): compulsory		
Semester (winter/summer): summer		
Language of instruction: Serbian		
Mode of course unit delivery (face-to-face/distance learning): face-to-face		
Number of ECTS Allocated: 4		
Prerequisites: Basics Herbology, Advanced Herbology, Basis of Phytopharmacy		
Course Aims: The aim of the course is to familiarize the students with the basic characteristics of herbicides, as chemical compounds of different mechanisms of action, their selectivity, efficiency, phytotoxicity, persistence, and resistance. Enabling students for the proper choice of herbicides, determining the amount of herbicides for efficient, safe economical and ecotoxicological application for weed control in crops and perennial plantations, as well as on non-agricultural areas.		
Learning Outcomes: Enabling students to based on knowledge of the mechanisms of action of herbicides, their efficacy, phytotoxicity, persistence and resistance acquire knowledge for their selective application.		
Syllabus:		
<i>Theory</i>		
Herbicides- history, their significance, systematization and application. Absorption and translocation of herbicides in plants. Physiology of action. The technology of herbicide application and intervention periods. Selectivity. Persistence of herbicide. Inorganic formations with herbicidal activity. Organic herbicides - basic characteristics, biological properties and mechanism of action (carboxylic acids and their derivatives, aryloxy-alkyl carboxylic acids and their derivatives, amides and anilides, carbamide, sulfonylurea herbicides and imidazolinones, carbamate, dipyridines, diazines, triazines, triazinones, triazoles, nitrophenols, nitroanilines, nitrodiphenyl ethers, benzonitrile, phosphonates and phosphinates). Herbicide metabolism. Resistance, causes and anti-resistance strategy. Tolerant and transgenic plants and herbicides. Biocides and other compounds with herbicidal action. Weed protection programs for cultivated plants: small grains, maize, industrial and vegetable plants, apple and stone fruits, vine, berry and nut fruits, herbs, ornamental and fodder plants, application on non-agricultural areas. Desiccants, defoliant and arboricides. Plant growth regulators. Application of surfactants, wetting agents, and protecting agents. Possibility of mixing herbicides. Ecological exposure to herbicides and monitoring.		
<i>Practice</i>		
Familiarizing with the basic contents of herbicides. Determination of herbicide efficacy and selectivity. Phytotoxicity. Mixing pesticides and pesticide substances. Methods for bioassay. Leaching of herbicide. Establishing the resistance of weeds to herbicides. Development of programs for weed control in individual cultivated crops and plantations.		
Required Reading:		
Jamal, R. Qasem (2011): Herbicides Applications: Problems and Considerations, Herbicides and Environment. Dr Andreas Kortekamp (Ed.), ISBN: 978-953-307-476-4		
Zimdahl, R.L. (2013): Fundamentals of Weed Science. Academic Press.		
Kramer, W., Schirmer, U., Jeschke, P., Witschel, M. (2012): Modern Crop Protection Compounds (Herbicides; Fungicides; Insecticides). Second, Revised and Enlarged Edition, Wiley-VCH Verlag & Co. KgaA, Weinheim, Germany		
Second, Revised and Enlarged Edition, Wiley-VCH Verlag & Co. KgaA, Weinheim, Germany.		
Janjić, V. (2005): Fitofarmacija. Društvo za zaštitu bilja Srbije, Beograd Institut za istraživanja u poljoprivredi Srbija, Poljoprivredni fakultet, Banja Luka.		
Spasić, R. (ed.) (2017): Pesticidi u poljoprivredi i šumarstvu Srbije. Pesticidi u poljoprivredi i šumarstvu Srbije.		
Weekly Contact Hours: 6	Lectures: 3	Practical work: 3
Teaching Methods:		

Lectures – oral presentation and direct communication; visual (presentations, illustrations); Practical classes (laboratory-experimental methods)

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	Final exam	points
Active class participation	10	written exam	20
Practical work	20	oral exam	50
Preliminary exam(s)		
Seminar(s)			

The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.