INFORMATION ABOUT THE COURSE

1. Basic information

Course name	**Environmental Toxicology**
Field of study	Agriculture
Study level	Second cycle
Study profile	Academic
Study form	Full time
Speciality	Environmental Management
Unit running the study programme	Department of Agricultural Chemistry
Name(s) and scientific degree (title) of teacher(s)	**dr hab. Ayhan Gokce, Nigde University, Turkey**
Introductory courses	Geography, Chemistry, Physics
Prerequisites	Knowledge of the fundamentals of inorganic, organic and agricultural chemistry, basic computer technique - Microsoft Excel or similar program.

2. Semester schedule of classes

Semester	Lectures	Classes	Laboratories	Project classes	Seminars	Field practice	ECTS
II	15		30				5

3. EDUCATIONAL OUTCOMES (acc. to National Qualification Framework)

No.	Description of the outcomes	Reference to the major specific outcomes of education	Reference to the area specific outcomes of education
KNOWLEDGE			
W1	Student has extensive knowledge of chemistry to be able to make analyses of the natural environment; knows the essence of instrumental methods and their applications in the environmental and agricultural research	K_W02	R2A_W01 R2A_W05
W2	Student has extensive knowledge of biological, chemical and physical processes taking place in the environment; knows the essence of instrumental methods and their applications in research on the effects of human impact on the environment	K_W04	R2A_W01
W3	Student has extensive knowledge of the sources of toxins, their properties and transformations, and possible means of reducing their environmental impact	K_W15	R2A_W01 R2A_W04 R2A_W06
W4	Student is able to acquire knowledge on his/her own and develop professional skills involved in identifying and shaping the conditions and environmental effects of agricultural production, and to use this knowledge creatively	K_W17	R2A_W03
SKILLS			
U1	Student is able to acquire knowledge on his/her own and develop professional skills in understanding and shaping conditions and environmental effects of agricultural production, and creatively use this knowledge.	K_U01	R2A_U01

U2	Student can predict threats to the environment and apply methods appropriate to the habitat conditions to reduce their occurrence	K_U18	R2A_U05 R2A_U06
U3	Student knows the life processes in ecosystems and threats arising from agricultural and non-agricultural activities and is able to select techniques to eliminate or minimize them	K_U17	R2A_U05 R2A_U07
SOCIAL COMPETENCES			
K1	Student has an awareness of professional ethics and the risks and dangers arising from agricultural activity and recognizes the importance of its potentially negative consequences for the health of people and livestock	K_K04	R2A_K05 R2A_U06

4. TEACHING METHODS

lecture with the multimedia presentation, laboratory exercises

5. METHODS OF EXAMINATION

two tests per semester, the evaluation reports of the exercises, the assessment for the activity

6. TEACHING CONTENTS

Lectures	Introduction to environment: abiotic and biotic components and factors, climate change and global warming. Introduction to environmental problems: ozone, greenhouse effect, toxicants, pollutants, contaminants, hazardous waste, air pollution, smog, haze, acid rain, water pollution, etc. Classification of major environmental toxicants: agricultural toxicants (insecticides, fungicides, herbicides), industrial toxicants (heavy metals, radionuclides, chlorofluorocarbons, polychlorinated biphenyls (PCBs), environmental hormones and hormone disturbing pollutants, etc. Fate of environmental toxicants: biological concentration (biomagnification) and degradation. Degradation of pesticides, residual effects, and safe harvesting intervals. Toxicity tests and probit analysis (dose-response assessment): Indicator organisms used in environmental toxicology. Basic statistics for sampling organisms in environmental toxicological studies Lethal and sublethal effects of pesticides on pests and non-target organisms: a. Risk assessment using life tables, b. Honeybee toxicity and honeybee colony collapse disorder, c. Effects of insecticides on mammalian wildlife, fish, amphibians and reptiles. International laws and regulations (WHO, FAO, etc.) Toxicological effects of contaminated soils: Effects of toxicants on soil microflora and microfauna. Climate change and environmental toxicology.
Labs	Toxicity tests and Probit analysis. Random distribution, sampling simulation, and sequential sampling. Analysis of thermal summation. Population projection: exponential, age-specific life table, and age-stage life table. Critical review of biodiversity indices

7. VALIDATION OF LEARNING OUTCOMES

Outcome	Evaluation form					
	Oral Exam	Written Exam	Colloquium	Project	Report	Other
W1			X		X	
W2			X		X	
U1			X			
U2			X			

U3			X			
K1					X	

8. LITERATURE

Basic literature	Costa L.G., Galli C.L., Murphy S.D. 1987. Toxicology of pesticides: experimental, clinical and regulatory perspectives. Berlin; New York: Springer (BG UTP). Bertold H.B., Elstner E.F. Plant toxicology 2005. New York: Marcel Dekker. Hogson E. 2004. A textbook of modern toxicology. Hoboken: John Wiley & Sons Deshpande, S. S. 2002. Handbook of food toxicology. New York: Marcel Dekker
Supplementary literature	Marquardt H. 1999. Toxicology. San Diego: Academic.

9. STUDENT'S WORK – BALANCE OF HOURS AND ECTS POINTS

Student's performance	Number of hours
Class attendance specified in p. 2	45
Involvement in classes	20
Study of literature	20
Others (preparation for exams, tests, engagement in projects etc.)	40
Student's total performance	125
Number of points proposed by NA	5
Final number of ECTS points (determined by the Educational Board)	5