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## Cross-Cutting Practical Trainings for Students in the Field of Ecology and Environmental Sciences

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## **Cross-Cutting Practical Trainings for Students in the Field of Ecology and Environmental Sciences**

### **Introduction**

The current environmental situation in Ukraine requires environmental experts who are able to model, predict, assess, and solve complex environmental problems. These experts should be environmentally aware, professionally educated, professionally competent and viable in their own professions. Practical trainings for students in the field of environmental sciences during their educational processes should be given with a special attention to international and domestic experiences in profession-oriented activities in accordance with current and anticipated requirements of labor markets. This will also ensure that students are employed after their graduation [Ridei 2011].

The *purpose* of this study, therefore, is to identify the main structural elements of cross-cutting practical trainings (e.g. trainings based on different disciplines) for students in the field of ecology and environmental sciences. The main tasks are to identify important qualities and skills that are required in the course of practical trainings, structure and content of these practical trainings.

### **Results and discussion**

According to the “Regulation on the practice of students of higher education establishments of Ukraine” (approved by the Ministry of Education of Ukraine on April 8, 1993 No. 93) practical trainings for specialists in ecology and environmental sciences are mandatory in their educational and professional training program “Ecology, Environmental Protection and Sustainable Use of Natural Resources”. These trainings aim at obtaining professional skills and knowledge in basic and applied ecology, environmental protection (in various industries) and the sustainable use of natural resources (socio-economic, environmentally safe use of land, water, forest and flora and fauna resources, institutional by type of natural resources) [Strokhal 2012].

However, it is difficult to achieve an efficient practical training without developed previously a gradual practice structure that considers the main principles of continuity and consistency of obtaining the desired amount of practical knowledge, abilities and skills according to different educational and qualification levels. Establishing a cross-cutting practical training can facilitate to achieve an efficient learning process in the higher education for students in ecology and

environmental sciences because these students are often involved in trans (multi) disciplinary courses. This cross-cutting training (or trainings) involves gradual (consistent), continuous acquisition of knowledge and skills with regard to the requirements of modern society and the labour market.

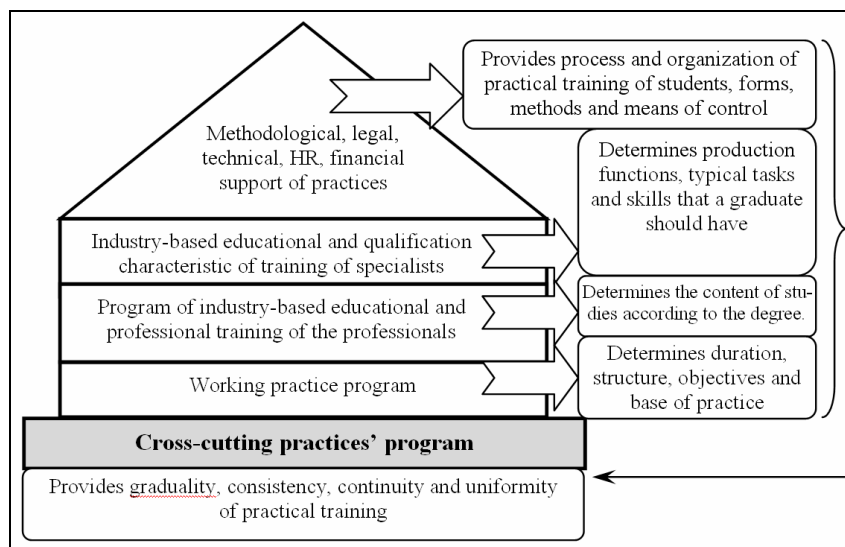
**Schedule 1**

**The structural-and-logical profile of practical trainings for students in ecology and environmental sciences**

Year	Type of practice	Name of practice	Name of discipline	Training cycle*
1	educational	botany, biology	botany, biology	NST
	educational	ecologies of biological systems	ecologies of biological systems	PPT
	educational	geologies with the basis of geomorphology	geologies with the basis of geomorphology	NST
2	educational	general ecology	general ecology	NST
	educational	radiobiology and radioecology	radiobiology and radioecology	PPT
	educational	edaphology	edaphology	NST
	educational	informatics and systemology	informatics and systemology	NST
	educational	hydrology	hydrology	NST
3	educational	agroecology	agroecology	PPT
	educational	chemical analysis	chemistry	NST
	science-and-research workshop	environmental control in the agrosphere	environmental protection legislation and environmental law, environmental economics	PPT
	production	production	environmental protection of agroecosystems	PPT
4	production	production	complex of disciplines	PPT
Master	science-and-production	science-and-production	complex of disciplines	NST, PPT
	teaching	teaching	methods of teaching in higher education, pedagogy and psychology of high school	PO-LASET

\* Natural sciences training – NST; Professional and practical training – PPT; Profession-oriented, liberal arts and socioeconomic training – POLASET

In this context, we have developed a cross-cutting practical training for the students that aims to combine the processes of gradual professional and practical trainings of students directly at the industry-classified enterprises (agricultural, processing, food, pharmaceutical, municipal, environmental agencies, environmental centres, research laboratories for environmental monitoring, assessment, certification), and in various professional environments (educational, scientific, healthcare and cultural, agricultural, environmental, business, social). The cross-cutting program has been designed according to the “Regulation on practice of students in higher education establishments of Ukraine” (approved by the Ministry of Education of Ukraine on April 8, 1993 No. 93) and the “Procedure for the formation of cross-cutting program practices of students of the National University of Life and Environmental Sciences of Ukraine” (approved by the Rector of Ukraine NUBES on 28.07.2012) [Ridei, Strokal, Rybalko 2013].



**Fig. 1. Cross-cutting framework of practical trainings for professionals in ecology and environmental sciences**

The key structural elements of the cross-cutting practical training include: (i) scientific methods (methods, techniques, methodology), regulatory (e.g. laws, decrees, regulations of the Cabinet of Ministers of Ukraine), technical (e.g. standardization system), human resource and financial supports of practical trainings; (ii) structural-and-logical profiles of practical trainings of the students accounting for the needs of the labour market (Schedule 1); (iii) working practice programs (educational, production, teaching practices, and research workshops), which indicate duration of these programs, also structure, content, objectives, place of the practice, forms of this practice, requirements of competences that

should be obtained during each type of the practice. The cross-cutting training program is the basis for organising practical trainings for the students in an efficient way. This program incorporates the implementation of modern (innovative) research, project design and environmental management tasks in a professional environment (Fig. 1) [Ridei, Strokal, Rybalko 2013]. The content of practical trainings in the structure of the cross-cutting training program is determined by a number of environmental, social and personal factors and conditions.

These include (i) a focus on development of an ecosystem thinking; (ii) an interest of agricultural higher education in development of environmental education and science and improvement of job prospects for graduates and their levels of competitiveness; (iii) needs of the production sector in ecology professionals who are profession-oriented and trained to practice; (iv) the necessity to form moral and ecological and environmental characteristics and environmental responsibility in the society [Strokal 2012].

During practices the students gain: management *abilities* in ecology and environmental sciences, including organizational, psychological, educational, scientific, intellectual, communicative, moral, practical; *professionally important qualities*, such as basic and applied research, interdisciplinary knowledge, self-reliance, initiative, commitment, predictability, decisiveness; *skills and abilities* to form and express arguments and defend their point of view through constructive dialogues that consequently reduces the risk of conflicts between the parties and encourages coordination and compromise in dealing with environmental problems, to take appropriate independent environmental – management decisions, to take biosocial responsibility for ecological safety of the environment, the economy and other spheres of human activity; perform landscape-ecological expertise of agrosphere areas, sanitary examination of goods, environmental inspection of entities; analyse the size of damages using the requirements of environmental legislation; determine the index of socio-economic and environmental development of the area, the quality status of land, ecological conditions of agricultural land through environmental mapping; assess soil to obtain the predictable ecologically safe and biologically valuable products and raw materials; conduct agroecological and phyto-sanitary monitoring of fields; perform radiological certification of different territories such as farms, environmental certification of industrial and agricultural enterprises, villages, solid waste, potentially dangerous objects of agrosphere, perform certification of fields, land, pastures and natural and recreational facilities; develop and implement the scientific basis for ecologization of agriculture in the current labour market conditions.

The cross-cutting training program allows the future professionals to be *ready* to perform professional research, design, manufacturing, expert control, legal and regulatory activities (e.g. environmental standardization, certification and licensing), environmental educational, managerial tasks related to rational use of natural resources, prevention of pollution, introduction of environmental management and

auditing systems, labelling, facilitating re-use, recycling and disposal of waste, prevention of natural and man-made disasters, development prospective and current plans and programs on environmental protection and observance of technological conditions of environmental facilities [Ridei 2011; Ridei, Strokhal, Rybalko 2013; Strokhal 2012].

## Conclusions

The cross-cutting training program for students in the field of ecology and environmental sciences involves observance of a certain procedure to form a structure of practices; the consistency in content and volume to conduct general environmental and landscape-oriented education practices, research workshop, production practices; provisions of their legislative and regulatory support, as well as the purpose, objectives, description of practice bases, methodological, informational, material and HR support, types, content and structure of research-and-practice papers, methods of research. It also regulates the types, forms and methods of control to form practical skills. It is determined by a number of general environmental, social and personal factors and conditions of employment.

## Literature

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## Abstract

The paper addresses the key structural elements of the cross-cutting practical training (or program), namely: methodological (e.g. methods, techniques), regulatory (e.g. laws, decrees, regulations of the Cabinet of Ministers of Ukraine), technical (e.g. standardization system), human resource and financial support of practical training; structural-and-logical profiles of practical trainings for students in the field of ecology and environmental protection in order to meet the needs of the labour market; working practice programs. There are defined the professionally important qualities and skills that are acquired in the course of practical trainings, including

academic, intellectual, communicative, moral, practical, self-reliance, initiative, commitment, predictability, decisiveness, which in turn encourage the specialists to carry out professional research, develop designs, conduct expert control, perform tasks such as legal and regulatory, environmental, educational, administrative that are related to sustainable use of natural resource, modelling and predicting the state of the environment etc.

**Key words:** practical training, specialists in ecology and environmental sciences, cross-cutting program.