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**ENVIRONMENTAL PROTECTION IN HIGHER  
EDUCATION IN  
THE REPUBLIC OF NORTH MACEDONIA<sup>1</sup>**

**PhD Marina Malish Sazdovska**

Faculty of security Skopje, mmsazdovska@gmail.com

**Abstract**

Environmental protection is a serious challenge for humanity because environmental problems are serious. Namely, climate change, pollution of all ecosystems water, soil and air, technical-technological development with negative implications, as well as many other problems have a negative impact on a healthy human environment. Pollution endangers man, but also flora and fauna. Natural disasters such as fires, floods, tsunamis, volcanic eruptions, etc. also affect the additional deterioration of the situation.

Hence, it is very important that the programs of higher education institutions deal with the matter of environmental protection. At that wye we will educate young people and increase their awareness of the importance of a healthy human environment. Thus, we will create conditions for decision-making in the direction of sustainable development and caring for both current and future generations.

The author of the paper makes a detailed analysis of the content of the university programs and the contents related to the protection of the environment.

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<sup>1</sup> professional paper

Key words: environmental protection, faculty, high education e.t.c.

## Introduction

Within the University St. Kliment Ohridski Bitola there are several faculties and institutes where different study programs are studied in all cycles of studies. Namely, there are the following units of the University: Faculty of Economics - Prilep, Faculty of Biotechnical Sciences - Bitola, Technical Faculty - Bitola, Faculty of Pedagogy - Bitola, Faculty of Tourism and Hospitality - Ohrid, Faculty of Security - Skopje, Faculty of Law – Kicevo, Techeno - Technical Faculty - Veles, Medical School - Bitola, Faculty of Veterinary Medicine - Bitola, Faculty of Information and Communication Technologies - Bitola, Scientific Institute - Prilep. As associate members of the University are: PSI Hydrobiological Institute - Ohrid and PPI Institute of Old Slavic Culture - Prilep.

According to the vision and mission of UKLO, the quality teaching-scientific process and academically and professionally recognized study programs are the fundamental ways to transfer knowledge from several scientific or artistic fields, areas and disciplines, which are also parameters for evaluating university success. Thus, the University shows its focus on students, study programs for all three cycles of education and holders of study programs, especially because it is an institution in which teaching and learning predominates. The study programs of the University are based on the Rulebook for the obligatory components that should have the study programs from the first, second and third cycle of studies. The Rulebooks regulate the observance of the general international principle by developing critical thinking of the students in the teaching process. In order to increase the quality of the study programs of the third cycle and the entire study process, with the new Rulebook on the conditions, criteria and rules for enrollment and study of the third cycle of studies at the University "St. Kliment Ohridski" - Bitola, from 2018, the application and registration procedure is changed.<sup>2</sup>

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<sup>2</sup>ИЗВЕШТАЈ ЗА САМОЕВАЛУАЦИЈА НА УНИВЕРЗИТЕТОТ „СВ. КЛИМЕНТ ОХРИДСКИ“ – БИТОЛА, (2017/2018 – 2019/2020), О к т о м в р и , 2 0 2 0,

Invasive globalization, modern technological progress, military confrontations, unsustainable behavior towards nature cause rehabilitation of the environment from the effects of these processes to be hard to achieve. An even greater challenge is shaping the awareness of the meaning and environmental protection. That is, the incorporation of this consciousness and the implementation of the new technological, economic, political and ethical dimension of living and working conditions in a safe and healthy environment. The basic cell that should be the initial impulse for creating environmentally conscious society is education. In this educational process, first needs to seriously review the basics of scientific assumptions and adopted principles that underpin actual society, which inevitably degrades the environment. A sustainable way of functioning of humans and nature is the central paradigm that should be "forced" to be in function of the change of anthropocentric consciousness and ethics in humans.<sup>3</sup>

According to current trends in the field of ecology, which relate to climate change; pollution of all ecosystems water, soil and air; food safety, environmental crime and many other environmental problems, it is necessary for higher education institutions in the Republic of North Macedonia to study appropriate study programs in these areas.

Regarding the specific educational content for the subject Environmental Criminology, students acquire knowledge on which they can detect environmental risks and threats<sup>4</sup> in the environment where they live and learn, as well as specific actions that are criminal offenses<sup>5</sup>.

From the research conducted so far with students who have taken courses in the field of environmental criminalistics, we can conclude that their awareness

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<https://www.uklo.edu.mk/filemanager/2020/Izvestaj%20za%20samoevaluacija%202017-18%20-%20202019-20.pdf>

<sup>3</sup>Mileski T. Malish Sazdovska M., DETERMINING THE NEEDS OF EDUCATION AND ENVIRONMENTAL PROTECTION, International Journal for Education and Training (IJERT) Volume 3, Issue 1, June, 2017 UDK: 37.017:502.17

<sup>4</sup>Mileski T. Ecological security, sustainable development, sustainable security. Faculty of Philosophy, Skopje, 2011.

<sup>5</sup>Malish Sazdovska M., Ecological criminology, Solaris print, Skopje, 2009

of environmental crime is greatly increased, and thus education has a positive role in that process.<sup>6</sup>

In that way, staff will be produced who will be experts in solving burning environmental problems, both nationally and internationally. Also, with the education of the youth on several levels, which is necessary to start from the earliest age, the awareness for preservation of the healthy human environment will be raised and care will be taken for humanity, but also for the animal and plant world. Hence, the analysis of the study programs of the University St. Kliment Ohridski Bitola is important, in order to understand the contents of the study programs related to ecology.

Environmental education should be correlated with environmental requirements during the life educational process or the educational process not only to cover the information about environmental events. You'll agree that environmental awareness is not consisted only of knowledge, but also of other elements such as emotional because knowledge without practical activity is not of big importance. The creation of environmental awareness begins at the early age of man and undoubtedly stresses the importance and role of educational institutions at all levels. If this process is continuous, then up-coming generations and in full working and mental activity they will be "armed" with adequate knowledge and be able to respond to all challenges related to environmental protection. This paper contributes to shaping the appropriate educational strategies and critical thinking on the need for appropriate programs with environmental themes in educational upbringing.<sup>7</sup>

#### Environmental protection in first cycle study programs

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<sup>6</sup>Malish Sazdovska M., Ivanov A., Victims of Environmental Crime (Students Perceptions of Environmental Crime), Criminal Justice Issues, Journal for Criminalistics, Criminology and Security Studies, Year XII, Sarajevo, 2012, No.5-6

<sup>7</sup>Mileski T. Malish Sazdovska M., DETERMINING THE NEEDS OF EDUCATION AND ENVIRONMENTAL PROTECTION, International Journal for Education and Training (IJERT) Volume 3, Issue 1, June, 2017 UDK: 37.017:502.17

At the Technical Faculty - Bitola, a four-year study program is accredited with 240 credits in Engineering for Environmental and Working Protection, with the completion of which students acquire the title of Graduate Engineer in Environmental Protection on module A and Graduate Engineer in Environmental Protection at module B. This staff profile is a highly educated profile with extensive knowledge of individual areas of environmental protection.

The goals of the study program are significant and refer to the effective education of engineers for environmental and work environment whose expertise will meet the needs for development of North Macedonia and the wider region, training graduates to organize, design and implement modern engineering needs, for protection of the environment and work environment, development of transferable skills and abilities in research methods, problem identification, logical analysis, choice of solutions and communication of ideas, demonstration of values from the interdisciplinary approach, as well as achieving greater efficiency and passability in studies by maintaining a high level of quality studies.

At the Faculty of Biotechnical Sciences - Bitola is accredited four-year study program with 240 credits: Quality and food safety, and students after graduation acquire the title of Graduate Engineer in Quality and Food Safety. This profile is characterized by extensive knowledge of fundamental and engineering sciences, but also practical knowledge in the field of food production and food safety systems.

From the above study programs we can conclude that they are few in number, namely only two study programs of the first cycle of studies out of a total of 11 units address certain aspects of environmental protection, namely: Engineering for environmental and work protection and Food quality and safety. These are important areas related to environmental and work environment protection and food safety, but of course other units of the University should take into account modern environmental safety risks and threats and accredit adequate study programs, each in its own field.

Environmental protection in second cycle study programs

At the Technical Faculty - Bitola are accredited one-year studies of the second cycle with two semesters: Engineering for Environmental Protection and Workplace, at the Faculty of Technology - Technical Veles is accredited one-year study program with two semesters: Quality Management and Food Safety and The Faculty of Biotechnical Sciences - Bitola is also accredited, a one-year study program with two semesters Quality and Food Safety.

Regarding the accredited study programs of the second cycle, it can be noticed that the units that have study programs of the first cycle, have an appropriate continuation of the studies in the given areas for protection of the environment and of the second cycle. It is a good practice for students who have been educated in the first cycle of engineering for environmental and work environment protection and food safety, to continue their education in the second cycle of studies. In this group of units of the university is the Faculty of Biotechnical Sciences - Bitola which also introduces a study program of the second cycle in the field of food safety.

It is especially important that the topics that are approved and on which the second cycle students have a social justification, to be closely related to the economy and other areas, as well as to have applicability in modern social trends.

#### Environmental protection in third cycle study programs

Given the fact that doctoral dissertations are in-depth analyzes and scientific papers that conduct comprehensive scientific research on certain topics, in the paper we will focus more on the analysis of this cycle of studies. This is due to the fact that social justification for scientific research is very important for the implementation of proposed solutions.

The distribution of the number of study programs of the third cycle of studies for the academic year 2019/2020, by units of the University "St. Kliment Ohridski" is as follows:

- Faculty of Economics - 5 study programs,
- Scientific Institute of Tobacco- 1 study program,
- Faculty of Pedagogy - 4 study programs,

- Faculty of Law -1 study program,
- Technical Faculty - 2 study programs,
- Faculty of Technical Technology - 1 study program,
- Faculty of Security - 1 study program,
- Faculty of Biotechnical Sciences - 1 study program,
- Faculty of Information and Communication Technologies - 1 study program and
- Faculty of Tourism and Hospitality - 2 study programs.

Tab. No. 1. Third cycle study programs in the field of environmental protection

No.	Faculty	Study program	Subjects
1	Faculty of Biotechnical Sciences	Technology and Food Safety	- Selected Chapters on Food Safety -Packaging and food safety Selected chapters in agroecology
2	Technical Faculty - Bitola	Mechanical Engineering	-Energy systems and environment -Thermenergetics and ZJS -Regimes and energy efficiency of thermal power plants -Thermenergetics and ZJS -Technologies for the application of renewable energy sources -Design and planning in the processes for

			minimization of waste and hazardous substances -Renewable energy sources -Technologies and plants for ZJC
3	Technical Faculty - Bitola	Industrial Management	Selected chapters in environmental management
4	Technical Faculty - Bitola	Traffic - technical engineering	Selected chapters in environmental management
5	Faculty of Tourism and Hospitality - Ohrid	Tourism	-Research of entrepreneurial and sustainable tourism development -Institutional dimension of sustainable tourism development
6	Faculty of Security - Skopje	Security	Security risks from transnational environmental crime and terrorism
7	Faculty of technical Technology Veles	Innovative Technologies for Food and Nutrition	Organic, quality and safe food

Table number one presents the units of St. Kliment Ohridski Bitola, who have accredited study programs of the third cycle, and which contain certain subject contents related to environmental protection. Out of a total of 11 units of the University, only 4 have one study program in which there are certain contents related to ecology, and one faculty with three study programs. As can be concluded from the data presented in the table of units that have a third cycle study program that has certain contents related to ecology, and that one or two subjects are: Faculty of Biotechnical Sciences, Faculty of Tourism and



Hospitality - Ohrid, Faculty of Security - Skopje and Faculty of Technical Technology Veles.

From the list of units stands out the Technical Faculty - Bitola which has as many as three study programs directly or indirectly related to environmental protection, namely: Mechanical Engineering, Industrial Management and Traffic - Technical Engineering. The other faculties have the following study programs: Food Technology and Safety, Tourism, Safety and Innovative Technologies for Food and Nutrition.

If we analyze the titles of the study programs of the third cycle of the units, it can be concluded that these are broad areas that are not directly related to ecology, and that they contain one or two courses related to environmental protection. Namely, they refer only to some segments of the study programs, such as: food safety, environmental crime, environmental management, etc. Hence, it can be concluded that the study of environmental protection in the third cycle is partial, there is no comprehensive study program that deals exclusively with environmental protection, but only certain aspects are processed depending on the scientific field of interest of individual units of the university.

An exception is the Technical Faculty - Bitola which has three study programs in which are studied: energy efficiency, renewable energy sources, waste and hazardous substances, environmental management and others which deal more specifically with topics related to environmental issues in the field of technical sciences.

From the content of the table for the third cycle of the units of Ss. Kliment Ohridski - Bitola, and having in mind the millennium goals of the United Nations for climate change and many other environmental threats to the planet Earth such as forest devastation, weather, enormous pollution, etc., we can conclude that this substance is not sufficiently represented at the university.

Evaluation of the study cycles of the third cycle

In order to develop the study programs of the third cycle of studies, it is necessary to analyze them and propose solutions to improve the quality of these studies.

According to the assessment of the students obtained by conducting a survey, it can be concluded that second and third cycle students are less satisfied with the examination of their knowledge in terms of the provided basic literature and the content and structure of the exam questions.

The analysis of the success of the third cycle of studies can be seen through the presentation of the results of the final exams. Namely, the average grade for taking the final exam for 2017/18. is 9.37, for 2018/19 it is 8.90 and for 2019/20 it is 9.09. The number of doctoral students basically increases over the years, as follows: for 2017/18 12 doctoral students, for 2018/19 -34, 2019/20 33 students. The number of mentors is also increasing, as follows: 2017/18 there were 121 accredited mentors, for 2018/19 - 123 and for 2019/20 143 mentors.

In order to create a network of doctoral students, which includes organizing conferences to share experiences and best practices, the Rulebook on conditions, criteria and rules for enrollment and study of third cycle studies from 2020 provides for the obligation to organize an annual conference for third cycle students to all units of the University, in order to present the independent research project under mentorship (doctoral project). Within the University, the scientific research and the progress of the second and third cycle students are continuously monitored in different phases of their studies, so that, in addition to mentoring, commissions composed of several professors are formed, in order to supervise the achievements. However, the general recommendations regarding the improvement of the quality of the third cycle of studies refer to the development of a network of doctoral students and the organization of annual conferences to share experiences and best practices among them and the organization of annual conferences to improve the competencies of the teaching staff.<sup>8</sup>.

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<sup>8</sup> ИЗВЕШТАЈ ЗА САМОЕВАЛУАЦИЈА НА УНИВЕРЗИТЕТОТ „СВ. КЛИМЕНТ ОХРИДСКИ“ – БИТОЛА, (2017/2018 – 2019/2020), Октомври, 2020,  
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## Conclusion

Environmental education is significant in many ways in terms of education of children and young people in any modern society. Namely, due to the increasing technological development of increased global risks and threats to human health from pollution, radiation, climate changes associated with natural disasters and so on. In order personal protection and the protection of the entire living world, it is necessary that they have adequate knowledge of environmental protection. That implies the need for environmental education to be part of the curricula in the Macedonian educational system, starting from the earliest age of children in pre-school up to the highest levels of education in the country.

Actually, the results of the environmental education of undergraduate studies in which they study subjects in the field of environmental protection indicate positive results of environmental education. The participants concluded that their awareness was greatly increased, they obtained new knowledge and skills in this area that allow detection of certain environmental risks and threats, taking precise measures to protect and thus directly reduce the rate of environmental crimes in the Republic of N. Macedonia.

The third cycle of studies treats a more comprehensive way of researching certain scientific-professional issues from different fields, and in the preparation of doctoral dissertations advanced methodological tools are used for analysis of certain scientific-professional current topics. Research should be original scientific settings, which will provide relevant scientific indicators for a particular phenomenon, and the applicability of the research will have great social significance. In doing so, doctoral students acquire the highest scientific title of Doctor of Science in a certain field, and therefore with the preparation of the doctoral dissertation should make a scientific contribution to enrich the sciences and scientific disciplines.

Hence, it is necessary for higher education scientific institutions to follow the world trends, especially in the field of environmental protection, and to offer study programs in this field.

In that way, conditions will be created for scientific contribution by developing scientific-professional topics in this field, to contribute to the actualization of this issue and to offer specific models and solutions for overcoming specific environmental problems.

From the above analysis it can be concluded that the units of Ss. Kliment Ohridski - Bitola have certain subject contents, which within the study programs of the third cycle of studies, contribute to the treatment of topics in the field of environmental protection. There are also a number of defended doctoral dissertations that provide scientific input to overcome environmental hazards. But all this is not enough and in the coming period we should work on increasing the content on this extremely important issue. Only by raising the quality of the teaching-educational process and hiring professional and competent staff, in the next period all areas of study from the first, second and third cycle of the University can be improved and thus act socially beneficial for the benefit of the whole living world, from man to the animal and plant worlds.

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