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WB Institution: **Higher technical professional school in Zvecan [HTPSZ]**

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Study on the needs, constrains and possibilities for the development of postgraduate study programme *Sustainable and resilient environments*

CONTENTS

INTRODUCTION

The fact is that the increase in the number of natural, technological and other types of risks and threats affects the environmental pollution. With the aim of establishing and developing security awareness and culture, acquiring and raising the level of general and specific knowledge and skills for fire protection, education is viewed and defined as basic preventive measure in modern environmental protection system.

In our country, within the existing educational system specific forms of professional training of personnel for environmental protection have been developed, all with the aim of creation of sustainable and resilient development.

Study program Safety at work - fire protection, is being realized on basic and specialized vocational studies, both in universities and higher education institutions, included our Higher Technical Professional School in Zvecan (HTPSZ).

The existing capacity of higher education institutions is not sufficient to cover the annual needs for new specialists in this field. This fact implies that the staff in this area is necessary, justifying the need for creation a master professional studies of vocational program Safety at work - fire protection.

Analysing the data, we have identified educational needs of students HTPS-Zvecan, with possibilities to implement the contents of the environmental and labour protection. Obtained are projections of possible directions of overcoming the current problems and shortcomings in this area. When asked whether they would like to gain new and expand existing knowledge of environmental protection and knowledge on sustainable development, the results indicate that almost all of them 140 (93.33%) want to acquire new knowledge and 10 of them (6,67%) said they did not want to acquire new knowledge about environmental protection and sustainable development. As the main ways of acquiring knowledge respondents finds lectures in classical teaching, 63 of them (42.00%), and 38 of them (25.33%) opted for education through lecturing through discussion groups, 35 (23.33%) of students opting for acquiring knowledge through media and the remaining 14 (9.34%) opts for acquiring knowledge through self-education and the Internet.

The introduction (creation) of master study program Safety at work - fire protection at HTPSZ would have given a huge contribution to the wider community through education of professional specialists, whose knowledge and competence would imply our working and living environment safer and more secure.

Professionally educated and trained specialized staff in the field of fire protection are going to be important factors in the process of integration and operationalization of science and practice, using all their professional knowledge, skills and competencies. Therefore, we believe that it is of special interest to organize mentioned master study program. Graduated students of basic vocational studies shall be given the opportunity to acquire new and innovate already existing knowledge, vocational training and permanent education for the protection and management of the risks and threats of fire, through a series of organizational, educational forms and activities.

1. CREATION OF MASTER DEGREE VOCATIONAL PROGRAM: PROTECTION AT WORK - FIRE PROTECTION

Study program title: **Fire protection**
Type of studies: **Master vocational studies** – duration two years (four semesters 120 ECST).
Vocation: **Master vocational engineer for protection at work - fire protection**

Study program will be implemented through:
compulsory subjects - covering basic knowledge that students need to master;
elective courses - which profiles the student closer to their education;
professional practice - which the student performs in the fourth semester;
Master's thesis - that the student realizes in the fourth semester.

1.1. The objectives of the study program

The objectives of the master of professional studies program derives from the basic goals and objectives of the HTPSZ as a scientific and educational institution as well as the study program purpose. The main objective of the study program is achieving competences and academic knowledge and skills in the field of fire protection engineering and application of scientific and professional achievements in order to solve the problem of fire protection and management so as development of modern fire protection systems. Specific objectives of the program are acquiring general and specific theoretical knowledge and practical skills for:

- identification of hazards and risks of fire in the workplace;
- analysis of the technological processes in terms of implementation of measures for protection against fire and explosion;
- engineering calculations of the combustion process relating to the stochiometric and thermodynamic problems;
- identification and analysis of risks and protection against fire and explosion caused by the effects of electricity/electrical energy;
- design and maintenance of fire alarms and firefighting systems;
- organization and managing the fire protection systems;
- organization and management of interventions, rescue, evacuation and rehabilitation from fire and explosions;
- fire and explosion expertise;
- project management and application of project management principles in the field of fire protection;
- development and implementation of methodologies, methods, tools and procedures in the management of fire and explosion;
- application of information technology in fire protection engineering
- management and development of human resources in fire protection systems;
- critical evaluation of current problems of fire protection and the characteristics of their research and solving;
- innovative approaches and teamwork;

- continual education and knowledge development in the field of fire protection.

1.2. The purpose of the study program

The purpose of the study program of master professional studies is to educate students for Master vocation professional safety engineer - fire protection in accordance with the needs and concept development of economy and society in order to solve complex problems of fire protection in the workplace.
HTPSZ has defined as the main tasks and objectives the education of highly competent staff in the field of work and the environment protection in line with the vision, mission, policies and strategies of the quality and content of the study program Master program study is fully in correlation with the basic tasks and goals of the school.
The content of the study program will enable students to acquire knowledge, from the field of natural, technological, socio-humanistic and medical sciences; skills and competencies that will enable them to work on complex, multidisciplinary fire protection. Scientific disciplines and professional curriculums at this level of study enables students to acquire specific theoretical knowledge and application skills of fire protection, the development of critical thinking skills for teamwork and cooperation, while the variety of elective courses will encourage independence and creativity in designing the study, as well as innovative and multidisciplinary approaches the fire protection in the working environment.
In conditions of rapid technological development that brings prosperity, but also new potential hazards and risks of fire, this concept of the study program bill bring up educated staff who possess the knowledge, competencies and skills in the European and global frameworks, master engineers who can identify and propose ways to solve potential hazard and fire risks in the workplace and to ensure better living and working conditions. Bearing in mind the social, economic and broader social importance of fire safety, the experts of this profile are going to have socially justified and useful skills.

1.3. The structure of the study program

The structure of the study program is compliant with the standards for accreditation of study programs of the first and second levels of higher education, in accordance with the Bologna Declaration and the Law on Higher Education.

1.4. Competence of graduates

Mastering the master study program of professional studies of fire protection provides general ability for:

- analysis of the problems in the work and environmental areas;
- prediction of solutions and consequences;
- mastering the methods, procedures and processes of identification and assessment of risks in the working environment;
- development of critical thinking and approached solving the current problems in the field of protection;
- application of knowledges in practice;

- development of competences and communication skills with immediate and wider environment;
- development of professional ethics.

In addition, the program provides subject-specific skills and professional competence for:

- assessment and insurance risks from fire and explosion;
- supervision in the field of fire and explosion;
- optimization and management of available resources in the system of fire protection;
- preparation of reports on the status of fire and explosion;
- preparation of plans and technical documents in the field of fire and explosion;
- design of specific surveillance system, fire alarms and fire fighting;
- organization and management of interventions, rescue, evacuation and rehabilitation of fire and explosion;
- expertise in fire and explosion;
- education and knowledge management in the field of fire and explosion;
- training, professional selection and development of skills in the field of fire and explosion;
- drafting normative acts in the field of fire and explosion;
- development of methodologies, methods and procedures for the management of the system of fire protection;
- development of methods for assessing the effectiveness of the fire protection system;
- project management and innovation in the system of fire protection;
- organization and management of the system of fire protection;
- innovation activities and teamwork in emergency management;
- management activities, maintenance of facilities, installations and equipment;
- education and training of employees in safety and health at work;
- organizing and managing the system of health and safety at work in organizations;
- preparation and participation in the development of work place risk assessment.

2. CURRICULUM FOR MASTER PROFESSIONAL STUDIES, PROTECTION AT WORK - FIRE PROTECTION

Study program includes 9 compulsory, 4 elective courses, which are selected from 8 offered, professional practice and master thesis.
Each curriculum is evaluated with a certain number of ECST credits.
In the structure of the study program are represented by different types of cases:

- academic general education
- theoretical-methodological
- scientific expertise
- professional application

Overall student's engagement consists of active teaching (lectures, exercises, laboratory exercises, seminars and other forms of active classes), individual work, tests, exams,

preparation of the master thesis and other forms of engagement. Practical work is an integral part of the study program. It is carried out in the chosen company or institution with the aim of training students for the practical application of acquired knowledge to solve existing problems in working and environmental protection. The study program is completed by the preparation and defense of the master thesis. Through the Master's thesis student demonstrates the ability to synthesize and apply the acquired theoretical and practical knowledge to solve problems in the system of protection at work and fire protection. Upon completion of studies, the student acquires the academic title:

Master vocational engineer for protection at work - fire protection

A list of compulsory and elective curriculums for Master of Professional Studies
First year:
1. The methodology of scientific research - compulsory
2. The dynamics of fire - compulsory
3. Protection of buildings against fire - compulsory
4. Risks in Manipulating Hazardous Substances - compulsory
5. Security of strategic energy facilities - compulsory
6. Maintenance of technical systems - elective
7. The economics of fire protection - elective
8. System Engineering - elective
9. Project Management - elective
Second year:
1. Fire protection due to the effects of electricity - compulsory
2. Information technology in the protection - compulsory
3. Equipment for the intervention and rescue - compulsory
4. Safety and Health at Work - compulsory
5. Ventilation of fire-threatened areas - elective
6. Security and emergency education - elective
7. Design and maintenance of fire protection systems - elective
8. Management and Human Resource Development - elective
9. Professional Practice
10. Master's thesis

2.1. The goals and outcomes of study curriculums

The methodology of scientific research
The goal of the program content: To enable students to successfully write scientific papers and prepare the master thesis.
Learning outcome: The ability to understand the different scientific methods used in the scientific literature - Ability to successfully cope with the scientific literature - the ability to write successful scientific work in the field of interest - the ability to create and successful complete the Master’s thesis

The dynamics of the fire
The goal of the program content: Acquiring knowledge on fire as a dynamic process that takes place in space and time. The study of the development phases of a fire, the basic parameters of development of fire within individual developmental stages. The

phenomena that accompany the dynamics of fire (flash-over, backdraft, bleve ...). The dynamics of fire in time and space (both indoors and outdoors). The influence of parameters of the surrounding environment on the development of a fire.
Learning outcomes: Understanding the dynamics of fire, which is a base for the actions in the field of preventive, repression and rehabilitation of fire protection.

Protecting of buildings against fire
The goal of the program content: Enabling students to: analyze the situation of the high-building construction and its structure in terms of the risk of fire, evaluating risk and vulnerability from fire in the facility, designing and installation of the technical preventive measures for the protection of fire in high-building constructions.
Learning outcome: The student who successfully completes course is going to be qualified to: evaluate the risk of fire in the high building constructions; independently or in a team develops projects of fire protection for high-building constructions, as well as parts of the investment and technical documentation of the buildings.

Risks in Manipulating Hazardous Substances
The goal of the program content: The objective is to familiarize students with hazardous materials, their characteristics, procedures and responsibilities for handling and manipulating them. Students should acquire knowledge about safety in the transport of dangerous goods, become familiar with the rules, laws, agreements, regulations, decisions and standards governing hazardous materials and their transport. In the framework of this course, students will learn about the types of transport means and modes of transport of hazardous substances, and protection measures when reloading hazardous substances, and protection measures in accidents.
Learning outcome: After passing the exam, students will be able to apply acquired knowledge in practice, to evaluate the dangers that can occur during operation and handling of hazardous materials and professionaly contribute in elimination of the consequences in the event of an accident.

Safety of Strategic Energy Facilities
The goal of the program content: educational goal includes introducing basic concepts of security of strategic energy and nuclear facilities and plants and its application. Based on the analysis of severe nuclear accidents (Chernobyl, Fukushima) gaps in the security of nuclear installations will be analyzed as well as risks related to the use of nuclear energy for peaceful purposes.
Learning outcome: Students acquires knowledge about the basic concept of security that must be taken into account in the design and maintenance of strategic energy system. Students will also be familiar with basic safety systems of nuclear plants as well as the basic methods of safety analysis (probabilistic and deterministic) applicable both to nuclear power and the energy industries in general.

Maintenance of technical systems
The goal of the program content: Acquiring knowledge about the processes of maintenance of technical systems in function of safety equipment and prevention of accidents in the technological process.

Learning outcome: After the successful completion of program content students will acquire the theoretical and practical knowledge about equipment maintenance, technical systems, methods, maintenance and security.

The economics of fire protection
The goal of the program content: Acquiring knowledge about the negative economic consequences of fire and explosions in the working environment and training for practical evaluation of direct and indirect damage and the effects of investment in prevention.
Learning outcome: Qualifying students for practical research and analysis of direct negative consequences in the field of fire and explosion, as well as understanding the negative economic consequences of fire and explosions and their overall impact on the economy.

System engineering
The goal of the program content: Acquiring knowledge on basic characteristics, process and systems engineering disciplines, and the models and methods of decision making and evaluation of effectiveness.
Learning outcomes: Ability to connect engineering and managerial demands in the process of analyzing and solving the problem of protection; for the development and application of methods and procedures for assessing the effectiveness of the protection system so as engaging in teamwork and collaborative decision making.

Project Management
The goal of the program content: Acquiring knowledge in the context, processes and tendencies of development of the concept of project management and the application of the principles of project management in preventive engineering.
Learning outcomes: Mastering the program content, students acquire the ability to use and develop the concept of project management in the field of protection of the working environment, the organization of project management and implementation of software tools for project management and the protection of the working environment.

Fire protection due to the effects of electricity
The goal of the program content: Acquisition of expertise for the identification and analysis of risks and the protection of material goods, cultural values and human life from fire and explosion caused by the effects of electricity.
Learning outcome: After the successful completion of program content, students are able to: identify hazards, analyze and evaluate the extent of protection the risk of fire or explosion due to the effect of electricity; examine the safety of electrical installations, devices, equipment and systems of protection against static and atmospheric electricity.

Information technology in the protection
The goal of the program content: Acquiring knowledge on the application of information technologies in safety at work and fire protection.
Learning outcome: Skill of application of information technology in solving of specific management problems in protection system management; proficiency in the use of information and communications technology in the monitoring of news in the profession, mastering skills, teamwork and decision-making in the protection system.

Equipment for intervention and rescue
The goal of the program content: Acquiring knowledge about the equipment and means of intervention and rescue, firefighting equipment types as well as providing help during the intervention of protection and rescue.
Learning outcomes: Having knowledge of correct choice and use of equipment and fire extinguishers according to the type of fire, the place of the intervention. Possession of skills to calculate the required amount of fire extinguishers as well as provision of other forms of rescue interventions.

Safety and Health at Work
The goal of the content: Acquisition of theoretical and practical knowledge in the field of general safety and health at work. Training for technical documentation regarding compliance to safe and healthy working conditions.
Learning outcomes: Acquiring knowledge on training, managing safety and health at work in accordance with the regulations and standards of domestic and European legislation. Create and implement the necessary safe and healthy working conditions. The basics of risk assessment in the workplace. Way to reduce and manage the remaining risks that could not be removed by known technical solutions.

Ventilation of fire-threatened areas
The goal of the content: Acquisition of theoretical and practical knowledge of ventilation systems for fire-threatened areas.
Learning outcomes: Having a knowledge of fire-threatened areas, ventilation systems, techniques of ventilation and smoke removal in fire-affected buildings.

Education for Security and Emergencies
The goal of the content: Familiarizing students with educational needs for security in emergency situations; training for the planning, organization, implementation and evaluation of educational activities for the safe operation and action in emergency situations.
Learning outcome: Possession of knowledge in the field of education for occupational safety, fire protection and emergency management

Design and maintenance of fire protection systems
The goal of the content: Exploring the reasons for the design and installation of fire protection systems in accordance with national and international standards. Acquiring knowledge about the design, operation and maintenance of fire protection systems principles. Training for independent design and maintenance of fire protection systems.
Learning outcome: Qualifying students for the formation of project task and project development for fire protection system as well as training for the maintenance of fire-extinguishing systems.

Management and Human Resource Development
The goal of the content: Acquisition of theoretical concepts of management and human resource development and understanding of their mutual connection and influence. Acquiring knowledge and skills for effective action to develop human resources in the system of security and protection. The development of critical thinking on different

aspects of the management and development of human resources. Consideration of the basic characteristics of the development of human resources in national and international context.

Learning outcomes: Having developed a system of knowledge about modern concepts, strategies and opportunities for human resource management; competencies - knowledge and abilities for efficient operation of the development of human resources in the system of working and living environment.

CONCLUSION

For personnel who are competent and professionally dealing with the problems of fire protection could be said to have primary responsibility for the protection of both the protection at work and the environmental protection. Their area of activity is the most immediate and most direct way connected with the fate of working environment in general. Achieving a quality and successful teaching-scientific process of education and training of these professionals may induce less adverse effects and losses in the environment. Especially if one takes into account that these personnel in addition to preventive, operative and rehabilitation operation should provide other necessary pre-conditions for the mobilization of the actions of all people in the protection and responsible and preventive action in their daily work and life activities.