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ENVIRONMENT MANAGEMENT IN STUDENTS HIGHER EDUCATION

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Abstract: The purpose of the work is in taking appropriate training themes for the educational level of qualification "bachelor". The main research directions are: 1) Definition of the purpose and objectives of training, 2) Substantiation of the major themes in education, 3) Formulation of topics and methodology for conducting exercises to achieve the necessary practical training, 4) Development of technology training.

Keywords: environment, protection, management, student, education.

The higher education is a complete permanently alternating system. This tendency will continue in future with the requirement to adapt to the system in the EU. The present paper aims to bring out a proper thematic consistence for specialist education with higher technical education on bachelor degree of sciences. To develop the topic the following problems must be solved: 1) Definition of the aim and purposes of the education; 2) Grounding of the main training topics; 3) The training exercises to acquire necessary practical experience - subjects and methodologies formulation; 4) Development of the educational technology.

Based on our experience in students teaching a syllabus was made on the direction of Environmental protection and management. Its main purpose was to acquire knowledge and skills in synthesis and analyze application of technical, organizing and management solutions on environmental safety of the manufacture processes and equipment and environmental protection. The problems to solve are: 1) Mastering of: a) main terms, definitions and categories in the environmental risk theory and safety; b) principles and methods in environmental risk of the technical and production systems analyses; c) risk sources, parameters, impacts, effects, standardization, measurement and assessment of risk factors, specifying the level of environmental safety regulated at Bulgarian and International acts; 2)

Improving the methodic for environmentally safety technical productive systems design; 3) Acquiring knowledge for: a) main principles, methods and instruments for environmental protection; b) environmentally adaptability of the industrial systems; c) main awkward for management solutions in environmental protection formulation; d) environmental legislations and rations. The subject has incoming links with Physics, Chemistry, Material-knowledge, Mechanics, Machine elements, Electrical engineering and etc. In order to achieve the aim and to solve the laid problems the syllabus envelops three divisions: I. Environmental risk; II. Environmental protection; III. Environmental management.

At the first division - Environmental risk – the main definitions and categories are introduced [3,6]. Based on the terms origin a linguistic-semantic analysis is made. The risk classifications on sources, causes, risk factors emissions and imissions, dispersion medium and other indications are shown. Especial attention is lighted on the methodic for environmental and other type of risk assessment [4,5,6]. Consecutively are examined the different stages – formulation of the environmental problems, risk analyses and assessment. The main information's sources are introduced. The characteristics of danger phenomenons and effects in the environment are analyzed. Constituting the conceptual model of the environmental risk is an important moment. The main requirements and stages are developed. The three stages of the assessment are visualized with examples for environmental risk for air, water, food and other types of pollution. The important position has the part of the methods and risk assessment criteria. The students are introduced with the methods for definition of the probability for danger phenomenons, events and impacts appearance – statistical, experts, imitation design.

At the stage of the environmental management conception, included at this part of the program, an acquaintance with the principles, comprehensions, approaches and their link with the sustainable development program. A parallel with the environmental risk management, which activities could be divided into preventive, correctional – reduction and compensative, is performed. Particular attention is turned to the conflict between economical interests and environmental solutions. The different modern principles and methods for solution taking are introduced.

The second syllabus partition is concerned to the environmental protection [1,2,3,4,5,6]. Consequently are introduced the environmental legislations and standards, air protection, water protection, wastes pollution protection.

The accent in environmental legislations and standards impacts the Environmental Protection Act. That's why it is represented in details. The main arrangements at the Act are revealed. The main principles in

environmental protection, sustainable development, human health risk reduction-advantages and disadvantages, society participation and transparency in solutions taking in the sphere of environmental protection, citizens notifications for the state of environment and etc. It is important to know the direction of the state politics and management in environmental protection. In that relation the rights and obligations of the main institution - Ministry of Environment and Waters, respectively its minister. In addition the rights and the obligations of the other ministries and municipalities. Protection and utilization of the environment's components, including waste management, are undivided part the strategic management. Because of that it is appropriate to give knowledge to the students for the protection and usage rules of the water and water objects, soil, bowels of the earth, biodiversity and air. The three components are included: a) prevention or reducing waste generation and the extent of their danger; b) recycling the wastes, second usage and regeneration or other type of process with extraction of energy or by-products; c) safety storage of the wastes, unusable on this stage of development. The strategies and programs for the environment, as well as the assessment and impact upon environmental are introduced. Industrial pollution as an anthropogenic origin substances directly or indirectly entering to the air, water or the soils, generation of vibrations, radiation and noise concerns the main professional direction of the students. It has harmful impact and damages the material values, limits or reduce the possibilities for useful environmental parameters consumption and all of it legal utilization. So, it is necessary to introduce in details, to analyze and to develop technical and management environmental solutions on their base. In parallel with the pollution it is provided to get the students acquainted with the national monitoring system and their subdivisions. I. National air monitoring net, precipitation, surface, underground and sea waters, the land and soil, noise pollution, non ionize radiation, warehouses and old pollutions with wastes, biological and radiological monitoring; II. Control and information system of the air emissions and wastewater status; III. Exploitation, communication and information provision and laboratory net service.

We consider it is necessary the students to be acquainted with the purposes of the national environmental monitoring system, especially monitoring taking of the national nets for environment components condition, data processing, analyses, visualization and data storage from the net or personal monitoring, information supporting for operation control, state prediction, environmental risk assessment and development of the strategies for environment components improvement and etc.

The education methods and resources for environmental

protection are developed on a specific range of pollutants, standardization and pollution protection. It is introduced particular pollutants investigation, lighting upon specific types of categories, depending on the student's specialty.

Analyzing ambient air pollution we find it is appropriate to consider suspended particles, carbon monoxides, dioxides and trioxides of the sulphur and nitrogen, chlorine, hydrogen fluoride, chlorine fluoride and hydrochloric acid, nitric acid, sulphuric acid and etc [3,4].

The methods for ambient air cleaning are introduced in two directions – dust cleaning and dust – steam and vapor pollutants cleaning. This knowledge should be limited to the principle of action and determination of the effectiveness of the ambient air protection. Water pollution is explained as a process of entering into water bodies of pollutants, microorganisms or heat. Detailed analyzes the main source of pollution, anthropogenic activity, particularly manufacturing and mainly industrial activities. The main pollutants in wastewater to be presented to students may be: a) dissolved organic matter; b) suspended agents; c) mineral oils; e) inorganic salts; f) acids and bases; g) toxicological agents; h) heat water; i) coloring agents; j) bacteriological agents; k) radiactivity agents; l) blowing agents

Considering them the limits on pollution in the five groups of indicators are determined-common physicals and inorganic chemical parameters, common indicators of organic pollutants, indicators of inorganic substances with industrial origin, indicators of organic compounds with industrial origin, biological indicators. In the protection of waters against pollution starting with sanitary protection zones for drinking water. The focus then is turned on four main methods, namely: mechanical, physicochemical, chemical, biochemical. From mechanical to be studied percolation, and filtering, and physic - chemical, flotation, adsorption treatment, ion exchange purification, extraction, reverse osmosis, ultra filtration and hypotheses. In class, based on the need for specific knowledge, it is appropriate to tackle some chemical methods such as neutralization, softening, desalination, etc. Similarly, students' attention can be emphasized on the aerobic and anaerobic treatment, and decontamination as the main methods for biological treatment of wastewater. Complex for the training appears the problem of soil contamination. The process of contamination is difficult to explain because it is necessary to know the basic phenomena, indicators and effects of soil. Based on this data to examine characteristics of degraded, contaminated or degraded soils. It is appropriate to contact the factors that lowering the soil fertility, desertification, acidification and dehumanization. It is separately studied the soil pollution. It is seen as a process of entering the soil from anthropogenic activity of substances and organisms adversely affecting

fertility, productivity and self-purification of soil, lowering technological, food hygiene and health value of cultivation and quality of other natural objects. It considers to a variety of sources, wastewater, fumes and aerosols (direct and via precipitation) wastes. Soil is exposed as a system of actions aimed on preventing the reduction of fertility, pollution and irrational use. Make a classification of protective actions. Preventive and corrective measures associated with the protection of air and water because they are among determining contaminant migration. Compensating actions are divided into ameliorative and cultivation. Since irrigation is focused on the mechanical (excavation of the contaminated layer, transport and burial in landfills, and deep tillage), chemical (dilution of pollutants and location of pollutants in the soil) and irrigation methods (sprinkler irrigation and soil).

The nature, classification and properties are the basic topic for waste conservation. The definitions and classifications are considered under the acts on waste management. The properties are presented in details as they are significant part the methods of treatment. Deals with the physical (dimensional weight, morphological composition, fractional composition, humidity), chemical (content of organic and mineral substances, total ammonia and nitrate nitrogen, phosphorus, calcium, carbon, sulfates, chlorides, pH, and many others), thermo (calorific , ash, nitrogen, sulfur, carbon, oxygen, moisture, volatile matter, volume weight), biological, microbiological (total macrobiotic, total microbes) and hygiene (bacteriological, entomological and helminthological). An important classification to be emphasized is the level of danger, explosive, oxidizing, and high flammability, flammable, irritant, harmful, toxic, etc. [3,4].

We consider it is necessary to study the most important methods for protection against pollutions caused by waste, non-waste technologies and industries, landfills, composting, recycling, incineration and pyrolysis. With the methods of protection from pollution of air, water and soil, there must be a comparative analysis to identify the advantages and disadvantages of different methods for recording the properties of the waste.

Waste management is taught law related to waste [7]. Presented as a set of rights, responsibilities, decisions, actions and activities. Connect with the generation and waste treatment, based on the information and forms of control. Management should be seen as system activities aimed to prevent, reduce or limit the harmful impacts of waste on human health and the environment. Obligations of persons treating wastes and waste holders are distinguished and their duties are defined. It is envisaged that discussion and exposure to students of administrative arrangements for treatment and transportation of waste, information on the activities of waste management programs of waste and control.

The third section of the curriculum is called "Environmental Management System" It is studied on a corporate level [3,4,5]. For full utilization of the students are introduced with the theoretical foundations of management. Starting with the market economy transition to the new models. A comparison between different models of market economy based on ownership structure, size and degree of government regulation and the degree of commercialization. The new dynamics of economic growth through the release of old structures and ways of thinking is introduced. A detailed review of common methods and techniques of management is made. Firstly it is presented the methods for forecasting, extrapolation methods, comparative method, the expertise, methods of modeling. Techniques of management decisions are paying particular attention to the selection list of Alex Osborne [4,5].

The next stage is to introduce students with the cycle management, functions and structure. The management process is treated as a set of discrete time cycles that are characterized by repetitive patterns. It is explained as a kind of continuous and deliberate intervention in the development of processes and phenomena, so that changes can be in the interest of the subject of government to implement its previously settled goals. Management process in nature is analyzed as a temporary border controls. He explains the form of relatively distinct time period which includes a specific order of procedures with a stability and repeatability, without denying the past. Students are introduced to the classification of the stages in the management according to R. Akoff, including a decision, implementation, evaluation and recommendation for amendment. The examples for management cycles of alternatives associated with the development of an object are presented. The phases of management - leadership, planning, organization, control, regulation are discussing. Each phase is realized through the implementation of numerous management functions. Each function consists of management activities Each activity is treated as a system of tasks and each task achieved through the implementation of the operations which are building blocks of the management system. The types of governance structures are introduced. Attention is drawn to the impact of human factors in management. Considering the economic aspects of the environment later in the curriculum is on investment management - nature and scope of capital investments, the conceptual apparatus and the types of investments, sources of funds for capital investments.

Environmental management at corporate level is a major part in this section. The nature, aims and objectives of management are associated with the life cycle of production. Thus it is highlighted the position and the role of the environment in all phases of this cycle. The requirements and criteria

are formulated to be met by projects in environmental management - environmental performance, fuel economy, maintenance of the affected groups, using innovative technologies, the possibility of transfer, the possibility of realization, handling and assessment; safety. In the teaching process further it is examined environmental policy as an instrument by which to declare the principles, objectives and intentions of the company in connection with environmental protection. Environmental policy is the basis for implementing and improving the management system. It is built on the goals and objectives of the company. The policy must be explicit to be understood by internal and external stakeholders to be reviewed and revised periodically to reflect changing requirements and performance.

The system for environmental management is a part of the system of corporate governance. The structure, the planning, responsibilities, practices, procedures, processes and resources for the formation of corporate environmental safety are introduced. The system presents environmental risks and opportunities for their management. Students are introduced to the five-stage system policy, planning, implementation and operation, checking and corrective action, management review. Separately each of the stages is considered. An important point is the audit which must be paid as a substantial part of the topic. Consequently are presented its phases-introduction, preparation, conduct, report and record the audit. Set out the rights and obligations of the lead auditor and members of the audit team.

Environmental indicators are seen as indicators that provide useful and timely information about the company's environmental activities, and actions by which to influence it. Given are specific examples of indicators. The options for implementation are specified.

Another important point in examining the management system is to assess the effectiveness of environmental activities. Clarifying the use of indicators in operational, managerial and organizational field. Examples are given of different aspects of environmental action on it and the consequences for society. Eco-balances are presented as recorded information about the various raw materials, energy production and waste companies use and maintain for a period of time. This practice is taught in the form of a report on physical inputs, outputs and functional reserves of the company. The basic categories of ecological balance are presented. Connections of the balance of production processes with the company as a whole are made. The life cycle assessment, including systematization of the effects of production on the environment throughout its life cycle is the next important point on this topic. The aim is to identify and to quantify the environmental aspects of production. This is achieved based on a principle "from the cradle to the

grave" meaning envelope from the extraction of raw materials to disposal of production due to depletion of its consumer qualities. Identify the specific properties of these products that are most important for the environment. After assessing the lifecycle, manufacturers can focus their attention on those aspects that must be reduced and minimized. There are many reasons, and hence the purpose of assessing the life cycle can be divided into three areas: financial benefits, design, and marketing. The life cycle is directly related to the other instruments of environmental protection. The compilation of life cycle assessment is presented in three steps: defining the purpose and scope of the assessment, inventory, evaluation of data from the inventory. Range of the estimated life cycle dependents on the analysis determined primarily by the purposes, the available financial, human, technical, technological and other resources, the scope of the significant environmental impacts, accessibility and volume of required data. Inventory is the next stage. At this stage the students explaining how to collect data on the operation and damage to the environment that occur at different phases of the life cycle. Evaluation of the data inventory is the third last stage of life cycle assessment. The information collected should be grouped according to the type, nature and extent of action on the environment. Evaluation of the data inventory is the third last stage of life cycle assessment that is appropriate for students to know. The information collected should be grouped according to the type, nature and extent of the impact on the environment. The report on the Environment is a kind of message information from the company for its activities in the environment. At first glance, a report is simple and routine work. Actually this is not true, as the report on the environment has a number of specific features that should be considered. Moreover, these requirements are included in the recommendations of the European Environment Agency. Therefore, students are acquainted with the detailed methodology for developing the report. Attention is drawn to define the goals to be placed with its development and promotion. Clarifies that these objectives are the basis for further work. Then it is introduced the manner to define the content of the report, taking into account the essential problems of the environment and the additional requirements of the audience for which it was intended. Same time are to include guidelines for identifying the information needed for the report. There are also a statement of the form, graphic illustrations, the structure and content of the report. Students are acquired with the appropriate skills to apply knowledge learned from lectures. Our experience shows that many suitable form are practical exercises. For technical specialty it is very suitable taking part into experimental exercises. They examine the extent of pollution in modeling systems or the effectiveness of various methods and devices for purification of waste gases

and water. Creating diverse conditions and pollution. Thus the learning process can become research. May be included exercises to evaluate the usefulness of certain management decisions, such as analysis of the effectiveness of capital investments for construction of wastewater treatment facilities. Lectures are illustrated with videos, multimedia presentations, transparencies, reflecting a variety of devices for environment - primarily corporate presentations. Assessment is carried out on two tests for which they are given advance compendium of questions from lectures and exercises. It is adopted a system for objective assessment of knowledge, which is based on collecting points. For the presented approach application there are issued appropriate textbooks for classes. The concept for students training in technical education on the problems of environmental management is built on experience and in accordance with modern aspects and achievements. It is applied and its effectiveness is proven. It is repeatedly improved. There are three basic directions, which are included in the contents - environmental risk, environmental protection and environmental management. The horarium is small but sufficient for courses expanding. the knowledge of future engineers

The exercises are practical, consistent with solving the problems inherent in everyday business practice. Some of them are held in establishments with typical situations of potential or apparent environmental contamination. Thus, learning is associated with the conditions and the business goals.

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