

## SWOT ANALYSIS REGARDING ENVIRONMENTAL EDUCATION IN ENGINEERING FIELD OF “PETRU MAIOR” UNIVERSITY OF TÎRGU-MUREȘ

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**ABSTRACT:** *The legal basis of EU environmental policy is established by Articles 174 to 176 of the EC Treaty<sup>1</sup>, plus articles 6 and 95. Article 174 sets out the objectives of environmental policy and has the purpose to ensure a high level of environmental protection taking into account the diversity of situations in different regions of the European Union. In Romania, Environmental Law<sup>2</sup> proposes a series of objectives which can be achieved only through the formation of well-trained professional specialists who can carry out its requirements. We considered it useful to conduct a SWOT analysis regarding technical environmental education performed at “Petru Maior” University of Tîrgu-Mureș for training specialists with relevant expertise and able to implement legal requirements concerning environmental policies.*

**KEYWORDS:** *SWOT Analysis, Environmental Engineering, Education*

**JEL CLASSIFICATION:** *K 23, K 32*

### 1. INTRODUCTION

“Petru Maior” University of Tîrgu-Mureș, since 2004, has had a specialization entitled “Engineering and Environmental Protection in Industry”. The main objective of this specialization is the formation of highly trained specialists who are able to manage environmental issues arising in any technological process. The training of these specialists is a necessity for the state of the industrial development when the focus is on sustainable development in full harmony with the environment.

### 2. SKILLS AND ABILITIES

All activities carried out under this specialization are centered on training the following skills and capabilities of all students who attend the environmental specialization. The main skills acquired during the four years of study are:

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<sup>1</sup> Maastricht Treaty.

<sup>2</sup> Legea nr. 137/1995, publish in Official Gazette no. 304 from December, 30, 1995.

- *Skills in mechanical technology and chemical technology.*
- *Skills and abilities to adapt technologies to specific environmental requirements, implementation of clean technologies, design strategies and environmental programs.*

Very important for these students are those subjects that introduce the main elements of the mechanical and chemical technology, thus enabling them to know the main factors which can act to implement current technologies in the clean and modern technology. These new technologies consider environmental factors, pollution reduction, and the making of finished products that incorporate green chemistry knowledge, and are environmentally friendly.

Skills for identifying pollution of water, air, soil and remediation methods and technologies. Skills for laboratory determination of pollutants, methods of analysis and pollution prevention. Recovery of waste.

The knowledge acquired allow future specialists to design and implement wastewater treatment plants that are adapted to a number of people or specific pollutants, to design and implement complex installations of air remediation and / or soil pollution and take into account the specific pollutants and amounts. Graduates have skills to perform specific laboratory determinations to identify quality and quantity of various harmful agents in the air, water and soil. Computer skills for technological processes and documents drafting

The large variety of pollutants, the diversity of analysis methods, and the complexity of technological processes involve the use of computer. Acquiring these skills enable the acquisition of results compatible and comparable with those of their colleagues from the European Union.

Expertise in environmental law. Compatibility with EU law, drawing up environmental documentation, environmental assessment, environmental risk assessment, crisis management.

Pollution knows no borders; the main pollutants are not specific only to certain areas. Certainly, the possibility of occurrence and concentration is typical of areas, but without modern methods of restraint they can affect areas far more extensive, even unexpected (e.g. Saharan sand characteristics were found, brought by the wind also in the USA). Therefore knowledge of and compliance with laws, rules and specific prescriptions is of particular importance. Moreover, we have to consider the specific European legislation, the prescriptions and the agreements established by international bodies (Kyoto protocol).

Teamwork skills, interdisciplinary cooperation and management

Students are prepared by management and communication disciplines that they study in order to approach the different styles of leadership, to use communication in promoting the company's objectives, to engage creatively in solving the problems of the company or agency where they work.

3. SWOT ANALYSIS<sup>3</sup>

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>✓ The main resource is the existence of environmental, well equipped laboratories.</li> <li>✓ In recent years we have made major acquisitions such as: UV-VIS spectrophotometers and IR spectrophotometers</li> <li>✓ Automatic equipment to adjust pH and wastewater conductivity, facilities for obtaining de-mineralized water using ion-exchange columns or osmosis reverse;</li> <li>✓ Equipment for the determination of suspended particles in the air, apparatus for determining nitrite ions, nitrate ions, ammonium and phosphates in water, etc..</li> <li>✓ A second important resource is human resource</li> <li>✓ The third important resource is a good cooperation with the Technical University of Cluj-Napoca, the University of Medicine and Pharmacy of Tg. Mures and the Environmental Protection Agency Tg. Mures</li> </ul>	<ul style="list-style-type: none"> <li>✓ Human resource – the shortage of teaching staff with specific skills</li> <li>✓ Increasing the practical activities in preparing students</li> <li>✓ Performing practice in institutions, firms and companies that are specialized in environmental protection</li> <li>✓ A rigorous selection of candidates for the first year of study</li> <li>✓ A better correlation between the disciplines taught</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>✓ Tg. Mures has three high-schools with environmental protection profile. This specialization is also found in other neighboring towns such as Reghin, Târnăveni and Ludus.</li> <li>✓ The existence of specific space and laboratories in the Faculty</li> </ul>	<ul style="list-style-type: none"> <li>✓ Implementation of environmental requirements in companies and even on the country level is performed with great delay and difficulty</li> <li>✓ Too many universities in the country have started to prepare specialists in this field</li> </ul>

<sup>3</sup> Albert S Humphrey SWOT analysis technique; Hill, T. & R. Westbrook (1997). "SWOT Analysis: It's Time for a Product Recall". Long Range Planning 30 (1): 46–52

#### 4. CONCLUSIONS

Considering all the statements above, we think that the existence of an environmental protection specialization within our university is good and necessary.

The formation of well prepared specialists who can take part in changing attitudes towards the environment is useful. These specialists must implement all the environmental legislation; they will focus on sustainable development, on environmental friendly products and on the development of green chemistry.

We consider that it is necessary to move from the phase of discussion and awareness to the phase of the implementation and the compliance of environmental issues.

We consider as well that it is necessary to focus on the development of some industries that encompass advanced technology, less raw materials, less energy and high reliability. The age of consumer society that involves low reliability products and great consumption of raw materials and energy is finished.

