

PROCEEDINGS OF INTERNATIONAL WORKSHOP
EDUCATION AND KNOWLEDGE PRESERVATION IN NUCLEAR SCIENCES
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**STATUS, PROBLEMS AND PERSPECTIVES OF THE EDUCATION
ON NUCLEAR ENERGETICS AND NUCLEAR SAFETY WITHIN
THE TECHNICAL UNIVERSITY OF SOFIA**

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Characteristics of the education on specialties related to nuclear energetics and nuclear safety within faculties of the Technical University of Sofia.

The specialties directly related to nuclear energetics and nuclear safety are defined on the basis of the educational plans and programs upon which the training is conducted.

It is obligatory within the training plans a special attention to be paid on the safety culture.

By the broad in deep analysis it is defined that within the Technical University of Sofia the direct relation to the nuclear energetics and nuclear safety have the following specialties from Energetics and Machinery Faculty (EMF) and United Technical College (UTC):

| <u>Specialty</u> | <u>Professional direction</u> | <u>Training qualification degree</u> | <u>Faculty</u> | <u>Established</u> |
|-----------------------------------|-------------------------------|---|--------------------|--------------------|
| 1. Thermal and Nuclear Energetics | Energetics | Bachelor, Master of science, Doctor | TU - Sofia, EMF | 1968 |
| 2. Thermal and Nuclear Energetics | Energetics | Specialist | TU - Sofia, UTC | 1987 |

The training is extended as follows:

- **For the specialist degree– 3 years (6 semesters)**
- **For the bachelor degree– 4 years (8 semesters)**
- **For the master of science degree– 5,5 years (11 semesters)**
- **For the doctor degree– under individual doctoral programmes.**

The correspondence training for the specialist and bachelor degrees is one semester longer than the regular training.

The form of graduating, following the acting uniform state requirements is:

- **For the specialist degree – State exam**
- **For the bachelor degree – Diploma thesis**
- **For the master of science degree – Diploma thesis**
- **For the doctor degree – Defense of Doctoral thesis**

The student's admission within the recent years is of an order of:

| <u>Specialty</u> | <u>Professional direction</u> | <u>Training qualification degree</u> | <u>Annual admission RT/CT</u> |
|--------------------------------|-------------------------------|---|-------------------------------|
| Thermal and Nuclear Energetics | Energetics | Bachelor, Master of science, Doctor | 85-90 25-30 3/3 |
| Thermal and Nuclear Energetics | Energetics | Specialist | 30/30 |

An analyses of the adaptation of the training documentation to the current European requirements.

Within all the degree of control on the covering of the necessary requirements it is introduced a credit system, related to the requirements of the European system for the credits transfer (ECTS), providing students mobility and acknowledgement of the gained education in the EU countries.

The status of completeness of the accreditation procedure, according to High Education Act is as follows:

| <u>Specialty</u> | <u>Profesional direction</u> | <u>Training qualification degree</u> | Status of the accreditation procedure |
|--------------------------------|------------------------------|--------------------------------------|--|
| Thermal and Nuclear Energetics | Energetics | Bachelor, Master of science, Doctor | NAA Final report preparation Expected rating – High |
| Thermal and Nuclear Energetics | Energetics | Specialist | NAA Final report preparation Expected rating – High |

The specialty selection by the candidate students

There is no clear motivation for selection of these specialties by the candidate students for the regular form of education. For the correspondence form of education the candidate students working within the subject area prefer these specialties. The specialty Thermal and Nuclear Energetics falling within the group of the most preferred between the machinery engineering ones.

The main problems within the education:

- **Non correspondence of the necessary equipment and the information assurance means to the requirements for the high quality of the education;**
- **Decreasing and aging of the lecturer stuff, which leads to lack of the possibilities for maintaining of the high quality of the educational process);**
- **Decreasing of the common secondary level education of the candidate students, due to decreasing of knowledge they got within the middle school.**

The basic reason, beside the standard one “lack of money” is non adequate interest of the related to the nuclear branch institutions and employers on the problems of the training of the necessary stuff.

It is necessary to be noted that the university lecturer is build up for years, and for the university collective is required “criticality” for its reproduction.

Possible corrective actions:

- **Coordination and interconnections of the educational plans, programs, and the subjects of the diploma thesis’s with potential employers of the nuclear specialists;**
- **Normative regulation of the relation between the training qualification degrees and the requirements of the job description within the institutions potential employers of the nuclear specialists.**

Measures for overcoming the problems in training of personnel for nuclear branch:

- **Inclusion of this specialties into the list of the regulated specialties, prepared by the Council of Ministers of the Republic of Bulgaria;**

- To find out an appropriate financial form for supporting of the departments training students within these specialties.

Strategy for training of personnel for nuclear branch:

In accordance with the orders of the Act on the Safe Use of Nuclear Energy (ASUNE) and the Convention on Nuclear Safety (CNS) it is necessary to warrant the educational and qualification level of the specialties within the nuclear branch. For this purposes in a current conditions it is necessary task oriented financial support of the university education in the following directions:

- Investment within the necessary equipment. It is suggestible to be erected inter universities laboratory complexes;
- To be ensured task oriented stipends for the students;
- To be ensured possibilities for upgrading of the qualification and additional financial stimulation of the lecturer staff;

- To be organized a system for post graduate qualification within the university for the graduated other specialties students.

Possible forms of financing:

- Organization of the specialized “fund” or “association” or other form of cooperation of the employers;
- Partnership of lecturers in international and national research projects connected to development of specific scientific and applicable problems of the NPP operation.

Participation of the university in the personnel training for the nuclear branch:

- Organization of specialized training for NPP operational personnel in accordance with requirements of ASUNE.
- Development of educational documentation for the necessity of specialized training for NPP operational personnel and ensuring of the necessary habilitated lecturers.

- **Research on problems, originated from NPP operation.**
- **Development of legal framework on specialized training of the NPP personnel in accordance with requirements of ASUNE.**
- **Support of employers during personnel selection.**