

# Professional and Public Accreditation as an Integral Part of Education Quality Improvement

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**The article outlines the experience of being an expert in professional and public accreditation. Basic elements of accreditation, which attempt to improve engineering training quality in contemporary world, are explained.**



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Training of highly-qualified and dedicated engineering staff to meet engineering industry requirements is currently characterized by a number of peculiarities. This is explained by rapidly changing world of manufacturing and rising costs for design, production and maintenance.

Professional and public accreditation of educational programs is designed to ascertain that specialist's, bachelor's and master's programs provide qualitative training of engineers who are capable of adapting to professional work practice, working in a multidisciplinary teams and generating non-standard solutions to fulfill the task. As a rule, faculty members and students of the university seeking accreditation are open to cooperation with AEER representatives even during consultative visit when "bottlenecks" of the program are detected and possible non-standard solutions are proposed.

The cooperation with potential employers and study of relevant industrial enterprises can help to bring students and their instructors together. In this very moment the feedback becomes so obvious that it eliminates such natural question as "What does professional accreditation give? That is just the way

educational programs provided by Kazakh National Technical University after K.I. Satpaev (050713 "Transport, Transport Equipment and Engineering", 050716 "Instrument Engineering", 050719 "Radioengineering, Electronics and Telecommunications"), and Togliatti State University (140211.65 "Electrical Power Supply", 150202.65 "Welding Equipment", 151001.65 "Mechanical Engineering Technology") were accredited.

In this respect, a consultative visit of professional and public accreditation experts to Siberian Federal University seeking accreditation for such programs as 210300.68.04 "Microwave Engineering and Antennas", 230100.68.02 "High Performance Computin" is a vivid example of such feedback which has revealed that strategic partners are really involved in curriculum revision and modernization while professional component defined by university is in compliance with local industry and business needs [1].

The presence of lab guidelines and practice class plans provide significant contribution to understanding of curriculum scope and sequence, as well as contemporary engineering trends and innovations [2].

Different information technologies are also of great importance in engineering training. Let us consider the example of Bachelor's and Master's programs offered by Faculty of Power Energy, Nanotechnology and Radioelectronics of Penza State University. The faculty offers the following degree programs: 210100.62 (68) «Electronics and Nanoelectronics», 210601.65 «Radioelectronic Systems and Complexes», 211000.62 (68) «Electronic Equipment Design and Manufacturing», as well as 280700.62 «Technosphere Safety» and Bachelor's program 140400.62 «Power and Electrical Engineering» (since January 1, 2013).

The curricula of the above-mentioned programs include courses in Materials Science and Technology. In the context of scientific school «Microelectronic and Information Technologies in Materials Science and Functional Electronics» (supervised by Doctor of Science, Professor R.M. Pecherskaya), automated complexes for lab classes in «Electronic Equipment Materials», course paper and final project fulfillment have been developed. These automated complexes allow students to examine electro-physical parameters

of the materials for nanoelectronics and microelectronics which have evolved through 8 generations since 1992 (Fig.1-4).

Training and research complexes designated to provide temperature, field and frequency measurements consist of hardware and software [3].

Such kind of inventions is widely applied in more than 130 universities, including National Research Universities, in Russia and its neighboring countries.

The complexes were developed based on the analysis of program curriculum and in compliance with the existing Federal Education Standards.

The quality of engineering training is improved due to the following reasons: remote education access; flexibility in curriculum content, study mode and program length; fundamental learning process and development.

While doing research or qualification project, a student has a possibility to acquire various data, i.e. reference or legal materials.

The investigation of dynamic processes accompanied with multi-channel measurements, storing and further mathematical processing of parameters to regulate production mode is provided during the experiment.

**Fig. 1. Automated Complex Layout (1992 – 1998)**



**Fig. 2. Automated Complex Layout (1999 – 2002)**

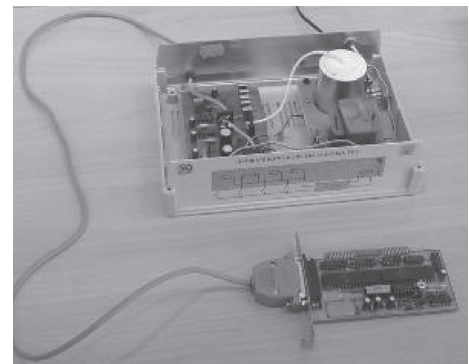
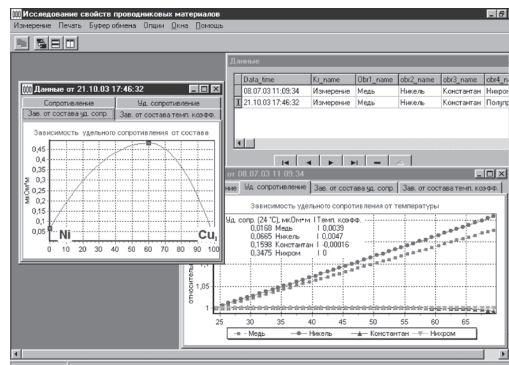


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**Fig. 3. Automated Complexes for Measuring Volt-Ampere (a) and Voltage-Capacitance Characteristics (б) of Microsystems**



**Fig. 4. Automated Complex for Single-Component and Multi-Component Conductor Material Study**



Professional and public accreditation is an effective management tool which allows university authorities to enhance education technologies and learning strategies applied in various curriculum subject areas; reveal new approaches to educational program implementation including student and faculty mobility.

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