

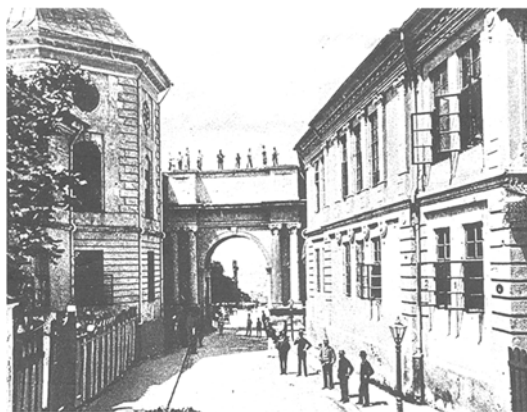
## A BRIEF HISTORY OF THE ELECTRICAL AND POWER ENGINEERING EDUCATION AT THE „GH. ASACHI” TECHNICAL UNIVERSITY OF IAȘI, ROMÂNIA

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**REZUMAT.** Lucrarea prezintă câteva momente esențiale care au marcat evoluția educației în domeniul electrotehnic și energetic din România la Universitatea Tehnică "Gh. Asachi ", din Iași, România.

### 1. Introduction. Mile stones

Text 1835 The „*Academia Mihăileană*” s founder is the great scholar Gheorghe Asachi, who obtained in this endeavour the permission and support of the ruling Prince Mihail Sturdza. The name of this academy was derived from the first name of the prince. Sturdza issued the official decision which authorized the founding of the Academy in 1834. As the institution was not assigned a building of its own, courses began at the Vasilian Gymnasium, a school founded by the same Asachi in 1828 (and named after the first name of another prince, Vasile Lupu, who had established an academy with its library in the early 17th century).



**Fig. 1.** 1835 The „*Academia Mihăileană*”.

On June 6, 1835 the Academy had its official inauguration on separate premises, with the participation of Prince Sturdza.

Although Academia Mihăileană no longer provided faculty courses after 1847, it was not legally declared closed, but just temporarily suspended its activity (during a time of a troubled political context caused by the frequent Ottoman-Russian clashes on Moldavia's soil, and the periods of the Russian occupation).

In 1860 Prince Alexandru Ioan Cuza decided to disestablish the institution and split its patrimony. Its faculties were set up as a nucleus for the newly established

University of Iași, while the inferior courses were re-created as the National High-School Iași (where studies lasted for 7 years). Many of the academy's professors continued their activity within the University.

After the Unification of the Romanian Principalities of Moldavia and Wallachia by the Prince Alexandru Ioan Cuza, the inauguration, on October 26, 1860, of the University of Iași, the first Romanian modern university, was to be a stepping stone towards the modern higher education in Romania.

There were, at first, only three faculties in the University: Philosophy, Law and Theology. Following the Education Act from 1864, the University was reorganized into four faculties: the Faculty of Letters and Philosophy, the Faculty of Physical, Mathematical and Natural Sciences, the Faculty of Law, and the Faculty of Medicine (this last one inaugurated only in 1879).

Stimulated by a new law in 1898, the University of Iași has managed to diversify its profile, to increase the number of departments, subjects taught and scientific activities.

At that time a spectacular development of the Faculty of Sciences took place: in 1892 were founded the Departments of Organic Chemistry and of Inorganic Chemistry which merged in 1906 to form the Agricultural Chemistry. Within the same Faculty, the creation of the Electrical School in 1910 was considered to be a great success, at the 60th anniversary of the Iași University (Fig. 2).

## **2. The Polytechnic Institute „Gheorghe Asachi”**

The Education Acts from 1932, 1937 and 1938 favored the evolution of both science departments and development of the University, which grew to include: Medicine and Pharmacy, Sciences, Law, Philosophy and Letters, and Agriculture.

In 1933, the agricultural education, included in the Applied Science Department, was the founding point for the Faculty of Agricultural Sciences.

The other two branches of the same Department (the School of Electrical Engineering and the Department of Chemical Technology) were reorganized in 1937, resulting in the Polytechnic Institute „Gheorghe Asachi”, who joined the Faculty of Agricultural Sciences a year later.

The Industrial Electricity School (November 1910), which later became the Electrotechnical Institute, was, in 1938, one of the two founding colleges of the Polytechnic Institute „Gheorghe Asachi” of Iași.

Because of the events during the Second World War, the Institute moved to Cernăuți, then returned to Iași, via Turnu Severin. The socialist industrialization, the post-December 1989 atomization of the higher polytechnic education, made that the modern Technical

University be connected to European standards, with flexible curricula related to requests from the real economy.

In March 1937, the Education Law voted by the Parliament at that time established that technical higher education would be taken under the aegis of the Polytechnic School of the University, creating just one higher education institution empowered to award the title of engineer at that time. As a natural consequence of the development of the engineering school from Iași, the first newly created institution under the name of Gheorghe Asachi, was founded and its first rector was elected Professor Cristea Niculescu-Otin.

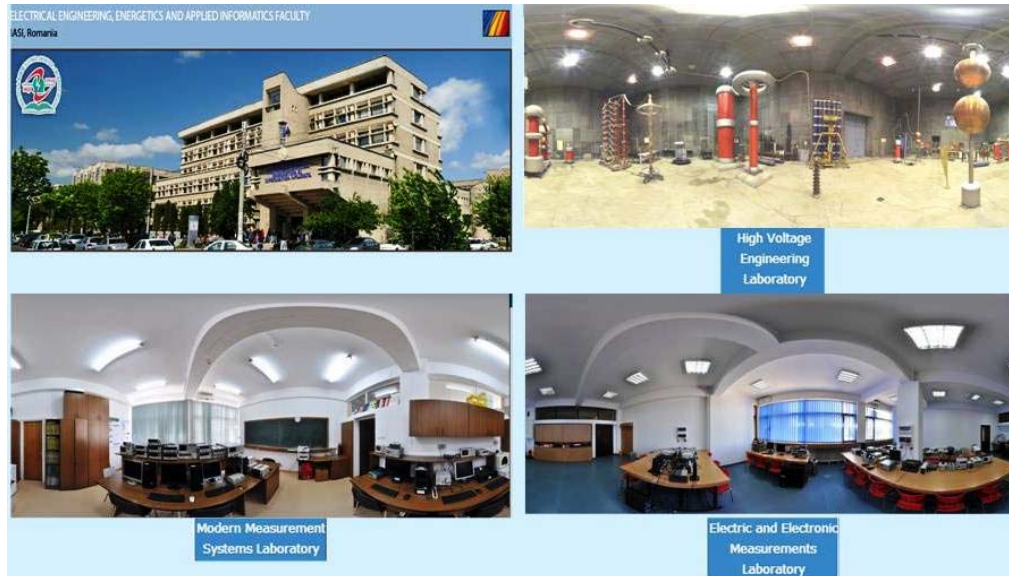
The 1948 reform in education recognized the Polytechnic Institute „Gh. Asachi”, which operated until 1993 when, a new reform transformed, on May 17, 1993 the Polytechnic Institute „Gh. Asachi” Iași in the Technical University „Gh. Asachi”. Currently, the Technical University „Gh. Asachi” Iași is organized in eleven faculties: the Faculty of Computer Engineering and Automatic Control, the Faculty of Civil Engineering and Building Services, the Faculty of Architecture „G.M. Cantacuzino”, the Faculty of Chemical Engineering and Environmental Protection, the Faculty of Machine Manufacturing and Industrial Management, the Faculty of Electronics, Telecommunications and Information Technology, the Faculty of Electrical Engineering, the Faculty of Hydromechanics, Geodesy and Environmental Engineering, the Faculty of Mechanical Engineering, the Faculty of Materials Science and Engineering, and the Faculty of Textile, Leather and Industrial Management.



**Fig. 2.** Within the Faculty of Sciences, the Electrical School in 1910 was created.

### 3. The Faculty of Electrical Engineering

The Faculty evolution was marked by the foundation in 1960 of the Power Energy specialization. Since 1995, the economic engineering (engineering and management) specialization was founded and, from 2003, IT applied in electrical engineering started as well.



**Fig. 3.** Modern Laboratories inside the Faculty of Electrical Engineering, Technical University Gh. Asachi România.

Since 2008, the Faculty of Electrical Engineering, by Government decision, becomes the Faculty of Electrical Engineering, Power Systems, and Informatics Applied in Electrical Engineering (acronym IEEIA), in recognition of its contributions to satisfying the needs of the real economic development in the third millennium, as well as to the development of technologies.

### 4. The Polytechnic Institute of București

On October 1st, 1864, Prince Alexandru Ioan Cuza signed a decree establishing the „*School of Bridges and Roads, Mines and Architecture*” in Bucharest.

The activity of this „*School of Bridges and Roads, Mines and Architecture*” was interrupted by the Prince Alexandru Ioan Cuza's abdication in February 1866.

On October 30, 1867, Prince Charles established the „*School of Bridges, Roads and Mines*” with a duration of 5 years, including a preparatory year, three



**Fig. 3.** October 1st, 1864, Prince Alexandru Ioan Cuza signed a decree establishing the "School of Bridges and Roads, Mines and Architecture" in Bucharest.

years of joint courses and a final year of training (specialization with two sections: Civil Engineering and Mining Engineering).

In 1913, with the intention to meet the needs of Romania's economic pre-war evolution the development of higher education was followed by applications and a first start was made by setting up a „*School of Electricians*”, later transformed in „*the Electrical Institute*” like the corresponding Institute from the University of Iași, created within the University of Bucharest. The initiative belonged to Prof. Dr. D. Hurmuzescu.

On September 1st 1920, Professor Nicolae Vasilescu-Karpen was appointed director, which elaborated the draft of a law aiming to transform the National School of Bridges and Roads in „*The Polytechnic School of Bucharest*”. The royal decree is signed by King Ferdinand in June 10, 1921.

At its beginning, the Polytechnic School of Bucharest is organized into the following four sections: Constructions, Electromechanical Engineering, Mines and Industrial Engineering.

By the law of 1938, the Polytechnic School from Bucharest turns into Politehnica of Bucharest „*Carol II*”.

The Faculty of Electromechanics was functioning with the following groups: Mechanics, Aviation, Weapons, Naval Technology, Electrical Engineering, and Electrical Communications. This situation lasted for ten years.



The Second World War disrupted the normal development of the education process, but it was not totally interrupted. At the end of the war, Politehnica of Bucharest, counted seven faculties: Constructions, Electromechanical Engineering, Mining and Metallurgy, Forestry, Industrial Chemistry, Agronomy, Architecture.

The education reform accomplished by the Law of August 3, 1948, transformed the Bucharest Polytechnic into "the Polytechnic Institute of Bucharest" with four faculties: Chemical engineering, Electrical Engineering, Mechanical Engineering, Textiles. For the first time, the electrical branch, which became one of the branches defining the technical progress, has a freestanding faculty and its groups of specialists are three in number: Machinery and Electrical Applications, Production and Distribution of Electricity, Electronics and Telecommunications.



a.



b.

**Fig. 4.** The Faculty of Electrical Engineering and Energy from Iași (a) and Bucharest (b).

In 1951, the Faculty of Electrical Power Engineering breaks into three separate sections: Thermo-Energetics, Hydropower, Electrical Energy. In the Faculty of Electrical Engineering, two specializations are kept: Machinery and Electrical Applications, Electronics. In 1953 specialized electronics breaks away too from the Faculty of Electrical Engineering, becoming an independent faculty.

In 1957 the Faculties of Electrical Power Engineering merged into one under the name of „*The Faculty of Electrical Engineering and Energy*” (Fig.4). These faculties will break away three years later, to reunite again in 1986, and then to separate once more four years later.

## 5. Personalities of the electrical and power engineering departments from Iași

Among prominent professors, true giants on whose shoulders grew the electrical and power engineering in Iași, we should mention the following few:



**Professor Dragomir Hurmuzescu**, born in Bucharest, March 13, 1865. After graduation in 1884, he becomes a member of the Natural Sciences Department of the University of Bucharest and also of the Physical and Chemical Department. After graduation of Sciences, he obtained in 1889 a scholarship to study physics in Paris, and in 1890 becomes graduated in physics at the Sorbonne. Hurmuzescu obtained the title of Doctor of Science on April 28, 1896 with the thesis „*A new determination of the ratio between the electrostatic and electromagnetic units*”.

It is the same year he was appointed professor of mathematical physics at the University of Iași, then professor of „*Gravity, Heat and Electricity*”. Having a clear vision of the future of science and higher technical education which had to prepare engineers, he coordinates the implementation of an „*Industrial Electricity School*” at the University of Iași, on November 1st 1910. This embryo developed in stages leading to the establishment of the Polytechnic School „*Gh. Asachi*” in 1937, with an Electrical Engineering Faculty. From that moment, the Faculty of Electrical Engineering has constantly evolved both in education and scientific performance.

Professor Dragomir Hurmuzescu’s activity in Iași ends in 1913, when he moved to the University of Bucharest, where he did the same thing as in Iași: he founded the Electrotechnic Institute. He was elected as a corresponding member of the Romanian Academy in 1915.



For the Romanian science, D. Hurmuzescu is remarkable not only as a great scientist, but also because he created a school in physics at the University of Iași, as well as laboratories and the scientific journal „*Scientific Annals of the University of Iași*”. Future physicists were trained in the sense of using rigorous experimental methods in their work, in order to achieve good results.

**Professor Ștefan Procopiu**, born on January 19, 1890 in Bârlad. He became head of the physics and chemistry department of the Faculty of Sciences of Iași in

1912. The same year, he occupies an assistant position at the University of Iași, at the Department of „*Applications of Electricity*” and in 1919 he is appointed professor. Follows a period of study in Paris at the Physics Research Laboratory having as teachers Gabriel Lippmann, Marie Curie, Paul Langevin, Aimé Cotton, Charles Fabry. With the thesis entitled „*On electric birefringence of suspensions*”, Procopiu became a doctor in physics at the Sorbonne, on March 5, 1924.

On January 15, 1925, he is appointed professor at the Department of Gravity, Heat and Electricity at the University of Iași. Procopiu contributed to the creation in 1923 of the Faculty of Science of the University of Iași, and to the creation in 1937 of the Iași Polytechnic „*Gh. Asachi*”, as Dean of the Faculty of Electrical Engineering (until 1 February 1941, when he was appointed Dean of the Faculty of Science of the University of Iași).



**Professor Cezar Parteni-Antoni**, born in Iași, in a family of intellectuals, on June 23, 1900. He attended primary and secondary school in Iași. Former student at the Faculty of Science, Department of Electricity, from the University of Iași, he became, in 1922, an electrical engineer. Doctoral studies in France, from 1923 to 1925, at the University of Nancy. With a thesis on „*Theoretical and Experimental Contributions to The Study of the Power Switching of the DC Electric Cars*” he was awarded the title of Doctor of Science in 1925.

Back in Iași in October 1925, Parteni-Antoni was appointed professor at the Faculty of Science, for the discipline „*Electrical Machinery*”. After the establishment in 1937, of the Iași Polytechnic „*Gh. Asachi*”, he became professor of Electrical Machines at the Electrical Engineering Faculty. He wrote a course in 5 volumes of Electrical Machinery, appreciated at the time. He developed an electrical machines laboratory and published numerous scientific papers in Romania and abroad.

From 1944 to 1950 he was the Rector of the Iași Polytechnic transformed into Polytechnic Institute in 1948. He ran as a Rector this school from Iași, during the difficult years at the end and after the Second World War, when, besides the inherent shortcomings due to the war, he had to deal with the destruction of the building which was bombed. Buildings were restored, laboratories were equipped, and social base for students were created. More than that, the Institute recruited new teachers.



On July 7, 1951, Professor Cezar Parteni-Antoni became the director of the Institute of Electrical Machines based in Craiova. In December 1953, he became professor at the Bucharest Polytechnic Institute, Head of Department of Special Electrical and Electromechanical Hard Machines.

In January 1954, he was elected Vice-Rector, and a year later he became Rector of the Bucharest Polytechnic Institute.

Cezar Parteni-Antoni remains one of the most prestigious personalities of the first generations of qualified electrical engineers in Romania.



**Professor Alexandru Poeată** studied at the Faculty of Electromechanics of the Polytechnic of Iași, between 1943 and 1948. After graduation, Alexandru Poeată was appointed assistant to the discipline of Power Engineering in the same college, starting on January 26, 1949. In the academic year 1950 – 1951, he was promoted to lecturer in the discipline of Transport and Distribution of Electricity, in the new Faculty of Electrical Engineering. He taught until 1955. He taught also subjects Rural Electrification, Use of Electric Energy, etc. until 1961. In the academic year 1961-1962, when the Energy Department at the Faculty of Electrical Engineering was established, he teaches and works as head of the Networks and Electrical Systems, until 1968. On June 26, 1968, he was confirmed associate professor. Starting with 1971, he gave courses in Electric Power Transmission and Distribution Systems until his retirement on October 1, 1990.

His research activity was in the domain of theoretical and practical issues of power engineering, such as:

- Optimization of the energy systems and regimes;
- Optimizing the development of transport systems and electricity supply;
- Prediction of burdens in urban and rural networks;
- Development of models for the study of electrical networks.



**Professor Nicolae Gavrilăș** obtained his engineering degree in 1956 with a major in „*Electrification of the industry and agriculture*” at the Faculty of Electrical Engineering, of the Polytechnic Institute of Iași. Between 1960 and 1963, he was a post-graduate student at the Czech Higher Technical School in Prague, where he obtained the title of candidate of

technical sciences, later equated with the scientific title of doctor engineer.

Teaching: starting in 1956 as assistant at the discipline Fundamentals of Electrical Engineering, he became in 1964 teacher of High Voltage Engineering, which he served until 2001. During his entire teaching activity, the Professor has developed the High Voltages Techniques discipline, introduced in 1960 in the curriculum, with the establishment of the Power Engineering specialization.

He was concerned with the production of textbooks (courses and laboratory guides). He had an important contribution in acquiring High Voltage Engineering Laboratory equipment, operational since 1980.



**Professor Gheorghe Savin.** He defended his doctoral thesis entitled „*Method for measuring inductance and capacity for sinusoidal and non-sinusoidal regimes*” in 1961 at the Polytechnic Institute of Iași.

He worked all along his academic career at the Polytechnic Institute of Iași, hired in the fall of 1949, initially in the newly established discipline of Electrical Measurements, then moving, in 1951, to the discipline of Theoretical Fundamentals of Electrical Engineering. For each of these disciplines, he created and developed laboratory experiments for students.

He became professor and doctorate supervisor in 1970. The areas of research he covered were Theoretical Fundamentals of Electrical Engineering, Electrical Measurements, making the study of nonlinear and parametric electrical circuits appreciated nationally, both through numerous publications (more than 60 papers in Romania and abroad) and as thesis advisor.

Among his publications, there is one remarkable monograph "Nonlinear and parametric circuits" (with prof. dr. ing. Hugo Rosman).



**Professor Hugo Rosman,** born on September 12, 1926, in Iași. He attended the Polytechnic School „*Gh. Asachi*” (the Faculty of Electrical Engineering), which he graduated in 1949. He received his PhD in 1968 with the thesis „*Study of the Linear Passive Two-Ports Functioning in Steady State Harmonic Regime*” at the Polytechnic Institute of Iași.

He began his career in the higher education in 1950 at the Polytechnic Institute of Iași, Faculty of Electrical Engineering, teaching the discipline Fundamentals of Electrical Engineering. He was remarked in terms of the quality of teaching: his very special lectures of high scientific content, consistency

and elegance of expression were very much appreciated. He was appointed Professor in 1974, then PhD Advisor in 1990.

His research interests were in: nonlinear and parametric circuits, sinusoidal periodic regime resonance, two-ports circuits, powers in linear circuits in steady state, Manley-Rowe relations for the parametric circuits. He published over 160 papers in journals and 3 monographs (7 volumes).

From 1953, he is a member of the editorial board of the Bulletin of the Polytechnic Institute of Iași. His work in this position ensured continuity and kept an outstanding editorial quality of the journal. In 2005, he joined the editorial board of the „*Revue des Sciences Roumaine Techniques*” - série Electrotechnique et Energétique.



**Professor Dumitru Bărbulescu**, born on December 20, 1919 in Iași. He graduated from the Faculty of Electrical Engineering from the Polytechnic Institute of Iași in 1949. Ph.D. degree in electrical engineering, in „*Electrical Measurements*”, was awarded in 1963 with the thesis entitled „*Methods of measurement using semi-compensation principle of the in series and shunt reactances circuits*”, sustained at Polytechnic Institute of Iași. He taught the discipline „*Electrical Measurements*”. He was appointed Professor in 1968, then PhD Advisor in 1969, in the field of Electrical Engineering.

His prodigious teaching activities and scientific research conducted on the electrical measurements lead to the publishing 3 books, courses and laboratory manual, as well as over 90 scientific articles in periodicals in Romania and abroad, as well as 6 patents. He was a member of the editorial board of scientific journals (The Bulletin of the Polytechnic Institute of Iași, The Metrology section).

The managerial qualities of Professor Dumitru Bărbulescu were proven when he acted as Dean (1963-1964) and (1964-1968) of the Faculty of Electrical Engineering, then Head of Department of Electrical Engineering, Machinery and Electronic Measurements (1969-1985).



**Professor Nicolae V. Boțan**, born in Basarabia, in the village Lapușna County Tătărăști, on May 9, 1915. He began his studies at the Faculty of Mathematics at the University of Iași and he becomes graduated in electrical engineering at the Iași Polytechnic „*Gh. Asachi*” in 1939. He defended his doctoral thesis entitled „*Contributions to*

*the Study of the Heating of Electrical Underground Cables*” at the Polytechnic Institute of Iași, in 1949, under the scientific supervision of Dr. Ing. Cesar Parteni-Antoni.

In 1941, he became a teacher at the Polytechnic Institute "Gh. Asachi" of Iași and he moved up to a teaching career as a professor in 1948. He became a doctorate supervisor in 1964 and received the academic title of doctor docent in 1969.

He taught many disciplines, many of which were introduced in programs nationwide. Among other disciplines, he taught the following: Transport and Distribution of Electric Power, High Voltage Engineering, Protective Relays, Electric Machinery, the Use of Electric Power in Agriculture.

In the first period, his scientific activity was focused on the field of Electrical Machines (coordinating partner prof. Antoni Caesar), Wind Energy (with prof. Al. Cișman) and Electrical Networks. Later, his research focused on Electric Motors issues, addressing various aspects such as speed monitoring and control electric drives, stability drives, motors asymmetric use of powers to change speed magnetic amplifiers, application of logical algebra methods to the analysis and synthesis of circuits of electric motors, choosing the optimum transmission ratio, use inertial mass, the sensitivity of energy.

He is author or co-author of nearly 200 papers, treaties, university courses, scientific research contracts. He became the head of the Electric Drive and Automation Department in 1952 and he was active until his retirement in 1980.

## **6. Conclusions and observations**

This paper shows the evolution of electric power engineering education in Iași. This report, in remembrance of the foundation of the Power Engineering Department, presents a short history the electrical and power engineering education at the Technical University „*Gh. Asachi*” from Iași and the current status of electric power engineering in România.

The oldest and the most important field in electrical engineering education in Iași for the last over 110 years now faces challenges in its existence and evolution in the changing era of computer and communication.

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