

45 YEARS OF CHEMICAL ENGINEERING IN THE UNIVERSITY CITY OF CLUJ-NAPOCA 1971-2016 LANDMARKS ON THE ESTABLISHMENT, DEVELOPMENT AND AFFIRMATION OF CHEMICAL ENGINEERING EDUCATION IN THE UNIVERSITARY CITY OF CLUJ-NAPOCA

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²*Quorum pars magna fui*
Vergiliu, Eneida, II, 6

In Cluj, **chemistry engineering** education officially begins in **1971/72** with the **Polytechnic Institute (IPC)** setting up an **Industrial Chemistry faculty** [1] with engineering and sub-engineers, specializing in **Technology of Inorganic Substances (TIS)** and **Technology of Building Materials (TBM)**, forms of higher education with a **chemical engineering** profile, science, discipline and profession with a specific field, and its own and autonomous organization status. [2] Unfortunately only the last proposal [3] (sub-engineers) was approved at the **Faculty of Civil Engineering**, which was a necessary, but insufficient solution for a viable faculty with legal personality, structure and autonomy of organization that had the approval of the Ministry of Forest Economy and Building Materials (**MEFMC**), and not for the first one by the Ministry of Chemical Industry (**MICH**), with the observation: “lack of material basis, specialists and experience” in the field. Considering, however, the intensive priority development of the chemical industry in the Transylvanian area, requiring highly qualified specialists, it was agreed to reopen the proposal for the next five-year period (1976-1980), conditioned in some ways also by the evolution, respectively, the performance of the already approved TBM Section [4]. It was,

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² *Quorum pars magna fui – At which I played a significant role.*

nevertheless, a hope, an encouragement, a motivation to mobilize, at any cost, for success. **The process was completed** in **1977**, however, not in the **Polytechnic**, but in the **University** as a result of the transfer, in **1974**, of the TBM Section from the Faculty of **Civil Engineering** to **Chemistry** in 1974, by **Decree No.147 / 1974** [5], so that the decision came too late and not in favour of the demanded **Industrial Chemistry** faculty [1], which was never established, but merely changed one master for another. [6]

As a consequence, the “**chemical engineering**” phenomenon in Cluj, in the absence of a free and independent structure of organization, **as a faculty**, will continue an atypical course in the shadow of the two higher education institutions, both with too few areas of common interest and concerns in the field.

The solution, perseverance and the implementation of modern technology in the university tradition by the compatibility of the principles of Humboldt's academic education of “pure ideas” [7] with the “applied” ones of the American Taylor's [8], from the technical education, the basic idea which was anticipated in “**The Duty of Our Life**” [9] by the great historian, archaeologist, professor and academician **Vasile Pârvan** (1882-1927), rightly considered “gray eminence”, spiritual mentor, ideologist, architect, architect and strategist of the National University of Upper Dacia [9], which, on the basis of a thorough and rigorous study of the Western European and American universities of the times, made a visionary project of great scope and broad perspective, adapted to the conditions of the recently united Romania (1918), which became a corner stone and Charter of our University. [10]

It is very difficult to encompass in a few words the excitement of four decades and a half of the life of some institutions, without taking account of their specificity, tradition, their historical time and the paradigms of their evolution. That is why, in the analysis of the events, there is no place to tell, except with parsimony, the “epic of chemical engineering” in Cluj, not completely as in the story of Vergiliu of Oneidas, which I chose as a moto. [11]

THE ITINERARY OF THE CHEMICAL ENGINEERING EDUCATION IN CLUJ. LANDMARKS OVER TIME

In the evolution of the chemical engineering education in Cluj-Napoca, several moments, events and important stages were distinguished, marking its course and development. These are related to the administrative affiliation to the **Polytechnic Institute** of Cluj-Napoca (1971-1974) and the **Babeş-Bolyai University** (1974/75), respectively.

I. The first stage (1971-1974) belongs to the Polytechnic Institute

1971 The beginning of chemical engineering at the Polytechnic Institute of Cluj-Napoca.

The Polytechnic of Cluj represents for the chemical engineering education of the Cluj-Napoca University Center the chance to exist and the first steps in its development. [3]

1971 Establishment of the TBM Section, a chemical engineering course (day course) at the Department of Civil and Industrial Buildings of the Faculty of Civil Engineering (initiator: assistant professor Liviu Literat).

1971-1974 The organization and development of the TBM Section and of the chemical engineering education in the Politehnica of Cluj takes place.

1974 The transfer of the TBM Section to the Faculty of Chemistry in the Babeş-Bolyai University under Decree 147/1974 on the Restructuring of Higher Education [5].

II. The second stage (from 1974 - present) continues in the Babeş-Bolyai University, where several periods of administrative and organizational evolution are distinguished:

1974 By transferring the TBM Section to *the Faculty of Chemistry*, the University diversifies and extends its scope also for technical-engineering higher education (in chemistry).

II. a. 1974-1977 TBM Section at the Faculty of Chemistry. (Dean, Prof. Dr. Liviu Oniciu, Deputy Prof. Dr. Ionel Haiduc). The TBM Section is assigned to the *Department of Organic Chemistry and Technology* of the Faculty of Chemistry and managed (according to the transfer document) in teaching, instructional and administrative terms, jointly by the University (UBB) and the Polytechnic Institute (IPC) [6].

II. b. 1977 The Faculty of Chemical Technology (1977-1990) was founded with the same name, status and competencies as those in the Polytechnic Institutes (Bucharest, Iasi, Timisoara). The deans of the new faculty were professor Zeno Andrei (1976-1984), professor dr. Liviu Oniciu (1984-1988) and Prof. Dr. Ionel Haiduc (1988-1990).

1977 To the head of the *Department of Organic Chemistry and Technology* (DOCT) is appointed Prof. Dr. Eng. Liviu Literat (Rector's Decision No. 485/17 January 1977 and the Ministry of Education, No. 24513/6 January 1977). From his position, he acts for the **establishment of the Organic Substances Technology (TSO)** specialization section, engineers, and activates until 1985 (two legislatures) in the organization, development, material and documentary endowment, attracting and employing engineering staff, subordinate and faculty departments.

1977 Establishment of the **Organic Substances Technology (TSO)** and **Inorganic Substances Technology (TSA)** specialization sections, engineers, day courses, the last one requested initially (1971) in the Polytechnics [4].

1985 There is an administrative restructuring of the faculty under which the Departments of Organic Chemistry and Technology (**COT**) and Chemistry-Physics (**CF**) are united under the leadership of Prof. Dr. Emil Chifu (1985-1990) under the name of the Department of Physical Chemistry, Organics and Technology (CFOT) and the Inorganic and Analytical Chemistry under the leadership of Prof. Gh. Marcu.

II. c. 1990 **The Faculty of Chemistry and Industrial Chemistry** (1990-1992) was established as a result of the reorganization of chemistry and chemical engineering education from the former Faculty of Chemical Technology (Dean, Prof. Dr. Emil Cordos, Vice-Chancellor Sorin Mager).

1990 Professor dr. Ionel Haiduc is elected Rector of Babeş-Bolyai University.

1990 The **Department of Chemical Engineering** (Chief of the Department, Prof. dr.ing.Liviu Literat) was established and the **Department of Technological Chemistry** (Head of the Department, lecturer, Florin Jugrestan, Ph.D.) was re-established [5]. It is proposed (by Prof. Liviu Literat) to structure the faculty into two representative departments for the new faculty: the **Department of Chemistry** and the **Department of Chemical Engineering**. The former, comprised the classical departments of Analytical Chemistry, Inorganic, Organic and Chemistry-Physics, and the latter, the departments of Chemical Engineering and Chemistry of Technology. [4]

1990 The Specialization Section (Engineers) of **Oxidation Materials Science and Engineering (SIMO)** (initiator Prof. L. Literat) is established and a PhD degree in chemical engineering is granted to professor dr.ing. Liviu Literat in Cluj (first Ph.D. in Chemical Engineering from the Cluj-Napoca University Center). [6]

1991 20th Anniversary of **Chemical Engineering Education in Cluj-Napoca** (Jubilee Symposium, September 19-22, 1991).

II. d. 1992 **The Faculty of Chemistry and Chemical Engineering was established** (name change approved by Order No. 6540/1994 from the 1994/95 school year). Newly elected Dean, Prof. Dr. Sorin Mager (1992-1996 and 1996-2000). Rector, reelected, was acad. Prof. Dr. Ionel Haiduc.

1992 The **Department of Chemical Engineering also includes the Science and Engineering of Oxide Materials** profile and is named the **Department of Chemical Engineering and Oxide Materials Science** (Chief of the department: Prof. Eng. Liviu Literat).

1993 Dr. Dulămiță Nicu (1993-2003) is elected head of the **Department of Chemical Technology**.

1993 Continuing study was approved (evening classes, not mandatory attendance) for the **TBM** sub-engineers series is obtained under Government Decision no. 1156 of 30 Oct 1990, published in the Official Gazette no. 109 of May 27, 1992 (Prof. L. Literat).

1994 Certification of two new chemical engineering specialties: **Biochemical Engineering (BE)** (Prof. Eng. Florin Irimie, PhD.) and **Informatics of Chemical Systems (ISC)**, Prof. Eng. Șerban Agachi, which is approved in 1995 by the Provisional Operating Authorization (GD No. 568/16 08.1995). [8].

1994 The first postgraduate programs in chemical engineering are initiated through **in-depth and master studies**: [9]

- Border Process Engineering (1994 / 95-2000 / 2001)
- Oxide systems engineering with special properties and applications (1995 / 96-2000 / 2001)

- Heterogeneous Catalysis and Biocatalysis (1995)

- Advanced Process Engineering (2001 / 2002-2008 / 2009).

1995 Accreditation (GD No. 568/1995) of Specialization sections, engineers: TSA, TSO and SIMO [10].

1995 The first **SIMO** engineers graduated (1990-1995).

1995 **The Department of Chemical Engineering and Oxide Material Science** initiates and becomes a founding member of the **Chemical Engineering Society of Romania (SICHR)**, Branch President Prof. Eng. Liviu Literat and Vice-President of the National Leadership Council [11].

1995 Professor **Liviu Literat** retires and becomes a **consultant teacher** (Rector's Decision No. 10.504 / 20.11.1995). [6]

The new Chief of the Department is Professor Eng. Eugenia Gavrilă (1995-1997).

1996 The Department of Chemical Engineering and Oxide Material Science is completed by the team of **Informatics of Chemical Systems** led by prof. Dr. Ing. Șerban Agachi.

1997 Professor PhD. Eng. Paul Șerban Agachi, General Chancellor of UBB (1996-2000) is elected chairman of the department. At the same time, he is also granted the right to conduct a PhD in **Applied Informatics**.

1997 The former proposal of Professor Liviu Literat for the establishment of the **Chemical Engineering Department** is implemented. Selected department directors: Prof. Dr. Nicu Dulămiță (1997 - 2003) and Prof. Ph. Eng. Florin Irimie (2003 - 2012).

1997 Official participation in the **60th anniversary of chemical engineering at the "Gh. Asachi" Technical University, Jassi**, 23.10.1997.

2000 A new **Department of Chemical Engineering** is established: the **Department of Biochemistry and Biochemical Engineering** (Chief of Prof. Eng. Florin Irimie, PhD).

2001 *The National Symposium “30 Years of Chemical Engineering in Cluj-Napoca”*, organized by the Department of Chemical Engineering and Oxidation Science, takes place (6-9 September).

2003 New Nomenclature of Specializations (GD No. 693 / 12.06.2003, published in OG No. 436/30 June 2003), changes the name of the TSA, TSO and ISC Sections into Engineering and Chemistry of Inorganic Substances (**ICSA**), Engineering and Chemistry of Organic Substances (**ICSO**) and respectively Chemical Engineering (**IC**) [12]

2004 Professor Liviu Literat is elected *honorary member* of the **Academy of Technical Sciences of Romania (ASTR)**, Chemical Engineering Section.

2005 *International Symposium Computer Aided Chemical Engineering Forum* (CAPE Forum), Cluj-Napoca, organized by the Department.

2005 Professor Șerban Agachi is elected a *correspondent member* of the ASTR, Automatic Section.

2006 National Chemical Engineering Symposium dedicated to the **35th anniversary of the Chemical Engineering education in Cluj-Napoca**, (July 3, Cluj-Napoca).

2006 Two new chemical engineering specialization sections are established: **Food Chemistry** and **Biochemical Technologies** and **Engineering and Environmental Protection in the Chemical and Petrochemical Industries**.

2007 The **Economic Engineering Section of the Chemical and Materials Industry is established**. The section has a short life, only 3 promotions (Figure 4 and 5).

2007 *European Symposium on Computer Aided Process Engineering (ESCAPE 17th)* 27-30 May 2007, Bucharest (jointly organized with POLITEHNICA University, Bucharest)

2008 (May) As the chairman of the Department is elected Prof. Vasile Mircea Cristea, Ph.D. (2008-2012).

2008 The 3rd **National Conference of the Romanian Academy of Technical Sciences organized by the ASTR Cluj branch**. “*Romanian Engineering: Past, Present and Future*” Cluj-Napoca, November 12-13 (co-organizers, Prof.L.Literat and Ș. Agachi, members of the Academy).

2008 Official participation at the **60th anniversary of the Faculty of Industrial Chemistry of Timisoara** (1948-2008). Timisoara, Oct. 2008.

2008 Participation of the Department at the **60th Anniversary of the Department of Oxidation and Nanomaterials Science and Engineering (ȘIMONA)**, Polytechnic University of Bucharest, Faculty of Applied Chemistry and Materials Science, Bucharest 17.11.2008.

2009-2012 New PhD consultants in Chemical Engineering: Prof. Dr. Petre Ilea and Ioan Bătiu.

2012 New system of university administrative organization. The functional unit becomes a Department, which includes, by individual or group option, the members of the former structures in specialized colleges. On this occasion, the bioengineering team (the former chair) goes from the chemical engineering department to the chemistry department lead by Prof. Dr. ing. F. Irimie.

2012 *The Hungarian teaching language chemistry and chemical engineering department is established.* Department Director assoc. prof. dr. Majdik Cornelia (2012-2016) and assist. prof. dr. Szabó Gabriella (2016 - present) (Figure 3).

2012 Professor Mircea Vasile Cristea is elected director of the Department of Chemical Engineering (2012-2016).

2012 Professor L. Literat receives the honorary title of professor emeritus.

2014 Professor Ioan Batiu retires.

2016 Professor Șerban Agachi retires, but remains a member (chairman) of the Doctoral School of Chemical Engineering.

2016 Professor Ph. Eng. Cormos Călin-Cristian becomes a PhD consultant in chemical engineering and a member of the Doctoral School.

2016 Assoc.prof.dr.ing. Graziella Turdean is elected Chief of the Department of Chemical Engineering.

2017 Prof. dr. Ing. Mircea Vasile Cristea becomes a PhD consultant in chemical engineering and a member of the Doctoral School.

2017 A third chemistry engineer member of the university, elected an ASTR correspondent member, is Professor Alexandru Ozunu, Dean of the Faculty of Environmental Science and Engineering.

CONCLUSIONS

As a succinct synthesis of the brief presentation above, the chemical engineering in Cluj, despite the difficulties and impediments of all kinds, managed to exist, to develop and to assert itself. Founded late (1971), within the Polytechnics, with a great time gap (1937), compared to those in Bucharest (1938) and Timisoara (1948) and very late compared with the age of the University (1919), it is a product of the two brand-name institutions in Cluj. "The first one prepared and accomplished his establishment, guiding its first steps, the second watched its development and affirmation" [4]. To both institutions chemical engineering is grateful, and so is the signatory of these lines, in turn, as a disciple of the (pure) Chemistry School of Cluj and of the Chemical Engineering of the Polytechnics in Bucharest, a link and an interface between the two schools and Professions, an initiator and militant convinced of the "idea" of a "**chemical engineering faculty**" in Cluj, express their gratitude and respect

to the eminent professors and colleagues of the two Institutions, as well as to the other older sister-schools, (from Jassy and Timisoara) who unconditionally supported us.

With the same deference, we apologize to colleagues who have provided basic, theoretical and practical chemistry training for chemist engineers, for the space, time, and information that has overwhelmed us.

Also, as a picture speaks more than a thousand words, or tens of pages printed, below I have tried to encompass this history in some easy-to-understand schemes.

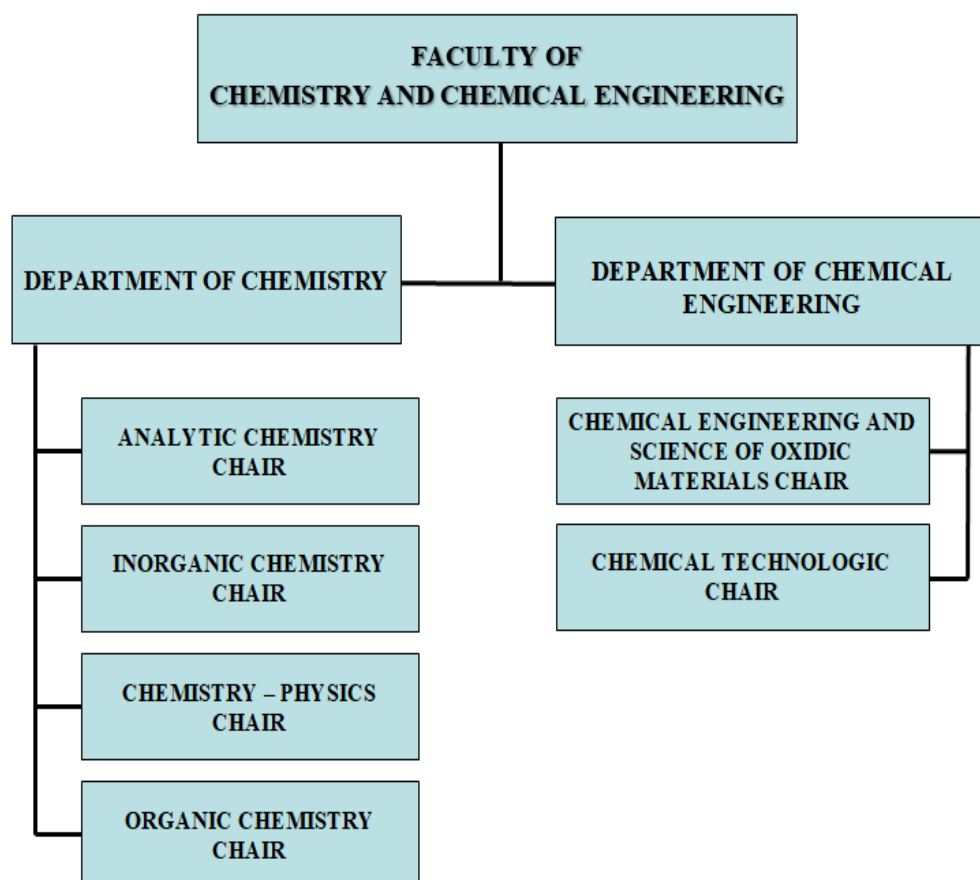


Figure 1. The structure of the Faculty of Chemistry and Chemical Engineering between 1995 – 2000

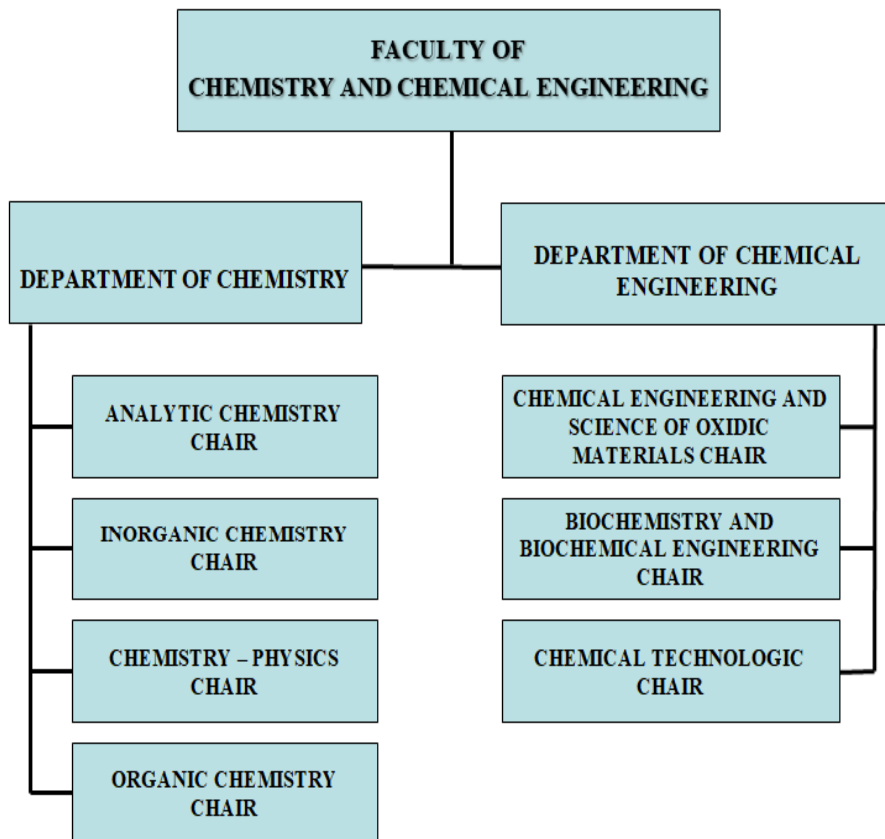


Figure 2. The structure of the Faculty of Chemistry and Chemical Engineering between 1999 – 2012

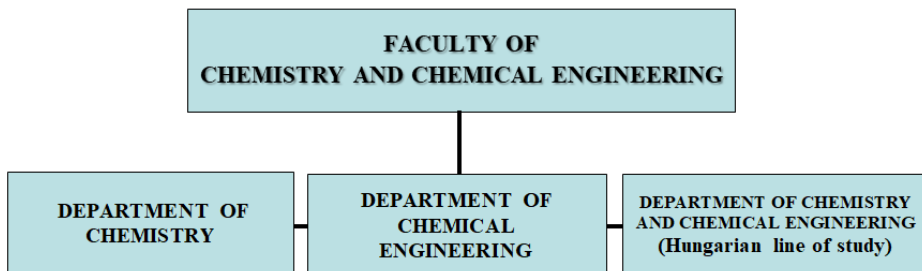


Figure 3. The structure of the Faculty of Chemistry and Chemical Engineering since 2012

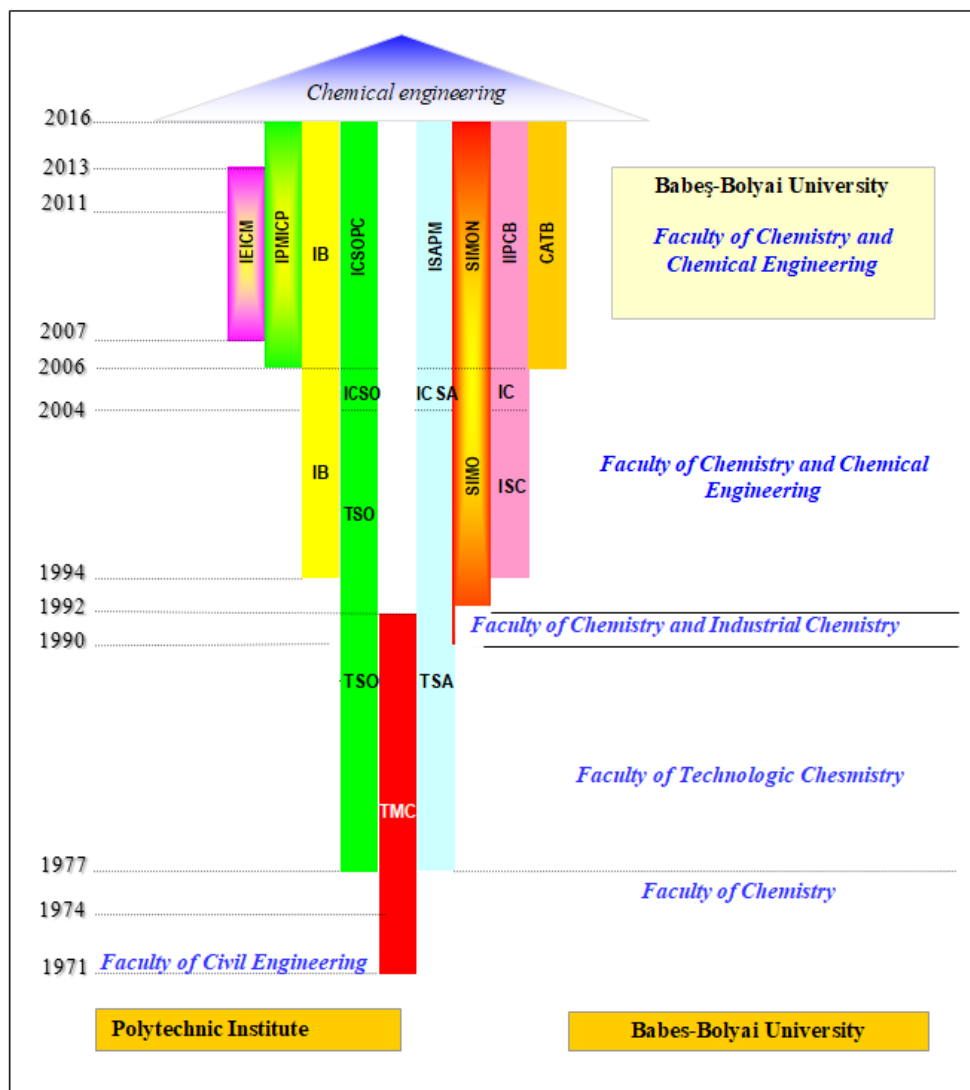


Figure 4. Structure of the chemical education in Cluj-Napoca

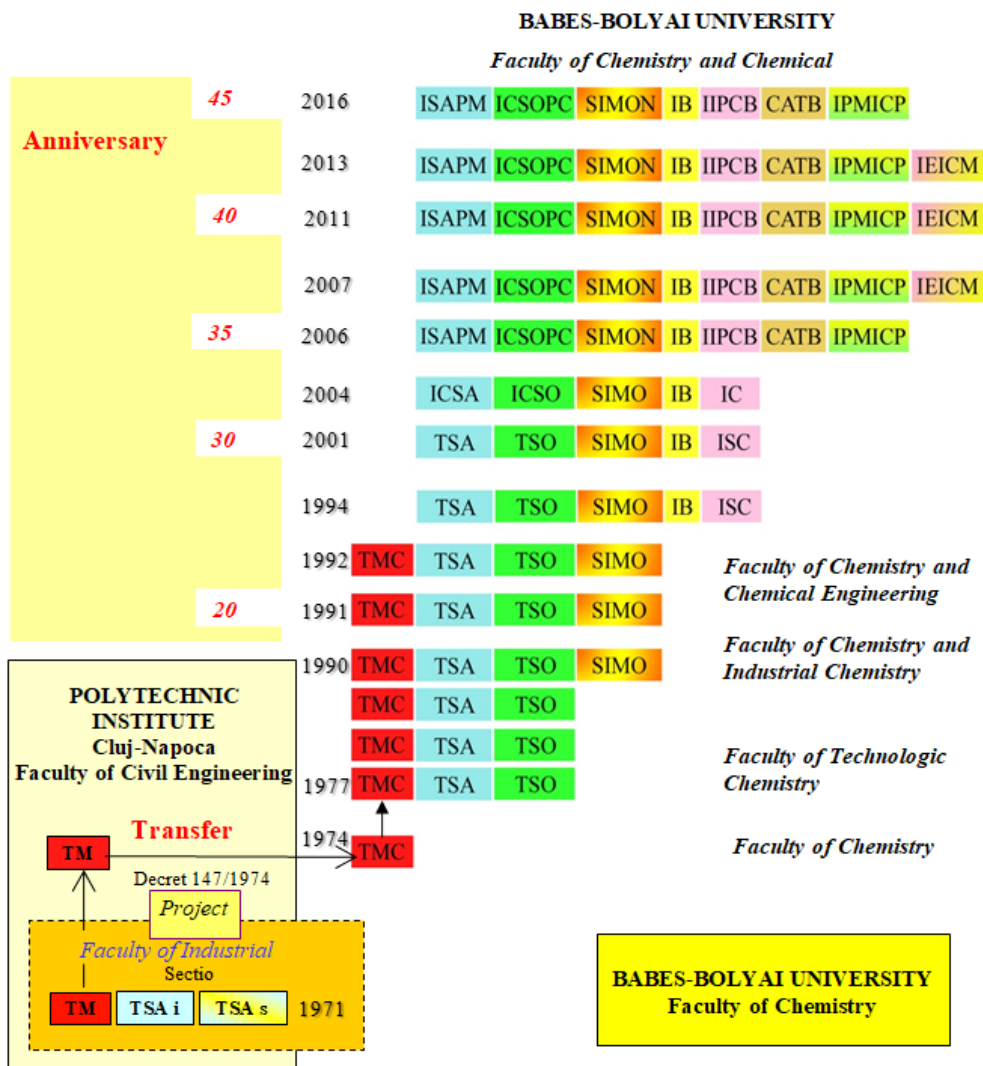


Figure 5. Structure of the chemical education in Cluj-Napoca

LEGEND: TMC Technology of Building Materials, TSAi Technology of Inorganic Substances, engineers, TSAs Technology of Inorganic Substances, subengineers, TSA Technology of Inorganic Substances, TSO Technology of Organic Substances, SIMO Science and Engineering of Oxide Materials, IB Biochemical Engineering, ISC Computer Systems Informatics, ICSA Engineering and Inorganic Substances Chemistry, ICSO Engineering and Chemistry of Organic Substances, IC Chemical Engineering, SIMON Science and Engineering of Oxide and Nanomaterials, ISAPM Inorganic Substances Engineering and Environmental Protection, ICSOPC Engineering and Chemistry of Organic and Petrochemicals, IIPCB Engineering and Informatics of Chemical and Biochemical Processes, CATB Food Chemistry and Biochemical Technology, IPMICP Engineering and Environmental Protection in Chemical and Petrochemical Industry, IEICM Economic Engineering in Chemical and Materials Industry.

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