TECHNICAL UNIVERSITY OF CIVIL ENGINEERING OF BUCHAREST

DOCTORAL SCHOOL

Self-assessment report of the doctoral field of studies
Geodetic Engineering

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SUMMARY

I. GENERAL INFORMATION

I.1. Institutional Capacity of IOSUD - Technical University of Civil Engineering in Bucharest – UTCB

I.1.1. The legal framework for the organization and functioning of UTCB. History

In Romania, the Higher Civil Engineering Education was established in 1864, with the establishment in Bucharest of a "School of Bridges and Roads, Mines and Architecture", transformed in 1867 into "School of Bridges, Roads and Mines" and in 1888 into "National School of Bridges and Roads". In 1921, the "National School of Bridges and Roads" was transformed into the Polytechnic School in Bucharest, where the training of construction engineers was done within the Civil Engineering Section, transformed from 1938 into the Faculty of Civil Engineering.

In 1948, as a result of the Education Reform, the Faculty of Civil Engineering broke away from the Polytechnic School (which became the Polytechnic Institute), based on the Decree of the Grand National Assembly, No. 175, of 2 August 1948 (see Annex I.1_UTCB-01_01 Decret 175.pdf) and the Order of the Public Ministry, no. 263, published in the Official Gazette No. 240, Part I, of 26 October 1948 (see Annex I.2_UTCB-01_02 Ordin 1948.pdf) and has been transformed into a self-sustaining higher education institution called the "Bucharest Civil Engineering Institute".

Since the academic year 1994-1995, by Decision of the Romanian Government no. 458 / 29 July 1994, the name of the Bucharest Civil Engineering Institute has been changed to the Technical University of Civil EngineeringBucharest.

I.1.2. General data on the seat of the UTCB

Name of institution:	Technical University of Civil Engineering of Bucharest
address:	122-124 Lacul Tei Avenue, sector 2, Bucharest, code: 020396
telephone:	021 - 242.12.08 (Rectorate, Faculty - CCIA, Hydrotechnics, CFDP, Geodesy, FILS, Doctoral School, DLSC and DPPD); 021 - 252.42.80 (Faculty of Building Services Engineering); 021 - 315.82.00 (Technological Machinery Faculty)
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Website:	www.utcb.ro

I.1.3. UTCB Structure

UTCB has legal personality, being an institution of national interest and part of the European Higher Education System established in 2005.

UTCB is organized and operates independently of any ideological or political interference.

The management structure and functions of the Technical University of Civil Engineering Bucharest are established by the University Senate, in accordance with the legislation in force.

The Technical University of Civil Engineering of Bucharest includes the following structures:

- *didactic structure - faculties, departments, Doctoral School, Resource Center for Education, University Library;*
- *research and design structure - Research, Development and Innovation Management Department;*
- *administration structure - directions and services; their title, composition and competencies are established in the Regulation of Organization and Functioning of the Technical University of Civil Engineering Bucharest; the structure of the list of functions for departments and services is proposed by the Administration Council, approved by the University Senate and updated periodically;*
- *structures for quality management, for the promotion of university professional ethics and deontology and for international and partnership relations.*

The faculties of the Technical University of Civil Engineering of Bucharest organize undergraduate and master's degree programs.

The faculty comprises one or more departments with the afferent staff, teaching staff from other departments of the university that has the didactic norm mainly in the respective faculty, students and secretarial staff.

The management of the faculty is ensured by the Faculty Council. The management functions are dean and vice-dean/vice-deans.

The Technical University of Civil Engineering of Bucharest has 7 faculties (see Annex I.3 - Annex I.3_UTCB_Facultati departamente.pdf) of which 6 with teaching in Romanian and one with teaching in foreign languages (English or French). The six faculties with teaching in Romanian (Civil, Industrial and Agricultural Civil Engineerings, Hydrotechnics, Railways, Roads and Bridges, Building Services Engineering, Technological Equipment, Geodesy) offer a higher education training for both the first cycle, of undergraduate studies with a duration of 4 years , following which the title of engineer is obtained, as well as for the second cycle, of master degree (4 semesters). The Faculty of Engineering in Foreign Languages offers a university training of 4 years for engineers, 3 years for the field of applied modern languages (translation - interpretation) and 2 years for a master's degree in both fields.

The 7 faculties, which operate within UTCB, as fields of undergraduate training and specializations, based on the Government Decision no. 403/2021 on the approval of the Nomenclature of fields and specializations/university study programs and the structure of higher education institutions for the academic year 2021-2022, as well as the approval of degrees granted to undergraduate graduates enrolled in the first year (see Annex I.4.1, Annex I.4_UTCB HG 580_2014 Annex 2-8.pdf, Annex I.5_UTCB_HG 326.pdf, Annex I.6_UTCB_HG 318.pdf), have their headquarters in UTCB's own buildings.

The departments are functional academic units of the Technical University of Civil Engineering Bucharest, which ensure the production, transmission and capitalization of knowledge in one or more fields of specialization and carry out didactic and scientific research activities.

The departments are established, organized, divided, merged or liquidated by the decision of the University Senate, at the proposal of the Council of the faculty in which they operate.

The department includes: The department council headed by the department director, the teaching staff related to a discipline or a family of disciplines, the research-design staff, the auxiliary staff and the secretarial staff.

Currently in UTCB, there are a number of 20 teaching departments within the seven faculties and another (Teaching Staff Training Department - DPPD) subordinated to the Administration Council.

In the coordination of the Administration Council of the Technical University of Civil Engineering Bucharest are also the following functional academic units:

•Teaching Staff Training Department;

The following structures also function under the subordination of the Rector, respectively of the vice-rectors.

• The Research, Development and Innovation Management Center is the research and design structure that:

- informs the teaching and research staff on the opening of grants competitions and research programs, at national and international level;
- provides logistical support for completing the necessary documentation for grant competitions and research programs;
- monitors the execution and development phases of grants and research programs;
- centralizes the information regarding the scientific research;
- contributes to the dissemination of the results of scientific research, development and innovation carried out in the centers and laboratories of the Technical University of Civil Engineerings Bucharest.

• The Quality Management Office contributes to:

- evaluating the quality of educational, research and auxiliary processes;
- applying best practices for controlling and improving the quality of staff training and teaching and research processes;
- internal audit and preparation for external audits;
- periodic staff evaluation;
- identifying the real requirements and expectations of the socio-economic environment regarding the competencies of the graduates, their correlation with the university experience and with the international / European practice.

• The International Relations Center comprises the International Relations Office, the Erasmus + Office and the Francophone Office and contributes to:

- ensuring the framework for student mobility through bilateral conventions;
- concluding institutional contracts for participation in various actions of the Community programs of the European Union;
- concluding agreements with universities in other countries;
- ensuring the conditions for the participation of teaching staff and students in conferences, symposia and other international events.

• The Center for Continuing Education, Graduates and Entrepreneurship has the mission to organize and supervise the postgraduate study programs of training and continuous professional development and improvement, the postgraduate study programs of continuing education dedicated primarily to UTCB graduates, as well as any forms of education and teaching conducted through UTCB, other than bachelor's,

master's, doctoral studies or those organized by the Department for the Training of Teaching Staff in UTCB.

• The Career Counseling and Guidance Center has the mission to provide specialized support services to the following categories of beneficiaries:

- students of the Technical University of Civil Engineerings of Bucharest, regardless of the study program they attend or the form of education, including students who come to study through mobility programs;
- students in the final years of high school, through partnerships concluded with pre-university education units;
- its own graduates or other universities.

• The university library is the unit that collects, organizes and capitalizes on the documentary fund - books, publications, graphic, audio-visual and digital documents - for the fields and specializations of the Technical University of Civil Engi neering Bucharest. The university library includes: the management position - director, the specialized staff made up of librarians and the secretarial staff.

Conspress Publishing House and the Multiplication Office operate within the Technical University of Civil Engineering Bucharest - Library, Publishing and Journals Service.

• The Communication and IT Center implements UTCB strategies for the introduction of modern information and communication technologies in education and research and has as objectives:

(1) Implementation of information systems in order to increase the efficiency of educational and research activity; the aim is to integrate the IT subsystems dedicated to the educational process, the financial-accounting and human resources departments and other departments in a global university management system.

(2) Ensuring high-performance communications through reliable access to Internet services for all UTCB teachers, students and staff and a continuous modernization of the Internet and Intranet facilities offered by the university's communications network - UTCB

(3) Providing high-performance ICT (information and communication technology) facilities for UTCB students, teachers and staff, regarding access to and processing of information relevant to each category of university users.

(4) Providing accessible and efficient electronic information services on UTCB's academic programs

• The undergraduate studies last four years, and are organized in the following fields: Civil Engineering, Engineering and Management, Environmental Engineering, Systems Engineering, Building Services Engineering, Mechanical Engineering, Mechatronics - Robotics, Geodetic Engineering and Applied Modern Languages. These fields of undergraduate studies include the following specializations: Civil, industrial and agricultural constructions, Urban engineering and regional development, Engineering and construction management, Hydrotechnical arrangements and constructions, Sanitary engineering and environmental protection, Environmental engineering, Automation and applied informatics, Railways, roads and bridges, Metropolitan transport infrastructure, Building services, Atmospheric equipment, Mechatronics, Ground and cadastre measurements, Civil engineering (in English), Civil engineering (in French), Building services (in French) (see Annex I.7 - Annex_I.7_UTCB_Facultati specializari.pdf) .

The duration of the bachelor's cycle is four years, the Transferable Credit System includes 240 credit points for the subjects of the 8 semesters plus 10 additional credit points for the diploma exam. For the bachelor's degree program in Translation and Interpreting (in the field of Applied Modern Languages) the Transferable Credits system includes 180 credit points for the subjects of the 6 semesters plus 10 additional credit points for the diploma exam.

Each of the undergraduate programs organized at the level of the faculties within UTCB has its well-defined didactic and research mission.

• Master's degree studies are organized in UTCB, for the 35 accredited master's degree programs (see Annex I.7 - Annex I.7_UTCB_Facultati specializari.pdf).

In accordance with the organization of higher education in cycles, the master's studies (Cycle II) were organized in the academic year 2021-2022 for a number of 993 places financed from the state budget and 432 places with tuition fee, for engineering fields. The organization of the master studies is done on the ECTS system, the duration of the studies is 4 semesters, totaling 120 transferable credits and 10 credits for the elaboration and defense of the dissertation. Both the interdisciplinary specializations (Faculty of Civil Engineering and Teaching Staff Training Department) and the master's degree in Specialized Translation and Interpretation have a duration of 4 semesters and also total 120 ECTS.

• Doctoral studies represent the third cycle of university studies, in accordance with the Bologna Process and allow the acquisition of level 8 qualification from the EQF / CEC and from the National Qualifications Framework.

Doctoral studies represent the third cycle of university studies and allow the acquisition of level 8 qualifications according to EQF/CEC levels and National Qualifications Framework.

The Technical University of Civil Engineering Bucharest (UTCB), as the Organizing Institution of Doctoral University Studies (IOSUD), organizes doctoral university studies in the fundamental field of hierarchy "Engineering Sciences", in the following branches of science and fields:

• Branch of science: Civil Engineering:
  - The field of doctoral university studies: Civil Engineering and Building Services;
• Science branch: Electrical, electronic and telecommunications engineering:
  - The field of doctoral university studies: Electrical Engineering;
• Science branch: Mechanical Engineering, Mechatronics, Industrial Engineering and Management:
  - The field of doctoral university studies: Mechanical Engineering;
  - The field of doctoral university studies: Industrial Engineering

In 2021, the periodic external evaluation was requested for IOSUD UTCB and for the two active doctoral fields, Civil and Building Services Engineering and Mechanical Engineering. Accreditation was maintained for IOSUD UTCB and for the field of Civil and Building Services Engineering and conditional accreditation for the field of Mechanical Engineering.

Within UTCB, there is only one Doctoral School in which a number of 48 prestigious doctoral supervisors and 254 doctoral students are active at the time of reporting (May 2022).

• Postgraduate studies: between 2016-2022, the portfolio of the UTCB offer was revised; this took into account the existing requirements in the market, as well as the

changes that occurred in the teaching staff. 10 courses were approved by the Ministry of Education and Research, endorsed by the ANC, etc. (see Annex I.8 - Annex I.8_UTCB_Cursuri postuniversitare.pdf).

• Scientific research program

Scientific research has become an intrinsic component of university activity and a sine-qua non condition for university performance. The relevance of research results, measured scientometrically by publications in impact journals, by grants / research projects won through competition and by patents recognized and applied in industry, is what positions the university in the rankings, brings complementary and additional funding and provides academic prestige. These arguments ensure that the concerns for scientific research have a privileged place between the activities of the university and a proper attention.

UTCB's scientific research activity has the following components:

(i) basic and applied research; (ii) development (of innovative products and services) and (iii) innovation (transfer to the socio-economic environment of innovative products and services). The research from UTCB must address the objectives stated in the National Plan for Research, Development and Innovation 2021-2027 (https://www.research.gov.ro/uploads/sistemul-de-cercetare/legislatie-organizare-si-functionare/proiecte-de-acte-normative/2021/anexa-1_sncisi.pdf) and in the HORIZON 2020 Program (https://ec.europa.eu/programmes/ horizon2020/en). Research activities can be funded from both public funds through the aforementioned programs and industry. The university must diversify and boost the offer of educational, research and consulting services to industry and society.

With a valuable and experienced potential for scientific research, in the last five years the departments, faculties and the university have proceeded to concentrate their efforts on priority areas of great scientific, technological interest and at the same time of great public utility.

Currently, the funding of research from public funds is done through programs aimed at broad multi- / multi- / trans-disciplinary topics, of major interest to society. The association of UTCB with strong and innovative clusters is essential in accessing public research funds. The traditional approach of doing research in small groups of people with quasi-identical skills can no longer ensure the success of funding applications. From this perspective and taking into account the objectives of existing research funding programs, the competencies of UTCB teachers and researchers to carry out publicly funded RDI activities will be grouped into the following high priority areas (which are not disjoint and are in the broad concept of sustainability): (i) Smart City, (ii) Energy Efficiency and (iii) Disaster Resilience.

Teams that have grouped around research centers must permanently demonstrate their viability by applying for funding, conducting grants / research / consulting projects, organizing scientific events and relevant publications.

Starting with 2016 and 2017, respectively, in UTCB are organized as annual events, the Gala of Awards of Excellence in Education and Research at UTCB (see Press release January 13, 2020 https://utcb.ro/gala-premiilor-de-excelenta-in-educatie-si-cercetare-la-utcb-2/) for the stimulation and reward of deserving university teachers, but also the Gala of Excellence Awards for UTCB Students awarded for the remarkable results obtained in extracurricular activities. (see Press release May 15, 2019 https://utcb.ro/gala-premiilor-de-excelenta-pentru-studentii-utcb-15-mai-2019/).

Currently, UTCB's research activity is based on (i) the strategic plans for research, development and innovation, (ii) the research component of the strategic plan for the implementation of the internationalization process and (iii) the methodologies for setting up and evaluation of research centers.

The updated programs of the research centers in UTCB can be viewed here (see Annex I.9_UTCB_Programul de cercetare al centrelor de cercetare stiintifica.pdf).

I.1.4. UTCB Mission and Objectives

The Technical University of Civil Engineering Bucharest is a technical university for the training of specialists with superior training in constructions, building engineering, machines and equipment for constructions, geodesy, environmental engineering, as well as in related fields such as engineering and management, systems engineering, applied modern languages (translation and interpretation with technical specifics) etc.

The Technical University of Civil Engineering Bucharest assumes the fundamental mission of being a national training center for the new generations of specialists and high-performance scientific research in the fields of constructions, their seismic protection, construction of roads, building services, construction equipment, land measurements, environmental protection, urban engineering and others.

The six faculties with teaching in Romanian (Civil, Industrial and Agricultural Civil Engineerings, Hydrotechnics, Railways, Roads and Bridges, Building Engineering, Technological Equipment and Geodesy) and one with teaching in foreign languages (Engineering in Foreign Languages) from the Technical University of Civil Engineering offer university training both for the first cycle, of undergraduate studies with a duration of 4 years, after which the engineer's title is obtained, and for the second cycle - master with a duration of 2 years. The Faculty of Engineering in Foreign Languages offers a 4-year university training for engineers, 240 ECTS, with teaching exclusively in English or French, and with a duration of 3 years, 180 ECTS, with partial teaching in foreign languages, for the bachelor's field aplied modern languages; the master's programs last 2 years for both fields.

The Technical University of Civil Engineering Bucharest is also an institution organizing doctoral university studies in in 2 fields of doctoral studies accredited during 2021 (Civil Engineering and Building Services and Mechanical Engineering) and 30 specializations.

The main objectives of the Technical University of Civil Engineering Bucharest, with a view to fulfilling its mission, are (see Annex I.10_UTCB_Plan-strategic-UTCB-2020-2024.pdf):

(1) Training specialists with higher education in the fields and specializations within the structure of the University, by transmitting a coherent system of scientific, technical-engineering, economic and humanistic knowledge to the students, as well as by enabling them to acquire professional and transversal competences, in accordance with the current and prospective requirements of the economic, social and scientific life.

(2) Continuously improving the study programs, syllabi and teaching methodology.

(3) The organization of the continuous education activities in the fields and specializations from the university structure.

(4) Placing the criteria of didactic and scientific competence at the base of the process of evaluation, selection and promotion of the teaching staff.

(5) Organizing and participating in national and international academic programs.

(6) Organizing and participating in scientific research, design, consulting and expertise activities, through the Department of Management of Research, Development and Innovation (DMCDI) within the university structure.

Achieving these objectives by carrying out their related activities leads to:

a) promoting technical higher education in construction and research, in accordance with the requirements of the knowledge-based society through initial training, continuing education and integration into the university values circuit;

b) increasing the prestige of the university, by publishing and disseminating the results of scientific research;

c) the inclusion in courses and other forms of activity with students of the main contributions of their own scientific research;

d) modernization of laboratories, research centers and computer networks;

e) participation of teaching staff and students in national and international scientific research programs;

f) development of exchanges with other universities in the country and abroad through cooperation programs and participation in scientific events.

UTCB's vision is to promote excellence in education and research, by transforming UTCB into a university of advanced research and construction education, and to become a landmark and a formidable partner at national, European and international level for universities, institutes and training centers. research, for the corporate environment and for society.

I.1.5. University Charter and Regulations specified by the Charter

UTCB is an organization with main activities of higher education and research, a distinct university community that operates on the basis of the Constitution, the legislation in the field of higher education and other legal regulations in Romania, is non-profit and has legal personality.

The academic structures, the decision-making competencies, the way of choosing the governing bodies at UTCB level, the specific principles and norms according to which the members of the university community carry out their activity in their own university space, as well as the regulations regarding the activity of auxiliary and technical-administrative teaching staff are described in the Charter. UTCB (see Annex I.11 - Annex I.11_UTCB_Carta-universitara.pdf)

On the basis of the provisions of the University Charter, regulations have been drawn up on:

a) organization and operation of the Technical University of Civil Engineering of Bucharest (Annex I.12 - Annex I.12_UTCB_Regulament-de-Organizare-și-Funcționare.pdf);

b) Code of Ethics and University Professional Deontology (Annex I.13 - Annex I.13_UTCB_COD-ETICA-01-09-11.pdf);

c) Methodology of organization and conduct of the elections of the governing bodies of the Technical University of Civil Engineering of Bucharest (Annex I.14 - Annex I.14_UTCB_Metodologie_Alegeri_UTCB_2019.pdf ;

d) Selection, promotion and improvement of teaching staff, research and design staff, as well as auxiliary and administrative staff (Annex I.15 - Annex I.15_UTCB_Regulament selectare promovare.pdf) ;

e) Methodology for evaluating the results and performance of teaching and research activities of teaching and research staff (Annex I.16 - Annex I.16_UTCB_Evaluare personal didactic.pdf);

f) Conduct of research, development and innovation, specifying the conditions under which contracts may be concluded with public institutions and economic operators with a view to carrying out fundamental and applied research programmes, as well as the way in which staff carrying out these activities are remunerated (Annex I.17 - Annex I.17_UTCB_ROF-CDI.pdf);

g) Conducting the university's international cooperation actions (Annex I.18 – Annex I.18_UTCB_ROF DRI.pdf);

h) Admission of students (Annex I.19 - Annex I.19_UTCB_Metodologie-admitere-licență.pdf; Annex I.20 - Annex I.20_UTCB_Metodologie-admitere-master.pdf; Annex I.21 - Annex I.21_UTCB_Metodologie admitere Doctorat 2021_2022.pdf);

i) Conduct and completion of the professional activity of students (Annex I.22 - Annex I.22_UTCB_Regulament-privind-desfasurarea-activitatii-studentilor-in-UTCB.pdf; Annex I.23 - Annex I.23_UTCB_Metodologie-finalizare-studii-licență.pdf; Annex I.24 - Annex I.24_UTCB_Metodologie-finalizare-studii-master.pdf; Annex I.25 - Annex I.25_UTCB_Metodologie finalizare SUD.pdf)

j) Granting of scholarships and research (Annex I.26 - Annex I.26_UTCB_Regulament-burse-cu-anexa.pdf);

k) Organisation and conduct of university doctoral studies (Annex I.27 – Annex I.27_UTCB_ROF SUD rev 2_2020.pdf);

l) Organization and operation of the Department of Training of Didactic Personnel (Annex I.28 - Annex I.28_UTCB_Regulament DPPD_2017.pdf);

m) Organization and operation of the University Library and Conspress Publishing House (Annex I.29 - Annex I.29_UTCB_Regulament Biblioteca.pdf);

n) Organization and operation of dormitories and canteens of the Technical University of Civil Engineering of Bucharest (Annex I.30 - Annex I.30_UTCB_Regulament-privind-organizarea-și-funcționarea-căminelor-și-cantinei-studențești.pdf).

The entire didactic, research, managerial, administrative and economic-financial activity of UTCB is carried out in compliance with the national legislation in the field and the standards and regulations of the university, approved in the Senate meetings of UTCB.

The general framework regarding the work discipline in UTCB, necessary for the development in optimal conditions of the internal activity of the university, is established by the internal Regulation (see Annex I.31 - Annex I.31_UTCB_REGULAMENTUL INTERN.pdf).

The education and research activity in UTCB is structured on faculties and departments, and in the structure of technical-administrative services are included departments, services, offices and other technical-administrative units whose components and links are presented in the UTCB Organization Chart (Annex I.32 - Annex I.32_UTCB_Hotarare senat Organigrama cu anexa.pdf). The organization chart is public, being presented on the official website of UTCB (https://utcb.ro/wp-content/uploads/2021/03/Anexa-1-la-HS-1140-10.12.2020-Regulament-de-Organizare-%C8%99i-Func%C8%9Bionare.pdf).

I.1.6. University Management and Managerial Structures

The management structures of the Technical University of Civil Engineering Bucharest are: the University Senate, the Administration Council, the Councils of the faculties and the Councils of the departments. The organizational structures of UTCB are presented in the UTCB Organization Chart (Annex I.32_UTCB_Hotarare_senat Organigrama cu anexa.pdf).

The Technical University of Civil Engineerings of Bucharest is led by the University Senate composed of 45 members.

The Senate consists of 75% teaching and research staff (33 people), as well as 25% of students (12 people).

The members of the University Senate are elected according to the Regulation on the methodology for organizing and conducting the elections of the governing bodies of the Technical University of Civil Engineering Bucharest (Annex I.14_UTCB_Metodologie_Alegeri_UTCB_2019.pdf).

Each faculty has representatives in the University Senate, based on the principle of representativeness on departments and cycles of education - bachelor and master - according to the approval of the University Senate. Correspondingly, doctoral students have representatives in the University Senate.

The University Senate elects, by secret vote, a president who leads the meetings of the University Senate.

The Senate is convened in ordinary meetings every two months during the teaching activity and in extraordinary meetings at the request of the rector or at the request of at least one third of the members of the University Senate.

Any person from the Technical University of Civil Engineering Bucharest or from outside it can participate in the works of the Senate, as a guest.

The operative management of the Technical University of Civil Engineering Bucharest is ensured by the Administration Council, composed of the rector - as president - vice-rectors, deans of faculties, director of CSUD, the general administrative director and a student representative, member of the Senate.

The following persons have the quality of permanent guests: the President of the Senate; the representative of the AEDIFEX Trade Union of UTCB and the chief secretary of the university.

The Administration Council is convened by the Rector of the Technical University of Civil Engineering Bucharest.

Any person may attend the meetings of the Administration Council, at the invitation of the rector.

The Rector of the Technical University of Civil Engineering Bucharest is appointed in one of the following ways:

a) by public competition, based on a methodology approved by the University Senate according to the legislation in force, or,

b) by the universal, direct and secret vote of all the tenured teaching and research staff within the university and of the student representatives from the University Senate and from the faculty councils.

The manner of appointing the rector is established by referendum at least six months before each appointment of the rector, by universal, direct and secret vote of all tenured teaching and research staff at the university and student representatives in the university senate and councils of the faculties.

The rector, confirmed by the Minister of Education and Research, concludes a management contract with the University Senate, including the criteria and indicators of managerial performance, the rights and obligations of the contractual parties.

The rector, after confirmation by the Minister of Education and Research, appoints the vice-rectors based on the consultation of the University Senate, ensuring the representation of the faculties of the Technical University of Civil Engineering Bucharest.

The rector may be dismissed by the university Senate, under the conditions specified by the management contract or according to art. 56, paragraph (9) of the University Charter.

The faculty is led by the Faculty Council, chaired by the dean. The council consists of representatives of the teaching and research staff, as well as representatives of the students.

The representatives of the teaching and research staff in the Faculty Council are elected by universal, direct and secret vote of all the tenured teaching and research staff, with the preponderant norm in the respective faculty. The teaching staff with reserved positions benefits from the same right, in accordance with the law.

The representatives of the students in the council are elected by universal, direct and secret vote by the students of the faculty, in proportion of 25% of the total number of the members of the Council.

The deans are selected through a public competition organized by the rector of the university, at the level of each faculty. The competition board is proposed by the Faculty Council and is approved by the University Senate. The contest can be attended by persons from the university or from any faculty from the same field in the country or abroad who, based on the hearing in the plenary of the Faculty Council, have received its approval to participate in the contest. The faculty council has the obligation to approve at least two candidates. After the appointment by the rector, following the validation of the competition by the University Senate, the dean appoints his vice-deans.

Any person from the university or from outside the university can participate in the meetings of the Faculty Council.

The Faculty council is convened in ordinary meetings every two months during the teaching activities and in extraordinary meetings by the decision of the dean or at the initiative of at least one third of its total members.

The faculty council convenes annually the general assembly of the teaching staff for information and debates on the problems of the faculty.

The Technical University of Civil Engineering Bucharest (UTCB), as the Organizing Institution of Doctoral University Studies (IOSUD) acquired based on the proposal of the National Council for Attestation of University Titles, Diplomas and Certificates (CNATDCU) and the approval of the Ministry of National Education organizes university studies PhD in the fundamental field of ranking "Engineering Sciences".

There is only one Doctoral School within UTCB. Based on the request of the General Assembly of Doctoral Supervisors, with the approval of the Council of University Doctoral studies, the Rector of UTCB may propose the establishment of several Doctoral Schools, with the approval of the UTCB Senate.

The doctoral university studies at UTCB are coordinated by the Council for Doctoral University Studies, hereinafter referred to as CSUD.

The relations between CSUD, the Doctoral School and other component structures of UTCB are established by the UTCB University Charter, respectively: CSUD

is directly subordinated to the Rector of UTCB and is led by the Director of CSUD, the Doctoral School is subordinated to CSUD and the Vice Rector and the Director of the Doctoral School.

The Doctoral School is run by the Doctoral School Council, composed of its director, appointed by the rector's decision, members - doctoral supervisors from the doctoral school in proportion of maximum 50%, doctoral students in proportion of 20% rounded in addition if necessary, the rest being completed with members from outside the doctoral school chosen from scientific personalities whose scientific activity has significant international recognition and / or personalities from the relevant industrial and socio-economic sectors.

The doctoral school has its own secretariat and can hire associated staff for certain periods.

The doctoral school is under the direct coordination of the rector of the Technical University of Civil Engineering Bucharest.

The department of the didactic structure is led by the Council of the department, composed of the director of the department and of 2 or 4 members, elected by / and from the didactic staff of the department.

The departmental director of the didactic structure and the members of the department's Council are elected by universal, direct and secret vote of all the tenured teaching and research staff of the department.

The strategic decisions regarding the activity of the department in the didactic structure are taken by the didactic and research staff of the department, which meets monthly or as many times as necessary. The department council may invite to these meetings the associated teaching staff, the auxiliary and administrative staff, as well as any other person from the university or from outside it.

The Center for Management of Research, Development and Innovation, the Center for Continuing Education, Graduates and Entrepreneurship, the Department of Teacher Training, the Office of Quality Management and the Center for International Relations are headed by directors appointed by the University Senate, at the proposal of the Administration Council.

The mandate of the members of the management structures and positions from the Technical University of Civil Engineering Bucharest is for a period of four years, based on the regulation regarding the election methodology. As an exception, student representatives due to the completion of studies or, in special situations (committing acts which deviate from the university professional ethics and deontology), may be replaced at the beginning of the academic year, keeping the principle of representativeness. Also, the mandate of the Director of the Doctoral School and of the CSD members is 5 years.

The number of vice-rectors of the Technical University of Civil Engineerings Bucharest is 4.

The number of vice-deans is established according to the number of students in the faculty, as follows: the faculties with a large number students, Faculty of Civil, Industrial and Agricultural Buildings, and Faculty of Building Services Engineering, have 4 and 3 vice-deans, respectively, and the faculties with a smaller number of students (Hydrotechnics, Railways, Roads and Bridges, Geodesy, Faculty of Engineering in Foreign Languages and Technological Equipment) have 2 vice deans.

The eligibility of the candidates for the management positions in the Technical University of Civil Engineering Bucharest, as well as the termination of the mandates of the persons holding management positions are regulated by law. A member of the

university community sanctioned for plagiarism by the decision of the University Senate may not hold any advisorship position in the university.

In case of vacancy in a management position, by-elections shall be held or a public competition shall be organized, as the case may be, within a maximum of three months from the date of vacancy.

The person with a management position who is unable to exercise the mandate for a period of more than 30 consecutive days during the teaching activities is replaced for this period by an interim person appointed by the decision of the rector. The interim period may not exceed one year. If this period is exceeded, the provisions of paragraph (4) are applied.

The management functions of rector, vice-rector, dean, vice-dean and department director are not cumulated. A person may hold the position of rector or dean for a maximum of two terms of four years each. Any person with a management position has the right to present his / her resignation to the rector, as a unilateral act. Any person in a management position may be removed from office by the procedure used in the election, at the initiative of one third of the number of voters, or, as the case may be, by the decision of the Faculty Council or the University Senate.

The position of General Administrative Director is filled through a competition organized by the Administration Council. The president of the competition board is the rector of the Technical University of Civil Engineering Bucharest. A representative of the Ministry of Education and Research (MEC) must be part of the board. The validation of the contest is done by the University Senate, and the appointment is made by the rector.

I.1.7. Teaching Staff

Starting with 2020, the Technical University of Civil Engineering Bucharest has at its disposal an elite teaching staff with a good recognition in the country and abroad, which has asserted itself both through the results of teaching and research, as well as through direct participation in the most important constructions made in our country. UTCB has a number of 454 teaching posts distributed by faculties and departments in accordance with Table 1 (see also Annex I.33 - Annex I.33_UTCB_Situaţia posturilor didactice şi a ocupării acestora.pdf).

In UTCB, the tenure teachers are Professors, Senior Lecturers or Lecturers and all have the title of Ph.D. in the field/the taught subjects.

Table 1. Teaching positions by departments and faculties in the academic year 2021-2022

Crt. No.	Faculty or Department	Full Prof. No.	Assoc.Prof. No.	Lecturer No.	Assist. No.
1	Faculty of Civil, Industrial and Agricultural Civil Engineering	8	23	97	21
2	Faculty of Hydrotechnics	11	10	32	10
3	Faculty of Railways, Roads and Bridges	4	8	32	17
4	Faculty of Building Services Engineering	13	19	27	7
5	Faculty of Technological Machinery	3	3	11	2
6	Faculty of Geodesy	6	6	22	6
7	Faculty of Engineering in Foreign Languages	2	6	17	15
8	Department for Training of Didactic Personnel	1	7	12	1
	TOTAL UTCB	48	82	250	79

* The legally constituted didactic positions include the didactic positions occupied by the incumbents and the vacant positions whose activities are carried out in the hourly payment.

For Assistant Lecturers who do not have pedagogical training, UTCB ensures their training within the Department for Teacher Training/Didactic personnel that operates on the basis of its own regulations/rules (Annex I.28_UTCB_Regulament DPPD_2017.pdf).

The situation of the teaching positions and their occupation can be found in Annex I.33 (Annex I.33_UTCB_Situaţia posturilor didactice şi a ocupării acestora), and the List of teaching staff in Annex I.34 (Annex I.34_UTCB_Lista-personalului-didactic-la-structura-academica-evaluata.pdf) The percentage distribution of teaching positions is that presented in Annex I.35 (Annex I.35_UTCB_Numarul si structura posturilor didactice.pdf).

I.1.8 Material Basis

UTCB's material base consisting of land and buildings is distributed in six locations:

- The location from Lacul Tei Boulevard. no. 122- 124 (Cadastral court decision no. 7029 / 11.06.2002, District 2 Court);
- The location from Lacul Tei Boulevard. no. 143 (Cadastral court decision no. 7028 / 11.06.2002, District 2 Court);
- The location from Pache Protopopescu Boulevard. no. 66 (Cadastral court decision no. 7030 / 11.06.2002, District 2 Court);
- The location from Calea Plevnei, no. 59;
- The location in Colentina, Răscoala street from 1907, no. 5 (Cadastral court decision no. 7031 / 11.06.2003, District 2 Court);
- The location of the Space Research Laboratory from Murighiol - Tulcea County (Cadastral court decision no. 4560 / 07.08.2002, Tulcea Court).

These lands total an area of 9.07 ha and the buildings total a built-up area of 93,690 sqm.

From the total surface of 93690 sqm, the built surface is 53911 sqm, 41839 sqm representing didactic spaces and administrative or annex spaces.

The situation of teaching, research and library spaces is presented in Annex I.36 (Annex I.36_UTCB_Detalierea-indicatorilor-privind-spatiile-de-invatamant.pdf).

The situation of the educational spaces by faculties is presented below (Table 2) and the topographic plans of the six locations, in Annex I.37 (Annex I.37_UTCB_Amplasament UTCB.pdf).

Table 2. Educational Spaces

EDUCATIONAL SPACES		
Building name	Spread area (sqm)	Usable area (sqm)
FACULTY OF CIVIL, INDUSTRIAL AND AGRICULTURAL CONSTRUCTIONS	10344	6135
FACULTY OF HIDROTECHNICS	12670	8037
FACULTY OF RAILWAYS, ROADS AND BRIDGES AND FACULTY OF GEODESY	10400	5127
FACULTY OF INSTALLATION ENGINEERING	15411	7659
FACULTY OF TECHNOLOGICAL EQUIPMENT	5086	3353
TOTAL	53911	30311

I.1.9. Financial Activity

The accounting of the university has as specialized activity the evaluation, knowledge, management and control of the assets, debts and own capitals, as well as of the results obtained from the institutional activity, ensures the chronological and systematic registration, processing, publishing and maintaining information on financial position, financial performance and cash flows, both for its internal requirements and for external users.

The institution's accounting provides information to the authorizing officer regarding the execution of the revenue and expenditure budgets, the result of the budget execution, the patrimony under administration, the patrimonial (economic) result, the cost of the programs approved through the budget.

The items presented in the financial statements are valued in accordance with the general accounting principles, according to accrual accounting, principles that the UTCB Economic Directorate respects and applies.

Some of the most important principles applied and respected by the Economic Directorate are:

- the principle of continuity of activity - shows that UTCB continues normally its functioning, without entering into a state of abolition or significant reduction of activity;
- the principle of the methods permanence - The evaluation methods must be applied consistently from one financial year/exercise to another;
- the principle of prudence - The evaluation must be made on a prudent basis and in particular all commitments arising during the current financial year or a previous financial year must be taken into account;
- the principle of accrual-based accounting -The effects of transactions and other events are recognized when transactions and events occur and not as cash or equivalents are collected or paid and are recorded in the financial statements and reported in the financial statements of the reporting periods.

The financial statements prepared on the basis of this principle provide information not only about past transactions and events that led to receipts and payments but also about future resources, respectively future payment obligations.

This principle is based on the independence of the according exercise to which all revenues and all expenses relate to the year/exercise to which they refer, without taking into account the date of collection of revenues, respectively the date of payment of expenses.

UTCB has organized its own accounting structure, led by an economic director, with specialized higher education, subordinated to the General Administrative Director

The economic director, responsible for the organization and management of accounting, ensures, according to the law, the organization and inventory of assets and liabilities, as well as capitalization of its results, compliance with the rules for preparing financial statements, their timely submission to law enforcement, keeping the supporting documents, the registers and the financial statements, organizing the adapted accounting management to the specifics of the institution.

The Economic Department subordinates the financial-accounting service headed by a head of service, as well as two offices: the Financial Office and the Accounting Office.

According to the Regulation of organization and functioning, the attributions of the Economic Directorate are:

a) Coordination and monitoring of the activity of subordinated structures;
b) The organization, guidance, management, control and responsibility for the efficient conduct of the economic activity of the institution in accordance with the legal provisions in force;
c) Keeps and transmits to the UTCB Archive the documents created and held.

Also, according to Law no. 500/2002, the economic director has attributions in the substantiation, elaboration and execution of the institution's budget, and within the economic directorate the accounting records of the patrimonial elements of the nature of assets, debts and own capitals are organized, of income and expenses in cash and commitment accounting bases, the payment of expenses is made, the financial statements are drawn up.

The structure of the revenue and expenditure budget approved by the MEC, on the basis of which UTCB carries out its economic activity, is presented by financing sources, in which revenues are detailed by nature and source of financing, and expenses are detailed by nature and destination.

Financial resources of the UTCB ore composed of:

- institutional contract, respectively basic financing, food allowance, holiday vouchers, scholarships for students, other facilities/activities for students (student transport), ongoing investments;
- the complementary contract, respectively capital expenditure allowance, diner dormitory subsidy allowance;
- income from self-financed activity, respectively own income from basic activity (education), research income, sponsorship income, publishing house, diner dormitory income, income from non-reimbursable projects (ESF, ERDF, Erasmus, World Bank, etc.)

The MEC approves UTCB's annual revenue and expenditure budget, as well as each budget correction.

The final revenue and expenditure budgets approved by the MEC for the years 2016-2022, broken down by nature and source of funding, are presented in the following table.

Tablel 3. Revenue and Expenditure Budget

Item. No.	Name of indicators	2016	2017	2018	2019	2020	2021	2022
I.	**Initial balance on January 1st ***	**15.521.516**	**5.793.909**	**5.081.185**	**16.846.480**	**21.431.175**	**31.277.522**	**37.739.444**
1	**TOTAL INCOME, of which:**	**91.689.233**	**81.462.645**	**78.104.629**	**105.940.140**	**105.639.035**	**102.748.962**	**94.107.113**
1.1	**Amounts received MENCS - institutional contract**	**50.676.114**	**37.318.875**	**42.667.411**	**69.234.566**	**68.964.115**	**59.595.828**	**58.522.103**
1.1.1	Basic financing	34.748.086	37.318.875	40.643.311	47.038.144	53.666.075	53.777.683	52.743.130
1.1.2	Food allowance	0	0	0	2.238.567	2.246.902	2.167.443	2.167.443
1.1.3	Institutional Development Fund - IDF	0	0	1.110.600	1.360.000	1.710.000	1.651.000	1.626.000
1.1.4	Law 85/2016	15.928.028	0	0	17.404.868	7.731.459	0	0
1.1.5	Juridicial decisions	0	0	0	285.287	164.129	0	0
1.1.6	Holiday vouchers	0	0	913.500	907.700	888.850	0	903.350
1.1.7	Funding for special situations	0	0	0	0	2.556.700	767.381	0
1.1.8	Funding for university research	0	0	0	0	0	1.232.321	1.082.180
1.2.	**funded program ROSE**	0	20.000	100.036	125.000	1.400.000	1.000.000	560.844
1.3.	**Own revenues obtained from fees and activities carried out by higher education institutions**	7.895.000	6.650.000	5.039.871	8.005.473	6.859.000	5.881.000	5.946.000
1.4.	**Other personal income + donations and sponsorships**	620.000	650.000	464.000	963.372	1.100.000	1.000.000	780.000
1.5.	**Projects financed from non-reimbursable external funds (FEN) POSTADERARE**	4.805.240	1.895.000	415.260	1.900.000	3.100.000	1.976.760	3.615.579
1.6.	**Revenues from scientific research, design, consulting and expertise**	13.000.000	14.000.000	10.596.655	6.276.289	5.600.000	7.371.423	8.000.000
1.7.	**Allocations from the state budget with special destination, of which:**	10.732.879	16.978.770	15.151.396	15.275.202	15.115.920	18.202.711	14.882.587
a)	capital repairs	1.800.000	1.500.000	900.000	1.700.000	250.000	1.950.000	950.000
b)	subsidies for dormitories and diners	3.048.234	2.856.149	2.784.305	2.726.111	2.408.415	2.580.167	2.354.988
c)	Endowments/features and other investments	649.000	700.000	300.000	625.000	550.000	2.300.000	550.000
d)	scholarships	4.315.145	9.193.621	9.890.091	9.145.091	9.634.505	9.736.544	9.228.599
e)	other forms of social protection of students	502.500	479.000	477.000	404.000	373.000	386.000	359.000
f)	allocations for investment objectives	418.000	2.250.000	800.000	675.000	1.900.000	1.250.000	1.440.000
1.8	**Own income dorms-diners**	3.960.000	3.950.000	3.670.000	4.160.238	3.500.000	2.408.133	1.800.000
2	**TOTAL EXPENDITURE, of which:**	**107.210.749**	**87.256.554**	**83.185.814**	**108.428.700**	**110.021.029**	**110.034.962**	**96.707.113**

2.1.	Expenses for the basic activity	72.610.082	49.390.444	51.429.077	79.613.195	81.113.823	71.208.671	65.347.259
2.2	Expenditures from amounts received ROSE Program	0	20.000	204.340	700.776	1.400.000	1.000.000	560.844
2.3.	Projects with financing from non-reimbursable external funds (FEN) POSTACCESSION	3.143.398	592.763	992.070	1.900.000	3.291.286	7.616.423	4.616.423
2.4.	Expenses for scientific research, design, consulting and expertise	15.513.440	15.752.141	10.873.931	6.279.289	5.600.000	7.286.867	8.500.000
2.5.	Expenditures from allocations from the state budget with special destination, of which:	10.732.879	16.978.770	15.151.396	15.275.202	15.115.920	18.202.711	14.882.587
a)	capital repair expenses	1.800.000	1.500.000	900.000	1.700.000	250.000	1.950.000	950.000
b)	grants for student dormitories and diners	3.048.234	2.856.149	2.784.305	2.726.111	2.408.415	2.580.167	2.354.988
c)	expenses for endowments and other investments, consolidations, rehabilitation	649.000	700.000	300.000	625.000	550.000	2.300.000	550.000
d)	scholarship expenses	4.315.145	9.193.621	9.890.091	9.145.091	9.634.505	9.736.544	9.228.599
e)	expenses for other forms of social protection	502.500	479.000	477.000	404.000	373.000	386.000	359.000
f)	expenses for investment objectives	418.000	2.250.000	800.000	675.000	1.900.000	1.250.000	1.440.000
2.6.	Expenses for student dormitories and diners	5.210.950	4.522.436	4.535.000	4.660.238	3.500.000	4.720.290	.2.800.000
II.	Final balance on December 31st	0	0	0	14.360.920	17.049.181	23.988.522	35.139.444

* the initial balance provided in the approved revenue and expenditure budgets for the years 2016-2019 is in fact the value that was approved to be spent from the total balance of budget, and for 2020 is the total balance of budget.

The final expenditures approved by the MEC for the years 2016-2022, broken down by their destination, are presented in the following table:

Table 4. Expenses 2016– 2022

	2016	2017	2018	2019	2020	2021	2022
II) TOTAL EXPENDITURE, of which:	107.210.749	87.256.554	83.185.814	108.425.700	110.021.029	110.034.962	96.707.113
10. Staff costs, of which	64.620.010	49.202.346	49.860.282	76.773.638	73.363.821	64.091.122	60.427.103
20. Goods and services	22.830.124	20.944.248	14.819.770	15.092.844	17.880.932	18.507.073	16.010.988

56.10 Projects financed from non-reimbursable external funds (FEN) POSTADERARE	783.158	592.763	0	0	0	0	0
from which:	0	0	0	0	0	0	0
56.10.01 European Regional Development Fund	0	0	0	0	0	0	0
56.10.02 European Social Fund	783.158	592.763	0	0	0	0	0
56.16 Other tools and facilitate post-accession	2.360.240	0	992.070	1.900.000	3.291.286	7.616.423	4.616.423
58.10 Projects financed from non-reimbursable external funds related to the financial framework 2014-2020, of which	0	0	0	0	1.600.000	3.320.253	2.316.423
58.10.01 Programs from the Social European Fund (FSE)	2.360.240	0	65.260	900.000	900.000	3.170.646	1.300.000
58.10.16 Other tools and facilitate post-accession	0	0	926.810	1.000.000	791.286	1.125.524	1.000.000
57. Social assistance	502.500	479.000	477.000	404.000	373.000	386.000	359.000
59. Other expenses	4.465.145	9.600.230	10.752.971	9.819.244	10.635.990	11.440.344	9.853.599
71. Non-financial assets	11.649.572	6.437.967	6.283.721	4.435.974	4.476.000	7.994.000	5.440.000

I.1.10. Students

UTCB has a permanent concern to provide students with all the information that is useful to them or that can support them in the training process in all its phases. For this purpose, the new UTCB SITE was created (see http://www.utcb.ro)

Admission of students to undergraduate, master's and doctoral programs is governed by the Admission Methodology approved by the UTCB Senate for each type of admission (Annex I.19 - Bachelor's Degree - Annex I.19_UTCB_Metodologie-admitere-licență.pdf, Annex I.20 – Masterat - Annex I.20_UTCB_Metodologie-admitere-master.pdf, Annex I.21 – Doctorat - Annex I.21_UTCB_Metodologie admitere Doctorat 2021_2022.pdf).

In order to support the candidates, for them to have a correct information and a good understanding of the activities they carry out in the whole complex admission process, they are developed, printed, distributed and displayed on the UTCB website.

UTCB presentation and details on undergraduate and master's admission (https://utcb.ro/studiaza/licenta/admitere/).

Admission of candidates for doctoral studies is done through an annual competition organized by UTCB, usually in the last 20 days of September (https://admitere.utcb.ro/admitere-sud/). The admission contest is organized on doctoral fields and specializations. Admission of candidates is made within the limits of the places put up for competition, in the order of the grades obtained in the competition. The admission competition comprises a written exam of linguistic competence and an oral exam, consisting of two tests.

The various activities related to the admission process are rigorously described in internal procedures which are distributed and explained to teachers in a special call dedicated to the admission process.

UTCB has regulated the procedure for promoting the student from one year of study to another, depending on the number of transferable credit points (ECTS) accumulated, in the Regulation on the development of students' activity in the Technical University of Civil Engineering of Bucharest (Annex I.38 - Annex I.38_UTCB_Regulament-organizarea-programelor-de-studii-în-sistemul-de-credite-transferabile.pdf).

The results obtained by the students during the schooling are attested by the Diploma Supplement, which is completed and issued at the end of the studies, simultaneously with the bachelor's degree. During the years of study, students' school situations are drawn up.

The final exam (diploma / bachelor's / dissertation / doctorate) within UTCB is carried out according to the regulations approved by the UTCB Senate (Annex I.23 - Annex I.23_UTCB_Metodologie-finalizare-studii-licență.pdf, Annex I.24 - Annex I.24_UTCB_Metodologie-finalizare-studii-master.pdf, Annex I.25 – Annex I.25_UTCB_Metodologie_finalizare_SUD.pdf), developed and updated every year, in accordance with the specifications of the Ministry of Education of that date, and diplomas and certificates of graduation of bachelor's, master's, postgraduate specialization and perfecting and doctorate are awarded to graduates in accordance with the conditions established by law (Annex I.39 - Annex I.39_UTCB_Regimul actelor de studii.pdf) .

The dynamics of student enrollment in the evaluated period, 2016-2022 is presented in Table 5.

Table 5. Dynamics of student enrollment in the period 2016 - 2022 reported in January of each year

Year	Cycle	Places financed with governemental fundings			Places with tuition fees			Total
		Romanian students	Foreign students	Total	Romanian students	Foreign students	Total	General
2016	Bachelor	2832	65	2897	1040	100	1140	4037
	Master	1114	10	1124	303	28	331	1455
	Doctorate	162	2	164	192	7	199	363
	TOTAL	**4108**	**77**	**4185**	**1535**	**135**	**1670**	**5855**
2017	Bachelor	2558	99	2657	977	151	1128	3785
	Master	1155	21	1176	284	51	335	1511
	Doctorate	162	4	166	154	14	168	334
	TOTAL	**3875**	**124**	**3999**	**1415**	**216**	**1631**	**5630**
2018	Bachelor	2444	93	2537	793	154	947	3484
	Master	1169	34	1203	201	39	240	1443
	Doctorate	147	8	155	123	26	169	324
	TOTAL	**3760**	**135**	**3895**	**1117**	**219**	**1356**	**5251**

2019	Bachelor	2320	68	2388	622	161	783	3171
	Master	1078	30	1108	173	45	218	1326
	Doctorate	158	5	163	162	23	185	348
	TOTAL	**3556**	**103**	**3659**	**957**	**229**	**1186**	**4845**
2020	Bachelor	2374	74	2448	865	201	1066	3514
	Master	1000	28	1028	271	44	315	1343
	Doctorate	147	2	149	136	20	156	305
	TOTAL	**3521**	**104**	**3625**	**1272**	**265**	**1537**	**5162**
2021	Bachelor	2569	67	2636	892	325	1217	3853
	Master	980	37	1017	344	74	418	1435
	Doctorate	134	7	141	149	25	174	315
	TOTAL	**3683**	**111**	**3794**	**1385**	**424**	**1809**	**5603**
2022	Bachelor	2819	71	2890	1015	104	1119	4009
	Master	967	26	993	394	38	432	1425
	Doctorate	103	7	110	155	20	175	285
	TOTAL	**3889**	**104**	**3993**	**1564**	**162**	**1726**	**5719**

I.1.11. Scientific Research Activity

Overview

The scientific research is a key component of the higher education process in UTCB and is achieved through the contribution of the academic teaching and research staff, based on research projects granted in a competitive system, through national, European or international research programs, regarding bilateral collaboration projects with domestic or foreign institutions, on consultancy agreements for the World Bank, or on projects contracted directly with various clients which are interested in the areas in which these activities are performed.

The research activities are included in university programs, in those of teaching departments, faculties, non-teaching departments, research centers, etc. The topic of doctoral scientific research programs is also included within these programs.

UTCB also carries out scientific research activities in partnership with other educational and research institutes in the country or abroad, including within networks (European Civil Engineering Education and Training - EUCEET, the thematic network set up by UTCB, a network comprising 131 partner institutions from 29 European countries) or research consortia whereby UTCB achieves research excellence. UTCB has concluded cooperation agreements in the field of research, with UTCB being part of more than 16 international organizations and associations. Collaboration agreements have been concluded with universities/institutes/research centers in the Netherlands, Portugal, Germany, Switzerland, France, and Bulgaria.

UTCB is part of the three clusters presented below:

1. "Măgurele High Tech Cluster" - expected results: participating in international competitions together with cluster members (innovative SMEs);
2. "Different Angle" - expected results: supporting initiatives aimed to create solutions for adding Bucharest to the list of smart cities and to promote the transfer of knowledge between academia and the private sector;
3. "Cluster for promoting nearly zero energy buildings in Romania (Pro-nZEB)" - expected result: promoting and developing the construction/building materials sectors with a focus on energy efficiency, and they have been successfully promoted.

UTCB is part of the "Cluster for promoting nearly zero energy buildings in Romania (Pro-nZEB)" and the expected result is promoting and developing the construction/building materials sectors with a focus on energy efficiency, and they have been successfully promoted.

UTCB is part of the "Măgurele High Tech Cluster" and the expected results are its participating in international competitions together with cluster members (innovative SMEs).

The Research, Development, and Innovation Management Center (CMCDI) is a structural and functional academic unit within the Technical University of Civil Engineering Bucharest, not being registered as a legal entity, established pursuant to the provisions of Law no.1/2011 and of the University Charter. Its goal is to support and encourage scientific research in UTCB, by ensuring that the management of the activities related to accessing funds for research in national and international competitions, funds related to the development and implementation of national and international research projects, and the analysis of the research results, as well as funds related to the technological transfer of knowledge to the socioeconomic field.

The scientific research activity operates under the Organizational Regulations concerning Research, Development and Innovation in UTCB (Annex I.17_UTCB_ROF-CDI.pdf) approved in the UTCB Senate meeting on 29.03.2018.

The objectives of the Research, Development and Innovation Management Center are:

- Implementing the research, development and innovation strategy developed by the UTCB Scientific Research Council;
- Increasing participation and accessing funding from national and international competitions, as well as those from the national and international economic environment by:
  - informing teaching and research staff on the availability of grants and research program competitions, at national and international level;
  - ensuring logistical support for filling in the necessary documentation for grant competitions and research programs;
  - providing consultancy in RDI project management.

By means of CNFIS-FDI-2018-0342 and CNFIS-FDI-2019-0438 projects, 130 academic staff and auxiliary teaching staff were trained by setting up courses: writing research projects on Horizon 2020, expert access to European and cohesion funds, and project management courses in order to attract investments and access research and cohesion funds by increasing the number of projects submitted in national and international competitions.

- Coordinating activities related to managing and monitoring the research, development and innovation projects carried out within UTCB:
  - approving research topics and completed research projects;
  - following up the performance and implementation phases of grants and research programs;
  - monitoring the performance of the accomplished indicators (research studies, new or modernized products and services, publications, using human and material resources according to project needs, ensuring purchases, etc.) for each research project.
- Expanding the collaboration between UTCB research structures or between the UTCB internal research structures and external structures interested in

developing collaborations with UTCB on topics of common interest such as research, development, innovation;
- Centralizing data related to scientific research;

By means of CNFIS-FDI-2018-0342 and CNFIS-FDI-2019-0438 projects, an IT platform was developed in order to centralize research results at institutional level - almost 450 researchers and support staff as beneficiaries (UTCB academic staff, researchers, PhD students, Masters students and auxiliary teaching staff). (https://cdi.utcb.ro/)

Analysis of the results of research, development, and innovation activities in UTCB;
- Ensuring the organizational framework for the evaluation of research centers, by complying with the scientific research ethics in UTCB;
- Disseminating the results of scientific research, development and innovation carried out in the centers and laboratories of the Technical University of Civil Engineering Bucharest;

By means of CNFIS-FDI-2018-0342 and CNFIS-FDI-2019-0438 projects, the participation in national/international events (fairs, exhibitions, competitions for universities, seminars on research activity, relevant lectures for disseminating research results) was accomplished.
- Gathering data and information necessary for the development of the scientific research strategy at university level, medium-to-long term;
- Promoting patenting activity within UTCB;
- Promoting RDI results at research fairs/exhibitions;
- Promoting RDI results within the International Solar Decathlon competition;
- Developing and updating the website.

The specific activities contracted by UTCB-DMCDI are carried out within 6 research departments:
- Civil engineering;
- Hydrotechnics;
- Railways, roads, and bridges;
- Building services engineering;
- Mechanical engineering;
- Geodesy, surveying.

The departments include research centers and laboratories corresponding to each faculty. Research Laboratories (different from teaching laboratories) have national accreditations and certifications.

By means of CNFIS-FDI-2018-0342 project, the following promotional materials have been issued:

1. A catalog in which the UTCB research centers were presented; to enhance the profile of UTCB internationally, the document is written both in Romanian and in English. The following information has been presented for each research center:
   - research infrastructure;
   - research areas;
   - sample research agreements;
   - research staff;
   - results (articles, books);
   - research services.

2. Flyers (in Romanian and English) for all research centers within UTCB

The promotional materials were used at national/international events (fairs, exhibitions, competitions for universities, seminars on research activity, relevant lectures for disseminating research results).

UTCB-CMCDI is administered through a research unit that provides information, consultancy and evaluation for specific research areas and has the following functions:

Pre-contractual support:

- opportunity dissemination;
- guidance in drafting proposals;
- registration and transmission of application form templates;
- raising awareness regarding international research programs.

Contracting support:

- guidance (training) in drafting agreements and annexes;
- registration of application form templates;
- registration and dissemination of national and international non-financial regulations;
- ensuring a link with contracting authorities;
- internal and external consultancy for patents of national and international innovations.

Management information:

- conducting regular and annual research evaluation reports;
- editing informative materials in the scientific research field;
- quality management of research activities (implementing standards, audits, evaluations, training).

The performance of financing agreements for research works is carried out under the operational procedures SMC-PO-13_ DMCDI (Annex I.40_Procedura Operationala - PO 13.pdf).

Each year, the CMCDI manager, together with the competent prorector prepares a report regarding the scientific research and technological development activity carried out in UTCB (Annex I.41_UTCB_Raport_cercetare_UTCB_2017.pdf, Annex I.42_UTCB_Raport_cercetare_UTCB_2018.pdf, Annex I.43_UTCB_Raport_cercetare_UTCB_2019.pdf, Annex I.44_UTCB_Raport_cercetare_ UTCB_2020.pdf, Annex I.45_UTCB_Raport_cercetare_ UTCB_2021.pdf)

Research funding

Funding the scientific research in UTCB is carried out pursuant to the provisions of the National Education Law no. 1/2011 and qualifies for a mixed mechanism, created in this regard by the regulations in force, which provide funding based on the teaching load, additional funding, and separate funding through agreements with different beneficiaries.

Funding based on teaching load shall be provided considering that scientific research is a mandatory component of the teaching load or through exclusive scientific research rules.

UTCB's own revenue shall be derived from scientific research agreements and shall be highlighted in a separate account.

The envisaged own revenue is used for the purpose of developing a basis for own research material, as well as for the payment of the staff who performed the agreement. The material basis consists of such items as: fixed assets, inventory items and materials of any kind. These items can be purchased during the performance of the agreement or, in case of agreements with third parties, after the reimbursement and receipt of the value of the agreement phases.

The revenue can be used to finance the following types of expenses: scholarships, research and information internships, member fees for taking part in relevant agencies, organizations and institutions, organizing and/or participating in national and international cultural and scientific events, publishing educational and specialized books.

Funding scientific research and RDI projects in UTCB is done from the following financing sources:

a. national public funds from the state budget, managed by the Contracting Authorities within the RDI Programs under the National RDI Plan, by organizing competitions or project tenders;
b. European Union public funds, from the European Commission Budget, managed by the contracting bodies within the RDI Programs of the European Commission, by organizing competitions or project tenders;
c. World Bank funds
d. funds for Research, Development, Innovation and Extension assigned to Romania as an EU member, under the Structural Instruments (Structural Funds and Cohesion Fund), managed in the competitive system based on projects deemed as winners and financeable, following competitions organized by the legally approved entities;
e. funds assigned to RDI projects by member states to which Romania benefits from funding, managed according to the Information Packages or Specifications developed under the conditions established by the sponsor or sponsors within the related project Programs and Competitions;
f. funds from research, design, consultancy, or innovation agreements concluded with economic operators or organizations from the economic or corporate environment;
g. other funding sources (international programs, donations, etc.).

Due to the great research potential provided by the academic staff and university researchers, and due to the special attention given to the growing research activity, UTCB has managed to win RDI projects within research project competitions, both at national and European level, and thus has managed to attract important funds for financing actual research activities, but also for investing in the research infrastructure.

As such, UTCB has made progress in the last 5 years in increasing research capacity and enhancing quality and performance in scientific research activity.

Through the research-design-consultancy offer granted to the economic environment, the UTCB research teams have achieved an important part of the total value contracted by UTCB.

The annual progress regarding the number and values of agreements on research, pre-normative and normative research, services, and educational services concluded between 2017 and 2022, by departments, was as follows (Table 6):

Table 6. Value of Research Contracts 2017– 2022

SECTIA	VAL. CTR la 31.12.2017 (LEI)	VAL. CTR la 31.12.2018 (LEI)	VAL. CTR la 31.12.2019 (LEI)	VAL. CTR la 31.12.2020 (LEI)	VAL. CTR la 31.12.2021 (LEI)	VAL. CTR la 31.12.2022 (LEI)	NR.CTR. la 31.12.2017	NR.CTR. la 31.12.2018	NR.CTR. la 31.12.2019	NR.CTR. la 31.12.2020	NR.CTR. la 31.12.2021	NR.CTR. la 30.04.2022
CC	2.774.882	2.964.097	3.764.263	438507.92	2634370.04	190740.69	61	19	47	11	30	7
CF	3.012.488	3.201.703	446.055	552458.99	1171573.63	264139.79	241	11	63	63	85	39
GC	1.096.563	2.117.444	925.787	296770	4115550	40625	18	22	14	10	12	2
H	3.919.843	6.023.316	5.729.267	2071173.48	2575482.12	702357.25	109	93	105	87	86	39
II	3.935.804	5.586.870	1.106.874	1026769.93	3843033.39	253915.82	43	19	22	28	23	11
UT	191.997	639.551	346	20000	298657.41	0	3	0	0	1	3	0
FILS	0	1871093.4	26927.27	451814.54	416821	4242	0	127	3	24	7	1
TOTAL	14.931.577,00	22404075.4	12345172.27	4857494.86	15055487.6	1456020.55	475	291	254	224	246	99

The structure and value of the performance indicators achieved in the period 2015 to 2020 demonstrates the level of the university's performance in scientific research, as well as the ways of harnessing the scientific research capacity, as shown in the following table (Table 7) and the detailed information can be found in the following documents:

- Annex I.46 - Annex I.46_UTCB_Articole stiintifice publicate in reviste de specialitate cotate ISI 2017-2022.pdf
- Annex I.47 - Annex I.47_Articole BDI 2017 - 2022
- Annex I.48 - Annex I.48_Lucrari publicate in volumele conf inter indexate ISI si sau organizate de soc profesionale inter.pdf
- Annex I.49 - Annex I.49_Anexa_Articole neindexate 2017-2021.pdf
- Annex I.50 - Annex I.50_Carti capitole carti publicate in edituri nationale 2017-2021.pdf
- Annex I.51 - Annex I.51_Carti capitole carti publicate in edituri internationale 2017-2021.pdf
- Annex I.52 - Annex I.52_Brevete 2017 - 2022.pdf
- Annex I.53 - Annex I.53_ Anexa_Premii 2017- 2021.pdf
- Annex I.54 - Annex I.54 - Manifestari stiintifice 2017-2022.pdf

Table 7. Research Results 2017– 2021

Item no.	Indicator name	Total number
1.	ISI listed articles	353
2.	BDI listed articles	452
3.	Works published in international conference volume of proceedings, ISI-listed, and in those organized by international professional companies	279
4.	Articles published in journals and conference volumes with referees (not indexed under BDI/ISI)	219
5.	Books published by national publishing houses, approved by CNCSIS (National Council of Scientific Research in Higher Education)	201
6.	Books/chapters published by prestigious international publishing houses	39
7.	Patents	21
8.	Awards	55
9.	Publicly defended PhD theses	53
10.	Doctoral supervisors, members of the research team	51
11	Scientific works	280

Research Staff

The research staff carrying out the scientific research activity consists of the university's teachers, their own, associate and auxiliary research staff, PhD students, master's and students as well as other staff. There are currently 327 teachers in the UTCB, of which 290 teachers, lecturers and heads of works, as well as 37 assistants. The scientific research activity is carried out by the university's teachers as follows from the following annexes:

- Annex I.55 - Annex I.55 Centralizatorul_datelor_privind_cercetarea_stiintifica_CDI_CPN_nationale_internationale 2017- 2022.pdf
- Annex I.56 - Annex I.56_UTCB_Centralizatorul_datelor_privind_proiecte_finantate_din_ fonduri_institutionale_structurale (2015-2020).pdf
- Annex I.57 - Annex I.57_UTCB_Centralizatorul_datelor_privind_programe externe mobilitati (2017-2022).pdf
- Annex I.58 - Annex I.58_UTCB_Proiecte internationale 2017-2022.pdf
- Annex I.59 - Annex I.59_UTCB_Proiecte nationale de cercetare 2017-2022.pdf

If, in the performance of research projects, the research staff with a basic research function does not participate, the teaching functions are internalized according to the law, with the research functions as follows: Professor – equivalent to scientific researcher category A; Associate Professor – equivalent to scientific researcher category B; Head of department/Lecturer – equivalent to scientific researcher category C; Assistant Lecturer – equivalent to scientific researcher.

Research centers

A. Research centers

UTCB has 18 Research Centers founded based on a methodology approved by the Senate. The list of the 18 research centers is the following:

1. Reinforced concrete structures research center (C.C.S.B.)
2. Seismic risk assessment research center (C.E.R.S.)
3. Mathematics and informatics research center
4. Hydrotechnical works and water management research center (A.Q.U.A.)
5. Groundwater engineering research center (C.I.A.S.)
6. Geotechnical engineering research center (C.I.G.)
7. Roads and airports research center
8. Research center for the recovery of mineral waste in construction materials (V.A.D.E.M.C.)
9. Advanced research center in strength of materials (C.A.R.E.M.)
10. Research center in the field of structural engineering, probabilistic modelling of actions and structural risk assessment Professor Dan Ghiocel (C.C.D.G.)
11. Advanced research center for ambient quality and building physics (C.A.M.B.I.)
12. Energy efficiency in buildings research center (C.E.E.C.)
13. Thermal systems research center (S.I.T.E.R.)
14. Electrical engineering and lightening research center (C.C.- I.E.L.I.)

15. Spatial geodesy, photogrammetry, remote sensing and G.I.S research center (G.E.O.S.)
16. Geodetic engineering measurements and spatial data infrastructures research center (C.C.M.G.I.I.D.S.)
17. Technical equipment engineering in constructions research center
18. Specialized translation and intercultural communication research center (T.S.C.I.)
19. The Center for Research in Applied Ethics (C.C.E.A) subordinated to the Doctoral School of UTCB.

B. Accredited or certified research laboratories:

Currently, there are 39 research laboratories in UTCB, as follows:

1. Steel structures laboratory – research/services/teaching, authorized by the State Inspectorate in Civil Engineerings (ISC) in 2002, 2007, 2011; currently being re-authorized;
2. Research and testing laboratory of the reinforced concrete department - research/services/teaching, grade I authorization given by the State Inspectorate in Civil Engineerings (ISC);
3. Structural testing laboratory – research/services/authorization: not applicable;
4. Geotechnical and foundations laboratory (with workstations in Colentina and Tei) – research/services/teaching, authorized by the State Inspectorate in Civil Engineerings (ISC);
5. Strength of materials laboratory – teaching/services/research;
6. Roads laboratory – teaching/services/research, authorized by the State Inspectorate in Civil Engineerings (ISC);
7. Thermal systems and equipment testing laboratory (INSIST) – services, accredited by RENAR;
8. Civil Engineering materials laboratory – teaching/services/research, authorized by the State Inspectorate in Civil Engineerings (ISC);
9. "GIRD DATA CENTER" laboratory Room II-1a – teaching/research;
10. Research-development laboratory in the field of SYSTEMS ENGINEERING – AUTOMATION AND APPLIED INFORMATICS – research;
11. Automation laboratory – Room II-11 – teaching/research;
12. Pollutant chemistry laboratory - Colentina complex of laboratories – research/services/teaching;
13. Microbiology and toxicology laboratory - Colentina complex of laboratories – research/services/teaching;
14. Water biology laboratory - Colentina complex of laboratories – research/services/teaching;
15. Small models laboratory - Colentina complex of laboratories – research/services/teaching;
16. Geospatial processing and GIS Tempus room laboratory – research/teaching;
17. Aerodynamics and wind engineering "Constantin Iamandi" laboratory – research/teaching;

18. Hydraulics laboratory – research/teaching;
19. Environmental protection laboratory – services;
20. Facilities laboratory – teaching/research/services;
21. Research laboratory for energy efficiency and study of clean energy sources – research/services;
22. Computer laboratory for research and development activities in the field of energy efficiency – research/services;
23. Laboratory "Research center in the field of thermal engineering" – research;
24. Electrical engineering laboratory – teaching/research;
25. Electrical machines laboratory – teaching/research;
26. Automatization and control laboratory – teaching/research;
27. Automation and regulation laboratory "Professor Constantin Ionescu" – teaching/research;
28. Measurements in installations laboratory – teaching/research;
29. Lightening and electrical laboratory – teaching/research;
30. Laboratory "Center of applications for lightning systems" – teaching/research;
31. Electricity quality and electromagnetic compatibility laboratory – research/services;
32. Laboratory for determining the photometric, technical and energetic performances of artificial and integrated lighting devices and systems "Professor Cornel Bianchi" - research/services;
33. Laboratory of home automation and pervasive systems in intelligent buildings – research/services;
34. Geodesy laboratory – research/teaching;
35. Spatial geodesy laboratory – research;
36. Photogrammetry laboratory "Professor. dr. eng. Nicolae OPRESCU" – research/teaching;
37. Remote sensing and GIS laboratory "Prof. dr. ing. Florea ZĂVOIANU" – research/teaching;
38. Cartography laboratory – research/teaching;
39. GIS laboratory – teaching/research;

Presentation of UTCB in Competitions, Expositions, National and International Fairs

UTCB participates at various fairs and research and innovation expositions, on its own stands, as well as in partnership with economic agents. The participation of UTCB is also done by means of presenting scientific papers.

A successful participation of UTCB students is at Solar Decathlon international competition. Solar Decathlon is a competition for universities all around the world that takes place in 5 geographical regions: Europe, Middle East, Asia, North America and Doctoral studies America. The competition involves the design, construction and assembly of a smart, energy efficient and fully equipped solar house in only 10 days. After entering the competition, each team is judged for 10 criteria, those being: architecture, engineering and construction, energy efficiency, electricity balance, comfort conditions, operation of the house, communication and social awareness, urban design, transport and accessibility, innovation and sustainability. During the

judging period (10 days) the houses are included in a visiting program during which students present and answer all questions related to the prototype.

From 2012 up to and including 2019, students from UTCB guided by academic staff participated at 4 Solar Decathlon editions (Solar Decathlon Europe 2012, Madrid, Spain; Solar Decathlon Europe 2014, Versailles, France; Solar Decathlon Middle East 2018, Dubai, United Arab Emirates and Solar Decathlon 2021, Wuppertal, Germany).

In 2019, EFdeN team obtained the first award at the Excellence Awards Gala for UTCB students.

Starting with 2016, the Technical University of Civil Engineering in Bucharest (UTCB) has been participating in the most prestigious international competition for students in the field of seismic engineering, organized each year by the Earthquake Engineering Research Institute (EERI) in different cities from the USA and Canada, as follows:

2016- San Francisco, USA
2017- Portland, USA
2018- Los Angeles USA
2019- Vancouver, Canada
2020- San Diego, USA

The aim of the competition is to promote research in the filed of seismic engineering among undergraduate students, as well as to develop professional relationships. Teams coordinated by University Professor Radu Văcăreanu, Associate Professor Viorel Popa and Associate Professor Mihail Iancovici (UTCB), together with Eng. Dragos Marcu (industry consultant, Pop Pop și Asociații) managed to occupy meritorious places in competition with teams from the most powerful universities in the world, such as UC Berkley, Stanford University, UCLA, etc.

Participating in this competition offers students the opportunity to acquire skills such as: practical realization of balsa wood models of a building with significant height regime and characteristics defined by the regulation, preparation and presentation of a speech in a foreign language, teamwork and communication, conduct research in the field of seismic engineering within an international context. They have acquired various skills, among which: designing of a building, following the most advanced principles and seismic design concepts from static and dynamic analyses, experimental testing of the structural behavior by means of free and forced vibration tests (seismic platform testing) and those of design based on performance and resilience. Moreover, an in-depth analysis was performed, regarding the implication of the design on the energy efficiency of the building. Thus, it resulted an integrated and multi-disciplinary project of high-level seismic design.

Teams of students from the Technical University of Civil Engineering in Bucharest (UTCB) obtained meritorious rankings for the following judging criteria: (i) the quality of the project proposal, (ii) the quality of the presentation, (iii) the quality of the project"s poster, (iv) the quality of the architectural project and (v) structural performance, in conjunction with the economic efficiency of the project.

Following the success of the project done by UTCB students in 2017, there was a subsequent participation at the International Fair Electric & Automation Show, Bucharest 2017, where the project was appreciated by awarding a mention within the Technical Innovation section.

SDC project from 2017 participated as integrated part in other events organized by UTCB, such as the first edition of ConstructFEST in 2017 and RIUF-Romanina International University Fair in 2018 and IEAS Fair – International Electric & Automation

Show. In 2018, EERI team from SDC 2017 obtained the first award at the Excellence Awards Gala from UTCB.

In 2015 and 2018 UTCB participated in the editions organized by the Research Salon, a national exhibition dedicated to all Romanian universities and research institutes from Romana, an event in which the results of scientific research were presented, as well as major projects in which the university was involved.

For the presentation of research centers and research/service laboratories from the university, CMCDI-UCTB participated (in 2015, 2016, 2017, 2018 and 2019) in the following fairs:

a. CONSTRUCT EXPO – international fair for technologies, equipment, machinery and construction materials;
b. ROMTHERM – international exhibition for installations, heating, cooling and air conditioning equipment;
c. ROMENVIROTEC – international exhibition for environmental protection technologies and equipment;

In 2015 and 2016 UTCB participated at RENEXPO® doctoral studies-EAST EUROPE –Energy + Energy Efficiency Fair and in 2018 at IEAS – International Electric & Automation Show, through partnership agreements with the event organizers.

Participation in the Innovation Forum, event organized within TIB 2015, in the event "Innovation day" and the appearance in the presentation volume "100 faces of innovation", volume made by the NATIONAL AUTHORITY FOR RESEARCH AND INNOVATION (ANCSI) increased the degree of visibility of the university.

I.1.12. University Doctoral Studies at UTCB

The Technical University of Civil Engineering Bucharest is a Doctorate Awarding Institution (IOSUD) comprising a Doctoral School that can organize doctoral studies in the fundamental field of ranking "Engineering Sciences", in the following branches of science and fields:

The doctoral studies organized within the Doctoral School of UTCB are carried out in in accordance with OM No. 5382/2016 of September 29, 2016, the Fundamental Field of Engineering Sciences, in the following branches of science and fields:

- Field of Science: Civil Engineering:
    - Field doctoral studies: Civil and building services engineering:
- Field of science: Electrical, electronic and telecommunications engineering:
    - Field doctoral studies: Electrical Engineering
- Field of science: Mechanical engineering, mechatronics, industrial engineering and management:
    - Field doctoral studies: Mechanical Engineering;
    - Field doctoral studies: Industrial Engineering.

In 2021, the periodic external evaluation was requested for IOSUD UTCB and for the two active doctoral fields, Civil and Building Services Engineering and Mechanical Engineering. Accreditation was maintained for IOSUD UTCB and for the field of Civil and Building Services Engineering and conditional accreditation for the field of Mechanical Engineering.

The doctoral studies are carried out at UTCB in the following forms of education:

1. Frequency student, on the allocated places from the budget with scholarship
2. Frequency student, on the allocated places from the budget, without scholarship

3. Part-time student, on budget allocated places
4. Tuition fee paying student
5. Self-funding student (fee in foreign currency) (CPV)

In June 2016, the Council of University Studies of Doctorate (CSUD) was established, headed by a Director of the CSUD, appointed following a competition. Until this date, the duties of the CSUD were taken over by the Doctoral School Council (CSD).

Relations between the CSUD, the Doctoral School and other component structures of the UTCB are established by the University Charter of the UTCB, respectively: THE CSUD is directly subordinated to the Rector of utcB and is headed by the Director of the CSUD, the Doctoral School is subordinated to the CSUD and the Proctor with the teaching activity, being led by the CSD and the Director of the Doctoral School.

The university doctoral studies at UTCB are organized in accordance with the Regulation on the organization of the University Studies of Doctorate (Annex I.27_UTCB_ROF SUD rev 2_2020.pdf) prepared by theCSUD, approved by the Council of Administration of UTCB and approved by the UTCB Senate.

The UTCB CSUD consists of 13 members:

- The Director of the CSUD who is appointed following a competition by the Rector of the UTCB, in accordance with the approved methodology (Annex I.60 - Annex I.60_UTCB_METODOLOGIE DE DESEMNARE A DIRECTORULUI SCOLII DOCTORALE si CSD.pdf);

- Members (Annex I.61_UTCB_METODOLOGIE DE DESEMNARE A MEMBRILOR CONSILIULUI STUDIILOR UNIVERSITARE DE DOCTORAT.pdf):
  - PhD coordinators, up to 50%, full professors or researchers who must have the right to conduct PhDs, at home or abroad, and meet the minimum and mandatory standards for the granting of the certificate of empowerment in force at the time of their designation as members of the CSUD.
  - Scientific personalities with international recognition or personalities from industrial sectors in the proportion of 30%. Members of the CSUD scientific personalities who are teachers or researchers must meet the same criteria defined for the members of the PhD advisors.
  - At least 20% doctoral students.

Currently CSUD is made up of:
Director CSUD: Prof Eng. Loretta Batali, Ph.D.
UTCB PhD Supervisors:

1. Prof.Eng. Ana-Cornelia Badea, Ph.D.
2. Assoc.Prof.Eng. Tiberiu Catalina, Ph.D.
3. Assoc.Prof.Eng. Cristiana Croitoru, Ph.D.
4. Prof.Eng. Dan Georgescu, Ph.D.
5. Prof.Eng. Ilinca Năstase, Ph.D.
6. Assoc.Prof.Eng. Catalin Teodosiu, Ph.D.

Members from outside UTCB:

1. Prof. Acad. Dan Dubina, Ph.D. (UP Timișoara)
2. Eng. Catalin Nae, Ph.D. (INCAS Bucharest)

3. Eng. Cristian Erbașu, Ph.D. (Federation of Employers of Civil Engineering Societies)

Doctoral members:

1. Eng. –
2. Eng. Charles Berville, Ph.D. student
3. Eng. Elena Simona Serban, Ph.D. student

To be mentioned the fact that a place is vacant after defending the doctoral thesis of Mr. Silviu Ionescu Lupeanu and at the moment the students are organizing elections.

See the following documents:

- Annex I.62 - Annex I.62_UTCB_Decizie numire director CSUD.pdf
- Annex I.63 - Annex I.63_UTCB_Hotarirea CA nr. 2184 din 10.03.2021_Director interimar CSUD.pdf
- Annex I.64 - Annex I.64_UTCB_Hotarare Senat -Validarea CSUD+CSD.pdf
- Annex I.65 – Annex I.65_UTCB_Hotarare senat 11411 - 10.12.2020 - completare CSUD CSD.pdf
- Annex I.66 – Annex I.66_UTCB_Hotarare senat 3649 - 28.04.2021, Hotarare senat 4170 - 19.05.2021- completare CSUD CSD.pdf

In accordance with the Regulation of organization of doctoral studies (Annex I.27_UTCB_ROF SUD rev 2_2020.pdf) CSUD has the following duties and responsibilities:

a. approves the Rules of the Doctoral School and the Regulation on the Empowerment of PhD Coordinators of the UTCB;
b. develops the doctoral school strategy (General Strategic Plan, Medium-Term Strategic Plan, Annual Implementation Plans);
c. proposes to the University Senate the establishment or abolition of specializations;
d. proposes for senate approval the tuition figures related to the Doctoral School;
e. approves the Advanced University Training Programme (PPUA)
f. periodically reviews the way in which the activities carried out within the Doctoral School are carried out and takes appropriate measures to increase their effectiveness;
g. approves the regulatory orders corresponding to the PhD advisors and guidance committees;
h. establishes minimum standards of scientific performance with a view to granting or revoking the membership of the Doctoral School to phD advisors;
i. approves the registration and expulsion of Doctoral students on the proposal of the CSD;
j. assists the external assessor in the evaluation process with a view to accreditation/re-accreditation or provisional authorisation of the Doctoral School;
k. adopts decisions on any other matter within its jurisdiction.

According to the approved documents, the mission of IOSUD - UTCB is to carry out and develop the activity of doctoral education AND, implicitly, in-depth scientific research in its fields of competence, for the benefit and progress of society.

The general strategic development plan of the University Doctoral studies sets out the strategic objectives in this field, such as (Annex I.67 - Annex I.67_UTCB_Plan managerial Director CSUD.pdf, Annex I.68 - Annex I.68_UTCB_Plan_Strategic_General_SD_UTCB.pdf):

- continuation of the tradition of engineering construction education at UTCB,
- developing new valences of future doctors to better adapt to the requirements of industry and the labour market,
- rejuvenation of the body of PhD advisors,
- improving the scientific level of doctoral thesis,
- ensuring compliance with the ethics of research,
- increasing the visibility of the doctoral studies, the Doctoral School as a whole, including the results obtained from doctoral scientific research, in order to strengthen the national position and position at an international leading position,
- increasing the internationalization of PhD students, as well as PhD advisors,
- increasing the level of equipment of research infrastructure,
- promoting interdisciplinary, transnational and international collaboration in the field of doctoral studies,
- ensuring compliance of doctoral studies and the doctoral school with the current evaluation criteria.

These objectives correspond to those set out in the UTCB Strategic Plan for the period 2020 – 2024 (Annex I.10 - Annex I.10_UTCB_Plan-strategic-UTCB-2020-2024.pdf) In UTCB university doctoral studies are organized in forms of part-time (IF) and reduced frequency (IFR) education and can be financed from the state budget, through grants obtained on a competitive basis, through tuition fees or from other legally constituted sources.

The evaluation of candidates for doctoral studies is made through anual contest organized by UTCB, in September of each academic year, in accordance with the approved methodology (Annex I.27 – Annex I.27_UTCB_ROF SUD rev 2_2020.pdf).

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The evaluation of candidates for doctoral studies is made through anual contest organized by UTCB, in September of each academic year, in accordance with the approved methodology (Annex I.21 – Annex I.21_UTCB_Metodologie admitere Doctorat 2021_2022.pdf).

The DOCTORAL degree is composed of the *"Advanced University Training Program" (PPUA)* with a duration of one semester and *the "Scientific Research Program (PCS)",*with a duration of five semesters, completed with the support of the doctoral thesis.

The advanced university training program is carried out in UTCB on the basis of an educational plan developed by the CSD, approved by the CSUD and approved by the Senate. El comprises the Ethics and Academic Integrity discipline and three mandatory disciplines (DO1 – complementary training disciplines, DO2 – general technical training

disciplines and DO3 – specialized technical training disciplines), which provide all UTCB PhD students with a unified vision in addressing scientific research specific to engineering sciences and management skills of scientific research projects, respectively.

The scientific research report comprises two elective disciplines and three research reports.

University doctoral programs provide the training of professional skills (content, cognitive and research) in specialized fields, as well as cross-cutting skills.

The competences provided by the IOSUD – UTCB Doctoral studies Programmes are:

Professional competences:

a. advanced knowledge in the field;
b. ability to identify, formulate and solve research problems;
c. mastery of advanced research methods and techniques;
d. knowledge of the management of research projects;
e. mastery of new research processes and solutions;
f. skills for documenting, elaborating and valuing scientific work;
g. linguistic skills at academic level in languages of international circulation necessary for the documentation and development of scientific papers;
h. understanding and ability to apply the principles and values of the ethics of scientific research in that field.

Transverse competences:

a. communication skills, written and oral, in the field of science and culture;
b. advanced language skills in languages of international circulation;
c. the use of information and communication technology;
d. interrelationship and teamwork skills;
e. knowledge of human, material and financial resources management;
f. driving qualities;
g. knowledge of career management;
h. knowledge of risk, crisis and failure management;
i. knowledge of the use of legislation in the field of intellectual property rights;
j. economic, technological and social entrepreneurship capacities.

CSUD has carried out its work through regular meetings, but also through distance communications, with the main tasks:

- ensuring the general framework for the conduct of university doctoral studies at UTCB by adopting and revising plans of measures, regulations, procedures, methodologies.
- promoting doctoral studies to UTCB
- increasing the scientific level of doctoral thesis
- promoting interdisciplinary research and international collaboration in the field of doctoral studies
- creating the framework and carrying out actions related to the empowerment of new PhD adivsors
- raising funds for doctoral studies

The main activities consisted of:

- adopting a plan of measures to increase the scientific level of doctoral thesis carried out at UTCB (Annex I.69 - Annex I.69_UTCB_Masuri imbunatatirea nivelului stiintific al tezelor.pdf)
- elaboration of the Regulation for the organisation of doctoral studies at UTCB (Annex I.27 - Annex I.27_UTCB_ROF SUD rev 2_2020.pdf)
- reviewing the Rules of the Doctoral School (Annex I.70 – Annex I.70_UTCB_ROF SD Revizia 10.pdf)
- elaboration and revision of the Regulation on the habilitation of new PhD coordinators (Annex I.71 - Annex I.71_UTCB_Regulament abilitare rev4.pdf) and carrying out associated activities in order to rejuvenate the corps of PhD advisors
- elaboration of the Methodology of admission to the doctoral studies (Annex I.21- Annex I.21_UTCB_Metodologie admitere Doctorat 2021_2022.pdf)
- elaboration of the Methodology for the completion of doctoral studies (Annex I.25 - Annex I.25_UTCB_Metodologie finalizare SUD.pdf)
- elaboration of the Regulation of Internal Grants for PhDstudents (GID) (Annex I.72 - Annex I.72_UTCB_REGULAMENT GID.pdf)
- elaboration of the Code of Ethics of the Doctoral School (Annex I.73 - Annex I.73_UTCB_COD-DE-ETICA-SD-UTCB.pdf)
- - elaboration of criteria for the internal evaluation of PhD advisors (Annex I.74 – Annex I.74_UTCB_Criterii evaluare conducatori de doctorat_2019.pdf)
- elaboration of a procedure for recognition of the status of doctoral advisor obtained in other states Annex I.75 - Annex I.75_UTCB_Procedura_Recunoastere abilitare _final.pdf)
- elaboration of methodologies for the appointment of the Director of the Doctoral School and members of the Doctoral School Council (Annex I.76 - Annex I.76_UTCB_METODOLOGIE DE DESEMNARE A DIRECTORULUI SCOLII DOCTORALE si CSD.pdf)
- - attracting FDI funds to improve the work of PhD students and the Doctoral School – CNFIS-FDI-0125-2018, CNFIS-FDI-0354-2019, CNFIS-FDI-0370-2020 FDI-CNFIS-2021-0144 and FDI-CNFIS-2022-0397projects.

I.1.13 Quality Management at UTCB

In the structure of the Technical University of Civil Engineering of Bucharest operates a Quality Management Office (Annex I.32 - Annex I.32_UTCB_Hotarare senat Organigrama cu anexa.pdf), as well as the UTCB Commission for Quality Assessment and Assurance (CEAC – UTCB) (Annex I.77 - Annex I.77_UTCB_ROF CEAC UTCB 2020.pdf, Annex I.78 - Annex I.78_UTCB_Decizie CEAC 16.12.2020.pdf). At the level of faculties, the Doctoral School and the DPPD also operate the Evaluation and Quality Assurance Commissions (CEAC-x), Annex I.79 - Annex I.79_UTCB_CEAC-X.pdf),

Technical University of Civil Engineering Bucharest has developed and implemented Quality Manual (Annex I.80 - Annex I.80_UTCB_Manualul Calitatii-UTCB_Ed.4.pdf), as well as a Certified Quality Management System for Education and Research Activities (Annex I.81 - Annex I.81_UTCB_Certificat SRAC 2018.pdf) within the university and has defined the quality objectives and Quality Policy for the overall activity of the university .(Annex I.82 - Annex I.82_UTCB_Politica universitatii MC.pdf).

The quality management system documentation includes system procedures, operational procedures and a series of record sheets used to record quality evidence (Annex I.83 - Annex I.83_UTCB_Lista inregistrarilor calitatii.pdf).

To increase the quality of the educational process in UTCB is implemented a procedure for "Assessing the professional performance of the teaching staff" (Annex I.84 - Annex I.84_UTCB_PO-10_Ed.4 - Evaluare personal didactic.pdf). The evaluation shall be carried out periodically, on the basis of an evaluation programme approved by the Management Board, on the basis of criteria approved by the UTCB Senate. In the evaluation process, the work of the teaching and research staff and the assessments of the students are taken into account. The evaluation process is completed the statistical processing of information on teaching activities, with the ranking of competences and with proposals to continuously improve the quality of the training of the teaching staff.

For the control and evaluation of the teaching process UTCB has implemented, within the quality assurance system, a procedure for "Control of the didactic process" (Annex I.85 - Annex I.85_UTCB_PO-06_Ed.4 - Contr. si eval. procesului didactic.pdf). The process of evaluation of the subjects is carried out on the basis of the "Methodology on the internal evaluation of the teaching process for the subjects in the educational plans of the teaching units of the Technical University of Civil Engineering of Bucharest" (Annex I.86 - Annex I.86_UTCB_PO-06_Anexa 5_02. Metodologie privind evaluarea interna a procesului didactic COD PO-06_Anexa 5.pdf).

UTCB has implemented an electronic system for tracking graduates in order to evaluate the evolution of graduates

Quality Assurance Policies and Strategies

The Technical University of Civil Engineerings Bucharest has a quality policy focused on internal clients (students, master students, doctoral students) and oriented towards the excellence of the services and activities performed.

UTCB's quality objectives are:

- identifying and applying the best practices for keeping under control and continuous improvement of the educational process (teaching-learning, monitoring and supporting the progress made by students and evaluating the knowledge and skills acquired by them);
- implementation of criteria and quality evaluation procedures on all segments of the educational process;
- introduction of feedback from students, graduates and employers, on the structure and quality of educational provision and its improvement accordingly;
- identifying the real requirements and expectations of the socio-economic environment regarding the competencies of the graduates of each specialization, their correlation with the university experience and with the international (European) practice.

The policy statement on the quality of the Rector of the Technical University of Civil Engineerings Bucharest is given below:

The main mission of UTCB is to train specialists who have the necessary capacity and skills to use valuable scientific, technical and managerial knowledge, in order to integrate in the economic processes of Romanian and European and international society.

UTCB promotes the concept of excellence of training and research and development services and is consistent with its mission to train, at the highest level, specialists to contribute to scientific and technological progress, to the development of professionalism and efficiency. to increase the usefulness of this training in the real economy, in order to increase the standard of living.

Our main goal is to contribute to the overall satisfaction of our customers (students and society) by providing quality education and training services.

Each UTCB employee is responsible for achieving the proposed objectives, so as to be achieved in addition to the satisfaction of customers and society and that of each of our colleagues.

Student satisfaction, i.e. the full realization of their requirements is necessary because they are the reason we exist. In everything we do, we must be with the students, support them in carrying out their activities and meet them, so that in the market of training services we will be their first choice.

Society satisfaction is necessary because science and technology must be considered priorities of society. Our managerial system is designed and oriented so as to have the necessary flexibility to adapt to change and to correspond to the national strategy of higher education.We want the personal satisfaction of our employees because the quality of the services offered is always determined and created by people. Employee satisfaction contributes to the greatest extent to increasing the quality of our activities. Procedures, techniques, rules are not enough to gain a competitive advantage. The elements that ensure success are in us, in our attitudes and actions, in the way we cooperate with our colleagues and in the way we cooperate with our clients.

In order to obtain the general satisfaction, we have created a Quality Management System that gives us confidence that we will maintain a high quality of training and research and development services.

The implementation of the quality policy is ensured by fulfilling the following objectives:

1. defining the requirements of our internal and external clients;
2. training capable graduates to succeed in the labor market competition;
3. increasing the performance of the education process by completing it with high-level scientific research activities, in accordance with the needs and expectations of current science and technology, by involving both teachers and students, masters and doctoral students;
4. the use of information technology, as a support for the continuous improvement of the quality of the educational process by all the factors involved;
5. Involvement of all university staff in knowing, understanding and improving the entire process of education and training of our students.

In implementing the quality policy, we follow the following principles that must be learned by each employee:

- transparency of our policy and its knowledge by all stakeholders;
- consistent and current use of the Quality Management System to give confidence that our policy will be implemented;
- make full use of our professional training and resources to be able to provide quality services;
- maintaining this system under control and measuring the obtained performances.

The general objectives of quality assurance are:

- Use of new systems for continuous improvement of the quality of educational and research processes in UTCB;
- Use of appropriate methods and tools to meet the criteria set out in the ARACIS Methodology;
- Improving the professional performances through the evaluation, self-evaluation and annual ranking of the teachers, based on some evaluation criteria of maximum exigency;
- Improving the quality of study programs and analytical programs through their periodic evaluation, based on internal and international evaluation criteria;
- Improving the quality of institutional management;
- Increasing the level of satisfaction of all employees by improving the conditions of activities, by establishing a modern ranking system, by correlating the volume and quality of activities and skills with the level of remuneration, etc .;
- Completion of a modern dissemination and communication system with all parties involved (society, academia, authorities, students, trainees, PhD students, etc.);
- Increasing the level of preparation of students for their integration in the European space and for ensuring compatibility and comparability with European diplomas in the fields of studies of UTCB;
- Implementation of a system for tracking (monitoring) the employment capacity of graduates;
- Establishing and managing a database and information on institutional quality assessment and assurance;
- Improving the system of transferable credits, including in doctoral studies;
- Continuous improvement of teachers through external studies or through research activities, consulting, or collaborations with administrative or production units;
- Increasing the number and volume of international and European collaborations both in teaching and research;
- Increasing the computerization of the teaching process by equipping the classrooms, computer communication with students and trainees, online presentation of courses, etc .;
- Equipment of research and teaching laboratories in order to update the level of knowledge of students and the level of research within UTCB;
- Ensuring the improvement in the UTCB fields through master studies, postgraduate studies, doctoral studies at a high scientific level in order to be able to compete on the domestic and European market;
- Designing and implementing a quality management system (SMC) for the teaching and administrative process;
- Updating and improving the quality management system for the research-development process.

I.1.14 Internal Management Control at UTCB

Ensuring the quality of management processes is achieved not only through an Internal Managerial Control System (Annex I.87 -Annex I.87_UTCB_PS-01B Elaborare documente de control intern.pdf), as well as through good communication between the university's management structures. The Council of Administration has weekly meetings, the minutes of the meetings are posted on the Intranet, as are the decisions of the UTCB Senate.

The responsibilities of UTCB management are clearly established and ensure the effectiveness of the (Annex I.88 - Annex I.88_UTCB_Schema responsabilitatilor conducerii UTCB.pdf).

The UTCB operates the Commission for the monitoring, coordination and methodological guidance of the development of the Internal Management Control System, in accordance with OUG 200/2016 (Annex I.89 - Annex I.89_UTCB_Decizie Rector 3900 din 12.05.2020 şi Regulamentul de organizare şi funcţionare al Comisiei de Monitorizare.pdf).

The UTCB also operates the Technical Secretariat (Annex I.90 - Annex I.90_UTCB_Decizii Rector nr. 3951şi 3952 din 13.05.2020-Secretariat Tehnic.pdf).

I.2. UTCB Doctoral School

I.2.1. Establishment

The Doctoral School of the Technical University of Civil Engineering of Bucharest is established according to the legal provisions in force, namely the Law of National Education No. 1 / 2011 with subsequent amendments andadditions and the Code of University Studies of Doctorate, approved by Decision of the Romanian Government No. 681/2011, with subsequent amendments.

I.2.2. Structure

The doctoral studies organized within the DOCTORAL School of UTCB are carried out in the Fundamental Field of Engineering Sciences, in the following branches of science and fields:

1. Branch of Science: Civil Engineering:
    a. doctoral studies field: Civil and building services engineering:
2. Branch of science: Electrical, electronic and telecommunications Engineering:
    a. doctoral studies Field: Electrical Engineering
3. Branch of science: Mechanical engineering, mechatronics, industrial engineering and management:
    a. doctoral studies field: Mechanical Engineering
    b. doctoral studies field: Industrial engineering.

In 2021, the periodic external evaluation was requested for IOSUD UTCB and for the two active doctoral fields, Civil and Building Services Engineering and Mechanical Engineering. Accreditation was maintained for IOSUD UTCB and for the field of Civil and Building Services Engineering and conditional accreditation for the field of Mechanical Engineering.

There is a single Doctoral School within UTCB, to which a number of 48 doctoral supervisors are affiliated, distributed in accordance with Table 8.

In addition, there are 6 Ph.D. supervisors qualified in the Scientific Branch of Geological Engineering, Geodetic Engineering, Mines, Oil and Gas, Field of Ph.D. studies of Geodetic Engineering.

In the Doctoral School of UTCB there are currently 254 doctoral students at different stages of the period of preparation of the doctoral thesis. For the above-mentioned doctoral fields we present the situation on 31.12.2021 regarding the number of PhD advisors and the total number in Table 8.

Tabel 8. Situation of authorised doctoral fields and the number of PhD advisors and PhD students as at 31.12.2021

Crt. No.	Doctoral field	Order of the Minister in force granting the institution the right to organize the doctorate in the field	Number of PhD advisors at the time of 01.12.2021	Total number of students – PhD students at various stages of the doctoral studies on 01.12.2021
1	Civil and Building Services Engineering	OM No. 5382/2016 of 29 September 2016	38	230
2	Mechanical Engineering		3	23
3	Industrial Engineering		1	1
4	Electrical engineering		-	-
5	Geodetic Engineering (in the process of being established)		5	-
TOTAL			47	254

To these numbers are added two candidates for habilitation who defended the habilitation thesis in the first part of 2022, out of which 1 in the field of doctorate in Civil and Building Services Engineering and 1 in the field of doctorate in Mechanical Engineering.

Wiithin the doctoral fields, on the proposal of the Doctoral School and with the approval of the UTCB Senate, specializations are defined as internal organization that reflect the areas of competence recognized in scientific research. 30 specializations are proposed for the two active fields:

Specializations in the field of doctoral studies Civil Engineering and Installations:

1. Fundamental sciences in civil engineering;
2. Mechanics of structures;
3. Seismic engineering and building safety;
4. Urban engineering and regional development;
5. Civil construction;
6. Communication paths, bridges and tunnels;
7. Railways;
8. Roads and airports;
9. Civil Engineering of reinforced concrete;
10. Metal structures ;
11. Geotechnical and foundations;
12. Water supplies and sewers;
13. Water Treatment;
14. Wastewater purification;

15. Hydrotechnical constructions;
16. Land improvements;
17. Hydraulics and fluid mechanics;
18. Hydrology, hydrogeology and water management;
19. Environmental protection in civil engineering;
20. Building services;
21. Civil Engineering management;
22. Management of investment projects;
23. Economy and efficiency of investments in construction;
24. The quality of the indoor environment;
25. Acoustics of buildings and equipment;
26. Energy of buildings and building services;
27. Geodesy, photogrammetry, cartography and remote sensing.

Specializations in the field of doctoral studies Mechanical Engineering:
28. Thermotechnics;
29. Civil Engineering machinery and equipment;
30. Technical mechanics and vibrations;

The Doctoral School of UTCB is headed by a director of the Doctoral School and a Council of the Doctoral School (CSD).

The Doctoral School consists of:

- PhD advisors;
- Members of the PhD advisory commitees;
- PhD students;
- Council of the Doctoral School (CSD);
- Director of the Doctoral School;
- Secretariat of the Doctoral School.

UTCB Doctoral School has its own organization and operation regulation approved by the UTCB Senate (Annex I.70 – Annex I.70_UTCB_ROF SD Revizia 10.pdf).

The CSD comprises 9 members (Annex I.76 - Annex I.76_UTCB_METODOLOGIE DE DESEMNARE A DIRECTORULUI SCOLII DOCTORALE si CSD.pdf):

- Director of the CSD who is appointed by the CSUD among the PhD advisors
- Members:
    - PhD advisors, up to 50%, full professors or researchers who must have the right to conduct PhDs, at home or abroad. The proportion of PhD advisors in the CSD is determined by the CSUD. The members of the CSD PhD advisors are elected by the General Assembly of PhD advisors. If the general meeting of phD advisors is not statutory (no more than 50% +1 members participate) only proposals of CSD members will be made in that meeting and the vote will be conducted electronically.
    - Scientific personalities with national recognition or personalities from industrial sectors in the proportion of 30%, appointed by the CSUD
    - Doctoral students at least 20%.

Currently the CSD consists of (Annex I.64_UTCB_Hotarare Senat -Validarea CSUD+CSD.pdf Annex I.65_UTCB_Hotarare senat 11411 - 10.12.2020 - completare CSUD CSD.pdf Annex I.66_UTCB_Hotarare senat 3649 - 28.04.2021, Hotarare senat 4170 - 19.05.2021- completare CSUD CSD.pdf Annex I.91_UTCB_Numire director SD.pdf):

Director of the Doctoral School: Conf. dr. ing. Ilinca Năstase

Doctoral advisors members of UTCB:

- Professor Ph.D. Eng Horațiu Popa
- Professor Ph.D. Eng Oana Luca
- Professor Ph.D. Eng Andrei Georgescu

Personalities members from outside UTCB:

- Professor Ph.D. Eng Cosmin Chiorean (UT Cluj-Napoca)
- Phd. Arch. Vasile Meiță (INCERC București)

Doctoral stundents members:

- Phd. Student Eng. Silviu Ionescu Lupeanu
- Phd. Student Eng. Alexandra Angelescu
- Phd. Student Eng. Catalin Sima

In accordance with the Regulation of Organization and Functioning of the Doctoral School (Annex I.70 – Annex I.70_UTCB_ROF SD Revizia 10.pdf), the CSD has the following duties and responsibilities:

- draw up the Regulation of the Doctoral School;
- implements the doctoral school strategy (General Strategic Plan, Medium-Term Strategic Plan, Annual Implementation Plans);
- develop the Advanced University Training Programme (PPUA)
- proposes the CSUD to set up or abolish specializations;
- periodically reviews the way in which the activities carried out within the Doctoral School are carried out and takes appropriate measures to increase their effectiveness;
- analyse the regulatory orders corresponding to the PhD advisors and guidance committees;
- grant or revoke, as appropriate, membership of the Doctoral School to PhD advisors;
- establish minimum standards of scientific performance with a view to granting or revoking the membership of the Doctoral School to phD advisors;
- proposes the registration and expulsion of Doctoral students, on the proposal of PhD advisors, members of the Doctoral School;
- assist the external assessor in the evaluation process with a view to accreditation/re-accreditation or provisional authorisation of the Doctoral School;
- adopt decisions on any other matter within its jurisdiction.

I.2.3. The Evolution of the UTCB Doctoral School

The UTCB Senate decided in the meeting of June 26, 2006 the establishment of the Department of Doctoral studies (DSD), starting from July 1, 2006, university structure consisting of director, deputy director and secretary, together with the 81 Ph.D. supervisors - academicians, academics and university lecturers, as well as over 760 PhD students.

Starting with 2007, after the accession to the European Union and the implementation of the Bologna Process in university education, the Doctoral School has been led by the following professors:

- Professor Ph.D. Eng Virgil Petrescu – 2006 – 2011;
- Professor Ph.D. Eng Mircea Degeratu – 2011 – 2012;
- Professor Ph.D. Eng Gabriel Racoviteanu – 2012 – 2016;
- Professor Ph.D. Eng Loretta Batali – 2016 – 2017;
- Associate Professor Ilinca Năstase – 2017 - present

Starting with 2012, the Advanced University Training Program (PPUA) was introduced, which takes place in the first semester, of the first year, in order to provide PhD students with a unitary vision in approaching the scientific research specific to engineering sciences.

Up to and including 2014, the Advanced University Training Program had a total of 8 disciplines classified into 3 groups of disciplines called "optional". The PhD students could choose a dicipline within each group.

The following table (Table 9) presents the disciplines that were studied within the PPUA between 2012-2014.

Table 9. Disciplinines within PPUA between 2012 - 2014

Nr. Crt.	Name of the discipline	Number of credits
Optional discipline 1		
1	Structural mechanics	10
2	Thermohydraulics and environmental engineering	
3	Geotechnics and foundations	
4	Analysis of mechanical systems and processes	
Optional discipline 2		
5	Management of scientific research projects	10
6	Integrated management in constructions	
7	Geographic information systems (SIG)	
Optional discipline 3		
8	Mathematical modeling and numerical calculation	10
9	Physical modeling and principles regarding data acquisition and processing	
	TOTAL	30

Starting from the 2015-2016 academic year, the disciplines studied within the PPUA were diversified, and their classification was done according to the way in which they are classified from a scientific point of view:

• Disciplines of complementary scientific training;
• Disciplines of general technical training;
• Disciplines of specialized technical training;

Within each set of disciplines there is a basic group of disciplines from which PhD students can choose one to study, and also a group of optional disciplines for which PhD students can opt regardless of the number of disciplines and which are activated depending on the number of entrants.

The following table (Table 10) presents the disciplines that have been studied within the PPUA starting with 2015-2016 academic year.

Table 10. Disiplines within PPUA starting with 2015-2016 academic year

Nr. crt.	Name of the discipline	The type of the subject	Number of credits
The discipline of complementary scientific training			
1	Management of scientific research projects	Optional subjects	10
2	The technique of carrying out and drafting scientific papers		
3	Management and business management in constructions		
4	The PhD methodology for scientific research	Facultative subjects	-
5	Technical English		
6	Technical French		
7	Technical German		
The discipline of general technical training			
8	Elements of physical modeling	Optional subjects Facultative subjects	10
9	Mathematical modeling and numerical calculation		
10	Physical modeling and principles of acquisition and processing of experimental data		
11	Modeling of transfer processes		
12	Infographics and numerical simulation	Optional subjects	-
13	Applications of variables and random processes in civil engineering		
The discipline of specialized technical training			
14	Structural mechanics	Optional subjects Facultative subjects	10
15	Hazard, vulnerability and seismic risk		
16	Geographic information systems		
17	Risk Assessment and Management in Hydrotechnical Engineering		
18	Risk sources in geotechnical engineering		
19	Environmental quality and energy efficiency of buildings		
20	Modern experimental techniques for the quality of built environment		
21	Durability of reinforced concrete constructions	Optional subjects	-
22	Nonlinear analysis of concrete structures		
23	Structural robustness		
24	Simulation of water treatment processes on pilot installations and instrumental analysis		

Starting with 2018, Ethics and academic integrity discipline was introduced within PPUA as a compulsory discipline. In the same year, through the project CNFIS-FDI-0125-2018, was done the course support for this disciplie. In 2019 (through the project CNFIS-FDI-0354-2019) and in 2020 (through the project CNFIS-FDI-0370-2020) were done course supports for the following disciplines: The technique of carrying out and drafting scientific papers, Management of scientific research projects, Technical English, Durability of reinforced concrete constructions, Nonlinear analysis of concrete structures, Simulation of water treatment processes on pilot installations and instrumental analysis

Table 11 and Figure 1 show the evolution of the number of PhD supervisors affiliated to the UTCB Doctoral School.

Table 11. The evolution of the total number of PhD supervisors affiliated to the UTCB Doctoral School

Nr. Crt.	Dcotoral Field	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
1	Civil and Building Services Engineering	61	62	45	44	38	38+1*
2	Mechanical Engineering	9	9	5	5	3	3+1*
3	Industrial Engineering	2	2	1	1	1	1
4	*Geodetic Engineering - in the process of being established*	1	2	2	3	3	6

To these numbers are added two candidates for habilitation who defended the habilitation thesis in the first part of 2022, out of which 1 in the field of doctorate in Civil and Building Services Engineering and 1 in the field of doctorate in Mechanical Engineering.

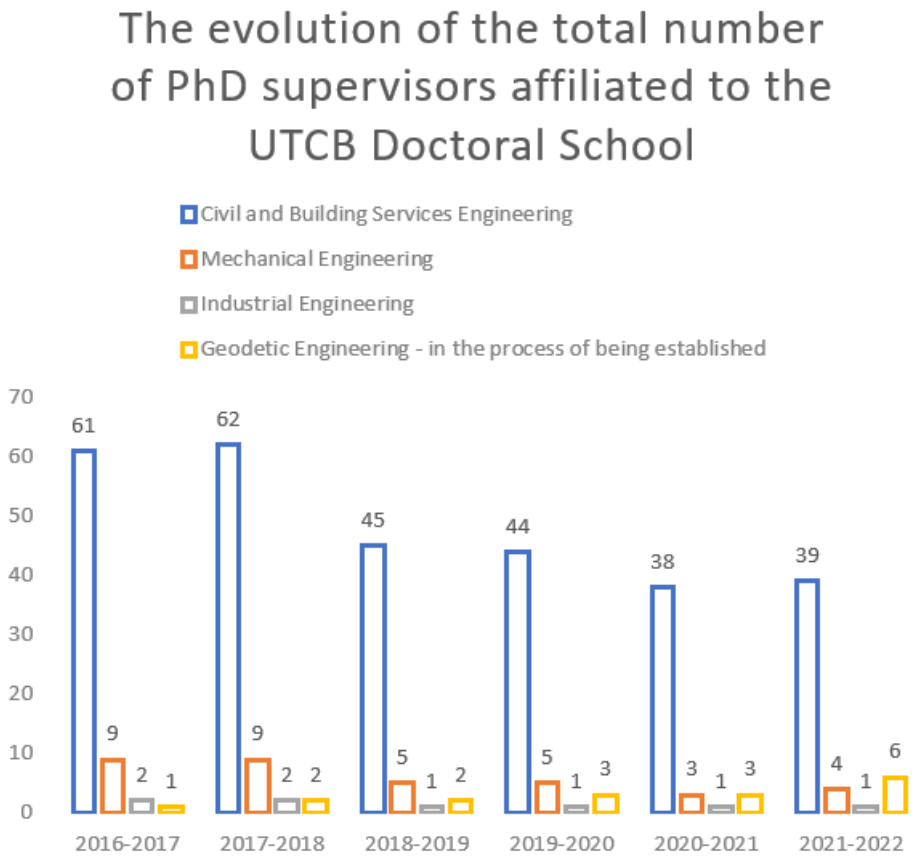


Figure 1. The evolution of the total number of PhD supervisors affiliated to the UTCB Doctoral School

Between 2016 and 2021, 15 doctoral supervisors were empowered, of which 9 in the field of Civil Engineering and Installations, 5 in Geodetic Engineering (field under establishment) and 1 in Industrial Engineering (as yet unaffiliated).

One can notice a decrease in the number of PhD supervisors during the analyzed period, due to the aging of the teaching staff, the retirement of many PhD supervisors, but also the efforts made to rejuvenate the PhD supervisors by qualifying a significant number of professors.

One can also notice, basically, the disappearance of the doctoral studies field of Electrical Engineering and a critical situation of the doctoral studies field of Industrial Engineering. However, the latter could be revitalized during the following years.

Figure 2 shows the age distribution of PhD supervisors within the UTCB Doctoral School.

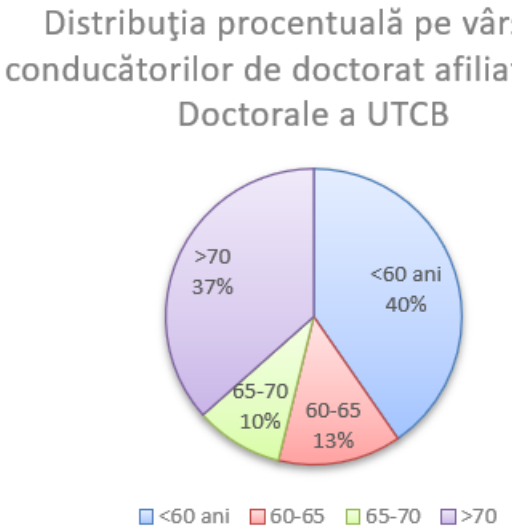


Figure 2. Percentage distribution by age of PhD supervisors affiliated to the UTCB Doctoral School

It is noted that, at present, for the whole Doctoral School, 47% of the Ph.D. advisors are over the retirement age (>65 years), and 53% are below the retirement age, of which 13% are between 60 and 65 years old, so in maximum 5 years they will be retired.

In Table 12 is presented the dynamics of the newly enrolled PhD students in the period 2016 – 2022, and in Table 13 the dynamics of the total number of PhD students in the same period.

Table 12. Dynamics of new PhD Students enrolled in the period 2016 – 2022 in the UTCB Doctoral School

No	Form of education	Year of registration						
			2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
1	Full time, with scholarship	Civil Engineering and Building Services	24	22	26	20	24	20
		Mechanical Engineering	2	3	0	2	1	0
		Industrial Engineering	2	0	0	0	0	0
		Total	**28**	**25**	**26**	**22**	**25**	**20**
2	Full time without scholarship	Civil Engineering and Building Services	23	28	2	0	13	10
		Mechanical Engineering	1	2	0	0	3	3
		Total	**24**	**30**	**2**	**0**	**16**	**13**

3	Part time, without scholarship	Civil Engineering and Building Services	0	0	37	16	0	0
		Mechanical Engineering	0	0	1	4	0	0
		Total	**0**	**0**	**38**	**20**	**0**	**0**
4	Full time, fee-based education	Civil Engineering and Building Services	11	18	2	6	13	3
		Mechanical Engineering	0	0	0	0	0	1
		Total	**11**	**18**	**2**	**6**	**13**	**4**
6	**TOTAL**		**63**	**73**	**68**	**48**	**54**	**40**

Table 13. Dynamics of total PhD students in the period 2016 – 2020 in the UTCB Doctoral School as compared to January of eachyear

Year	BUDGET			TAX			Total
	Romanian	Foreign	Total	Romanian	Foreign	Total	general
2016	162	2	164	192	7	199	363
2017	162	4	166	154	14	168	334
2018	147	8	155	123	26	169	324
2019	158	5	163	162	23	185	348
2020	147	2	149	136	20	156	305
2021	134	7	141	149	25	174	315

Figure 3 shows the percentage distribution by faculties of new PhD students enrolled in the period 2016 – 2021, and in Figure 4 the numerical distribution by forms of education.

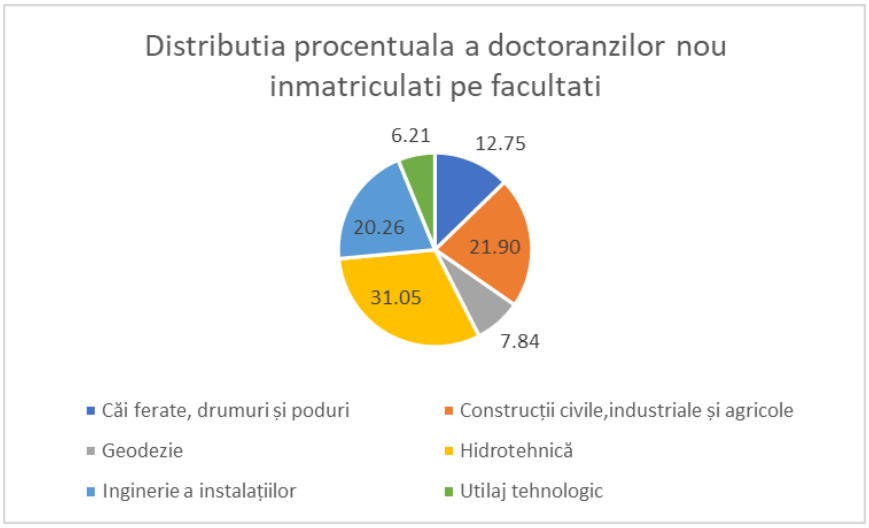


Figure 3. Percentage distribution of newly registered PhD students in the period 2016 – 2020

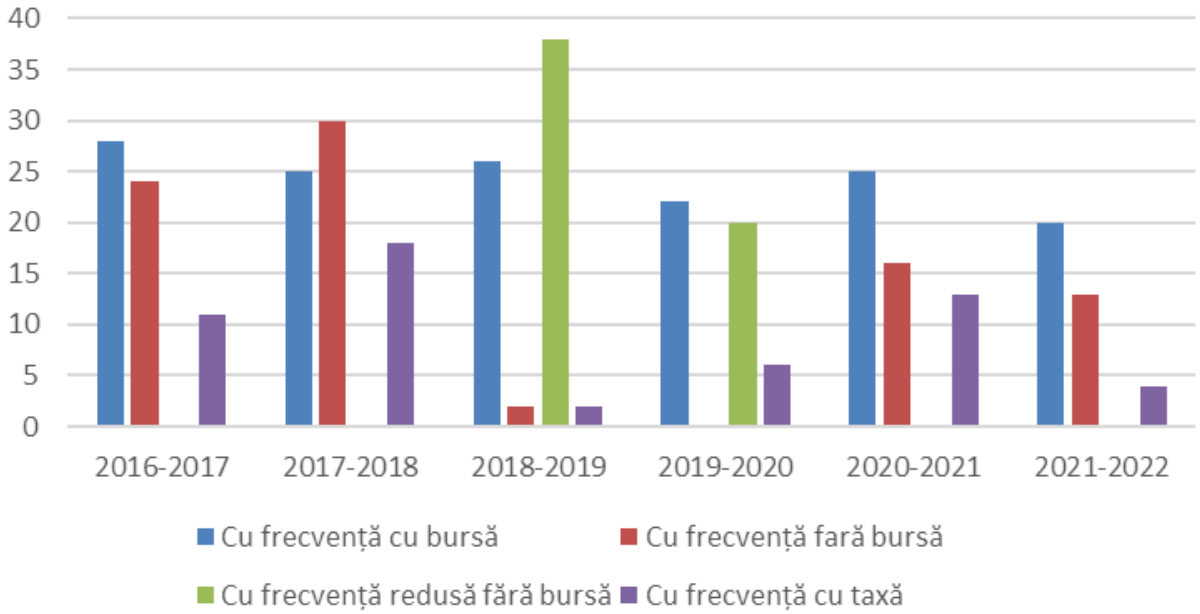


Figure 4. Numerical distribution of newly registered PhD students by forms of education in the period 2016 – 2021

During the period under review, 2016 – 2021, 154 PhD theses were presented in the period under review, and their distribution per year is presented in Figure 5.

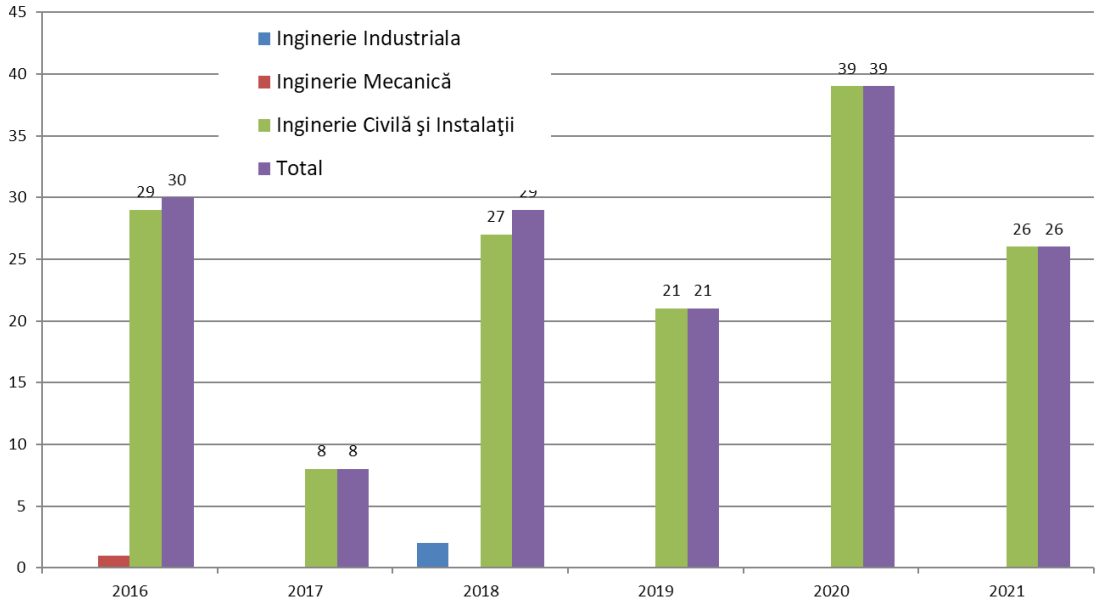
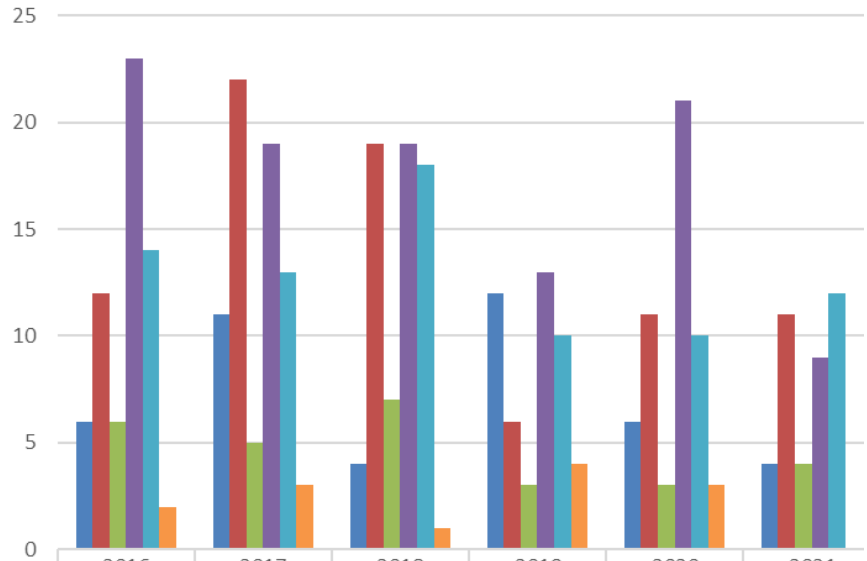


Figure 5. Yearly Distribution of PhD Theses in the period 2016 – 2021

Figure 6 shows the distribution of newly registered PhD students in the period 2016 – 2021 by faculties and in Table 14 these numbers are broken down by Faculties and PhD fields.



	2016	2017	2018	2019	2020	2021
Căi ferate, drumuri și poduri	6	11	4	12	6	4
Construcții civile,industriale și agricole	12	22	19	6	11	11
Geodezie	6	5	7	3	3	4
Hidrotehnică	23	19	19	13	21	9
Inginerie a instalațiilor	14	13	18	10	10	12
Utilaj tehnologic	2	3	1	4	3	0

Figure 6. Distribution of PhD students registered in the period 2016 – 2021

Table 14. Distribution of PhD students registered in the period 2016 – 2021 by faculties and doctoral fields

Year	Doctoral field	Faculty					
		Railways, roads and bridges	Civil, industrial and agricultural construction	geodesy	Hydrotechnics	Installation engineering	Technological equipment
2016-2017	Civil Engineering and Building Services	6	12	6	23	11	
	Mechanical Engineering					1	2
	Industrial Engineering					2	
2017-2018	Civil Engineering and Building Services	11	22	5	19	11	
	Mechanical Engineering					2	3
	Industrial Engineering						
2018-2019	Civil Engineering and Building Services	4	19	7	19	18	
	Mechanical Engineering						1

	Industrial Engineering						
2019-2020	Civil Engineering and Building Services	12	6	3	13	10	
	Mechanical Engineering						4
	Industrial Engineering						
2020-2021	Civil Engineering and Building Services	6	11	3	21	9	
	Mechanical Engineering					1	3
	Industrial Engineering						
2021-2022	Civil Engineering and Building Services	4	11	4	9	8	
	Mechanical Engineering					4	
	Industrial Engineering						
TOTAL		43	81	28	104	77	13

Table 15. Distribution of the total number of PhD students each academic year in the period 2016 – 2022 by doctoral fields and forms of education

Doctoral field	Year	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
Civil Engineering and Building Services Civil Engineering and Building Services	Full time education, with scholarship	69	65	71	74	69	69
	Full-time education, without scholarship	91	81	46	28	2	13
	Part-time education, without scholarship			37	36	60	32
	Full-time, fee-based education	166	167	180	149	161	117
Civil Engineering and Building Services	Full-time education, with scholarship	1	4	4	6	4	
	Full-time education, without scholarship	4	3	3	2	1	3
	Part-time education, without scholarship			1	3	5	6
	Full-time, fee-based education	2	2	3	6	12	13
Industrial Engineering	Full-time education, with scholarship	1	1	1			
	Part-time education, without scholarship	1	1		1	1	1
	Full-time, fee-based education						
TOTAL		334	324	348	305	315	254
	Women	78	86	80	72	61	81
	Men	256	238	268	233	254	173

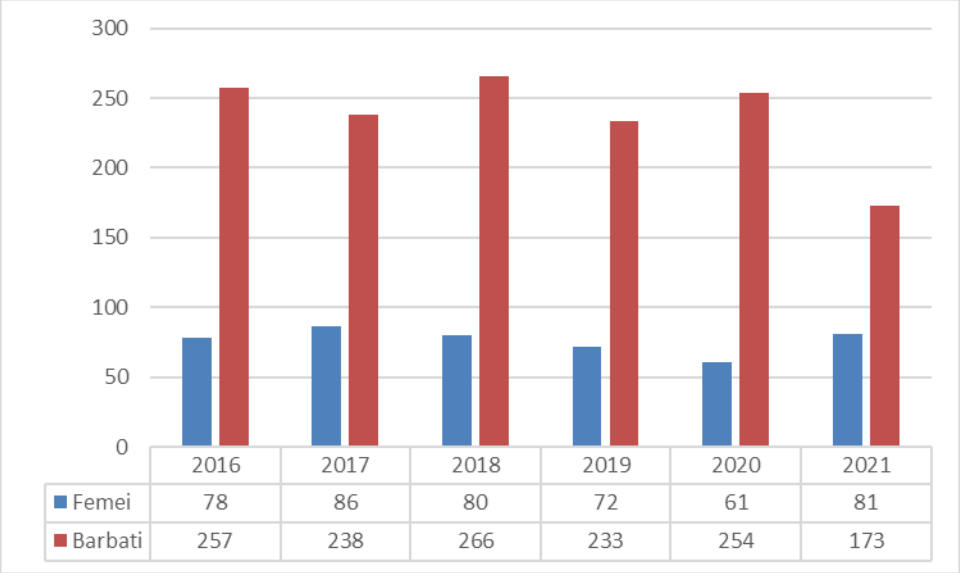


Figure 7. Total number of PhD students in the period 2016 – 2022

Table 16. Civil Engineering and Installations – dynamic of PhD Students for each reporting year 2016 – 2021

Crt. No.	University year		2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
1	Full-time education, with scholarship		69	65	71	74	69	69
		Women	33	30	18	20	15	16
		Men	36	35	53	54	54	53
2	Full-time education, without scholarship		91	81	46	28	2	13
		Women	17	22	18	12	0	2
		Men	74	59	28	16	2	11
3	Part-time education, without scholarship		0	0	37	36	60	32
		Women	0	0	9	8	12	12
		Men	0	0	28	28	48	20
4	Full-time, fee-based education		166	167	180	149	161	117
		Women	25	30	29	28	31	28
		Men	141	137	151	121	130	89
5	Total		326	313	334	287	292	227
		Women	75	82	74	68	58	78
		Men	251	231	260	219	234	149

Table 17. Mechanical Engineering – Dynamic of PhD Students for each reporting year 2016 - 2021

Crt. No.	University year		2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2020-2021
1	Full-time education, with scholarship		1	4	4	6	4	4
		Women	0	0	0	0	0	0
		Men	1	4	4	6	4	4
2	Full-time education, without scholarship		4	3	3	2	1	1
		Women	1	1	1	1	0	0
		Men	3	2	2	1	1	4

3	Part-time education, without scholarship		0	0	1	3	5	5
		Women	0	0	0	0	0	0
		Men	0	0	0	0	0	0
4	Full-time, fee-based education		2	2	3	6	12	12
		Women	1	1	2	2	2	2
		Men	1	1	1	4	10	13
5	Total		7	9	11	17	22	26
		Women	2	2	3	3	2	2
		Men	5	7	8	14	20	24

Table 18. Industrial Engineering – Dynamic of PhD Students for each reporting year 2016 – 2021

Nr. Crt.	Anul universitar		2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
1	Cu frecvență cu bursă		1	1	1	0	0	0
		Femei	1	1	1	0	0	0
		Bărbaţi	0	0	0	0	0	0
2	Cu frecvență fară bursă		0	0	0	1	1	1
		Femei	0	0	0	0	0	0
		Bărbaţi	0	0	0	0	0	0
3	Cu frecvență redusă fără bursă		0	1	1	0	0	0
		Femei	0	0	0	0	0	0
		Bărbaţi	0	0	0	0	0	0
4	Cu taxă		0	0	0	0	0	0
		Femei	0	0	0	0	0	0
		Bărbaţi	0	0	0	0	0	0
5	Total		1	2	2	1	1	1
		Femei	1	1	1	1	1	1
		Bărbaţi	0	1	1	0	0	0

I.2.4. Mission and Strategy of the UTCB Doctoral School

The mission of the UTCB Doctoral School is to carry out and develop the work of higher education at the doctoral level and implicitly of in–depth scientific research in its fields of competence for the benefit and progress of society.

Value will be developed by acquiring the necessary skills, abilities and expertise and by developing scientific approaches and innovative technical solutions in the field of doctoral studies.

The objectives and strategic directions of the UTCB Doctoral School are included in the General Strategic Plan of the Doctoral School (Annex I.68 - Annex I.68_UTCB_Plan_Strategic_General_SD_UTCB.pdf):

(1) Innovative thinking:

- encouraging creative thinking in the field of doctoral studies;
- positive reception of new ideas from a wide range of approaches and solutions;
- encouraging the publication of doctoral studies-derived results in the form of original technical and scientific papers, in publications of an appropriate level that would raise UTCB to a higher level of institutional classification;

- encouraging critical analysis of thinking as well as the alternatives generated.

(2) Credibility:

- developing knowledge and understanding of the technical sciences in its fields of activity, as well as connected or related sciences;
- accumulation of new technical and scientific knowledge and skills through the development of doctoral studies;
- collaboration and exchange of skills with other institutions;
- the correct transmission of knowledge through work carried out as a consequence of doctoral studies;

(3) Commitment

- stimulating the deployment of doctoral studies by engaging current experienced staff, but also by attracting other valuable people;
- supporting the young, training staff involved in the deployment of doctoral studies to complete their professional training;
- ensuring the space of expression for all its employees with concerns in the development of doctoral studies carried out by the UTCB;
- positioning itself as a dynamic university, among the best in the country and internationally in terms of doctoral studies;
- stimulating its employees, both individually and collectively, to actively contribute to the productive, mental and social work environment, as an important part of the work culture promoted by UTCB with regard to doctoral studies.

I.3.3. The Activity of the Doctoral School Council (CSD)

The CSD carried out its work through regular meetings, but also through remote communications, with its main tasks:

- The smooth running of all activities related to all stages of doctoral studies.
- Promoting doctoral studies at UTCB
- Increasing the scientific level of PhD theses through measures Promoting interdisciplinary research and international collaboration in the field of doctoral studies
- Attracting funds for the doctoral studies.

The main activities consisted of:

- Implementation of the Doctoral School Strategy set out in the General Strategic Plan of the Doctoral School of UTCB (Annex I.68 -Annex I.68_UTCB_Plan_Strategic_General_SD_UTCB.pdf)
- Review of the curriculum for the Advanced University Training Program (PPUA) (Annex I.92_UTCB_Plan_Invatamant_Scoala_Doctorala_PPUA_2021.pdf) şi a fişelor de disciplină asociate acestuia (Anexa I.93 - Anexa I.93_UTCB_Fise_discipline_Scoala_Doctorala_PPUA_2021.pdf)

- Implementation of an audit procedure of the Advanced University Training Programme (Annex I.94 - Annex I.94_UTCB_Procedura de audit discipline PPUA.pdf)
- Promoting the educational offer of UTCB (including through the use of the virtual environment, and at international level)
- Organizing an internal competition for grants for the PhD students to finance research (equipment, materials) and participation in conferences (Annex I.72 - Annex I.72_UTCB_REGULAMENT GID.pdf)
- Increase the scientific level of doctoral thesis through specific measures related to academic ethics and integrity, as well as the responsibility of PhD advisors and PhD students on the use of documentary resources
- Completion of time sheets of the activity of the PhD advisors and the advisory committees
- Registration and expulsion of Doctoral students, on the proposal of PhD advisors, members of the Doctoral School

I.3.4. Quality Management Measures and Promotion of Ethics and Academic Integrity at UTCB Doctoral School Level

IOSUD-UTCB promotes the concept of excellence of training and research and development services (Annex I.82 - Annex I.82_UTCB_Politica universitatii MC.pdf).

IOSUD-UTCB applies the Quality Management System for all activities (teaching, research and development), developed on the basis of ISO (Annex I.81 - Annex I.81_UTCB_Certificat SRAC 2018.pdf).

Quality assurance actions are carried out systematically, through the involvement of management structures at all levels, quality assurance structures, teaching and research staff, students, and other staff. The quality assessment and assurance system comprises specific processes, mechanisms and procedures and tools (Annex I.95 - Annex I.95_UTCB_Harta proceselor MC.pdf, Annex I.96 - Annex I.96_UTCB_Interactiunea proceselor MC.pdf, Annex I.82 - Annex I.82_UTCB_Politica universitatii MC.pdf) used in all university structures. These tools are constantly reviewed and improved.

At the IOSUD-UTCB level, the Quality Assessment and Assurance Commission operates (Annex I.78 - Annex I.78_UTCB_Decizie CEAC 16.12.2020.pdf; Annex I.77 - Annex I.77_UTCB_ROF CEAC UTCB 2020.pdf), as well as at the level of the UTCB Doctoral School (Annex I.79 - Annex I.79_UTCB_CEAC-X.pdf).

IOSUD-UTCB and the Doctoral School have developed and regularly apply a procedure for the evaluation and internal monitoring of the evolution of doctoral schools, among the criteria evaluated being:

(a) the scientific work of PhD advisors;

For the evaluation of the work of PhD advisors, the CSUD has developed a set of evaluation criteria that are presented in Annex I.74 - Annex I.74_UTCB_Criterii evaluare conducatori de doctorat_2019.pdf, in addition to the general criteria applicable to teachers in the UTCB (Annex I.15 - Anexa I.15_UTCB_Regulament selectare promovare.pdf).

(b) the infrastructure and logistics necessary to carry out the research;

The Center for Research, Development and Innovation Management (CMCDI) of IOSUD UTCB implements the quality management system with which UTCB has been certified according to the standard SR EN ISO 9001:2015 in 2020 (starting with 2005, 2011, 2014, and2017), with the certification of the management system for higher education and scientific research, according to ISO 9001:2015.

The CMCDI is coordinated by the pro-rector responsible for scientific research and a 7-member Scientific Research Council appointed by the UTCB Senate on a proposal from the Council of Administration (Annex I.97 - Annex I.97_UTCB_Consiliul cercetarii stiintifice.pdf). The Scientific Research Council takes decisions on the organisation of research and the definition of research objectives, based on consultations with deans, department directors and research centre directors.

Research centres are established by the UTCB Senate on the basis of the methodology approved by the UTCB Senate. They can be accredited by the Ministry of National Education through its specialized bodies. Research centres shall be regularly evaluated and ranked by the UTCB on the basis of their own methodology in accordance with the agreed methodologies at national and European level. The Department of Research, Development and Innovation Management provides the organizational framework for the evaluation of the research centres of IOSUD-UTCB in which PhD advisors and phD students work, respecting the ethics of scientific research in UTCB, according to the Regulation on the organization and functioning of the research, development and innovation activity in UTCB (Annex I.16 - Annex I.16_UTCB_Evaluare personal didactic.pdf)

(c) procedures and follow-up rules on the basis of which doctoral studies are organised.

All procedures and rules on the basis of which the doctoral studies is organised in the UTCB are regularly reviewed following the analysis carried out by the CSUD, the CSD observations and the General Assembly of PhD advisors. Thus, the Regulation on the organisation of doctoral studies has reached the 2nd revision (Annex I.26 – Annex I.27_UTCB_ROF SUD rev 2_2020.pdf), the Regulation of organization and operation of the Doctoral School at the 10th revision (Annex I.70 - Annex I.70_UTCB_ROF SD Revizia 10.pdf), and the Regulation on the Habilitation of PhD advisors at the 4th (Annex I.71 - Anexa I.71_UTCB_Regulament abilitare rev4.pdf).

The CSUD provides in its Regulation the existence of a mechanism for revising and updating the disciplines of the PPUA. It was implemented by the CSD through the audit procedure presented in the Annex I.94 - Annex I.94_UTCB_Procedura de audit discipline PPUA.pdf The disciplines of the PPUA are audited every 5 years according to the Audit Program developed by the Doctoral School and approved by the CSD (Annex I.98_UTCB_Calendar audit discipline PPUA 2020-2024.pdf). The purpose of the evaluation is to: balance the volume of knowledge transmitted and requested, corresponding to the number of course hours, the number of hours of individual study and the number of credits granted to the discipline; ensuring the link between the content of applications (seminar, laboratory, homework, projects, practice) and the content of lectures; correlation of the way students assess their knowledge with the

structure and volume of teaching activities: course, applications, individual study; Assessment of the skills acquired by the student after the promotion of the discipline.

The evaluation shall be carried out within the Doctoral School Council, on the basis of a Dossier drawn up by the Evaluation Commission. The evaluation committee shall be appointed by the Director of the CSUD. The committee includes: a member of the CSD or the CSUD who is also the President of the Commission; a holder of the disciplines of the PPUA, within the same type of disciplines (Complementary Scientific Training Discipline or General Technical Training Discipline, Specialty Technical Training Discipline); a representative of students from the CSD or CSUD, who promoted discipline in previous years.

The Committee on Ethics and Professional Deontology is a component of the general framework of quality assurance. It brings together prestigious professirs and carries out its work autonomously, at the request of members of the academic community. Ethical references and its rules of operation are enshrined in the University Code of Ethics (Annex I.13 - Annex I.13_UTCB_COD-ETICA-01-09-11.pdf), respectively in the Code of Ethics of the Doctoral School (Annex I.73 - Annex I.73_UTCB_COD-DE-ETICA-SD-UTCB.pdf).

Specific measures to promote professional ethics and ethics are based on academic freedom, competence and professionalism, honesty, integrity, responsibility and collegiality. The main specific measures to promote professional ethics and ethics are: the mandatory ethics course for all PhD students in year I; information transmitted by all PhD advisors to PhD students in the research activities carried out; information transmitted by all PhD advisors to PhD students on the elaboration of a scientific paper, the objectives of research and doctoral thesis.

I.3.5. Research Infrastructure

Scientific research, technological development and innovation are a key component of UTCB's higher education processes. The research activities within UTCB, through which the aim is to achieve excellence in research, are carried out through the contribution of the university teaching staff and research staff within the research norm and outside it, based on research projects accessed in a competitive system. or through projects contracted directly with various beneficiaries. Research, development and innovation (CDI) activities are included in the framework programs (CDI)) of the university, in those of the faculties, departments, research centers, etc. These programs will also include the topics of scientific research, technological development and doctoral innovation.

All doctoral students from IOSUD-UTCB are assigned to a laboratory or research center within the department where the doctoral supervisor works. They have access to the scientific research laboratories or other facilities of UTCB, according to the internal regulations of the laboratories or research centers.

The research centers are set up by the UTCB Senate on the basis of its own methodology. They can be accredited by the Ministry of Education and Scientific Research through its specialized bodies. The research centers are periodically evaluated and ranked by UTCB on the basis of its own methodology in accordance with the methodologies agreed at national and European level.

In the UTCB Senate assembly of 24.01.2011, the Methodology for Establishing the Research Centers in UTCB was approved (Annex I.99 - Annex I.99_UTCB_Metodologie_de_infiintare_centre_cercetare.pdf) and at the UTCB Senate

assembly on 17.12.2012 the UTCB Research Centre Assessment Methodology was approved (Annex I.100 - Annex I.100_UTCB_Metodologie de evaluare a centrelor de cercetare 2013.pdf).

Research units

A. Research Centers

UTCB has a number of 18 Research Centers that have been established based on a methodology approved by the Senate. The list of the 18 research centers is as follows:

1. Research Center for Concrete Structures (C.C.S.B.)
2. Research Center: Seismic Risk Assessment (C.E.R.S.)
3. Research Center for Mathematics and Informatics
4. Hydrotechnical Arrangements and Water Management (A.Q.U.A.)
5. Research Center: Groundwater Engineering (C.IA.S.)
6. Geotechnical Engineering Research Center (C.I.G.)
7. Research Center: Roads and airports
8. Research center for the recovery of mineral waste in construction materials (V.A.D.E.M.C.)
9. Center for Advanced Research in Materials Strength (C.A.R.E.M.)
10. Research Center in the field of Structural Engineering, Probabilistic Modeling of Actions and Structural Risk Estimation "Professor Dan Ghiocel" (C.C.D.G.)
11. Center for Advanced Research in Environmental Quality and Building Physics (C.A.M.B.I.)
12. Research Center: Energy Efficiency in Buildings (C.E.E.C.)
13. Research Center for Thermal Systems (S.I.T.E.R.)
14. Electrical and Lighting Engineering Research Center (C.C.- I.E.L.I.)
15. Center for Research in Spatial Geodesy, Photogrammetry, Remote Sensing and G.I.S (G.E.O.S.)
16. Research Center: Engineering Geodetic Measurements and Spatial Data Infrastructures (C.C.M.G.I.I.D.S.)
17. Research Center: Engineering of technological equipment in constructions
18. Research Center: Specialized Translation and Intercultural Communication (T.S.C.I.)
19. The Center for Research in Applied Ethics (C.C.E.A) subordinated to the Doctoral School of UTCB.

The research centers are presented in Annex I.101 - Annex I.101_UTCB_Centre de cercetare UTCB 2021.pdf).

B. Accredited or Certified Research Laboratories:

Currently in UTCB there are a number of 39 research laboratories as follows:

1. Metal Civil Engineerings Laboratory - research / services / didactic, authorized by ISC 2002, 2007, 2011; currently being re-authorized;
2. Research and Testing Laboratory of the Reinforced Concrete Civil Engineerings Department - research, services and didactic, authorized first degree by ISC;

3. Structural Testing Laboratory - research / services, authorization: not applicable;
4. Geotechnics and Foundations Laboratory (with work points in Colentina and Tei) - research / services / didactic, authorized by ISC;
5. Materials Strength Laboratory - teacher / services / research;
6. Road Laboratory - teacher / services / research, authorized ISC;
7. Thermal Systems and Equipment Testing Laboratory (INSIST) - services, RENAR accredited;
8. Civil Engineering Materials Laboratory - teacher / services / research, authorized ISC;
9. "GRID DATA CENTER" Laboratory Room II-1a - teacher / research;
10. Research-development laboratory in the field of SYSTEMS ENGINEERING - AUTOMATION AND APPLIED COMPUTING - research;
11. Laboratory of automation - Room II-11 - teacher / research;
12. Pollutant Chemistry Laboratory-Colentina laboratories complex - research / services / teaching;
13. Laboratory of Microbiology and Toxicology - Colentina laboratories complex - research / services / teaching;
14. Laboratory of Water Biology-Colentina laboratories complex - research / services / teaching
15. Small Models Laboratory-Colentina laboratories complex - research / services / teaching;
16. Geospatial processing laboratory and GIS Tempus room - research / didactic;
17. Laboratory of Aerodynamics and Wind Engineering "Constantin Iamandi" - research / teacher;
18. Hydraulics Laboratory - research / didactic;
19. Environmental Protection Laboratory - services;
20. Installations Laboratory - didactic / research / services;
21. Research laboratory for energy efficiency and study of clean energy sources - research / services;
22. Computer laboratory for research and development activities in the field of energy efficiency - research / services;
23. Laboratory "Research Center in the field of thermal engineering" - research;
24. Electrotechnics Laboratory - teacher / research;
25. Electric Machine Laboratory - teacher / research;
26. Automation and Command Laboratory - didactic / research;
27. Automation and Regulation Laboratory "Professor Constantin Ionescu" - teacher / research;
28. Laboratory of Measurements in Installations - didactic / research;
29. Lighting and Electrical Installations Laboratory - didactic / research;
30. Laboratory "Center for Applications for Lighting Systems" - teaching / research;
31. Laboratory of Electricity Quality and Electromagnetic Compatibility - research / services;
32. Laboratory for determining the photometric, technical and energetic performances of artificial and integrated lighting devices and systems "Professor Cornel Bianchi" - research / provision of services;

33. Laboratory of home automation and pervasive systems in intelligent buildings - research / services
34. Geodesy Laboratory - research / didactic;
35. Laboratory of Spatial Geodesy - research;
36. Photogrammetry Laboratory "Prof. dr. eng. Nicolae OPRESCU "- research / didactic;
37. Remote Sensing and GIS Laboratory "Prof. dr. eng. Florea ZĂVOIANU "- research / didactic;
38. Cartography Laboratory - research / didactic;
39. GIS laboratory - didactic / research.

The research laboratories are presented in Annex I.102 – Annex I.102_UTCB_Laboratoarele UTCB.pdf).

I.3.6. Educational Efficiency

The organization of teaching, starting with the admission of candidates for doctoral studies, the design, administration, financing and implementation of study programs and research programs, the selection and promotion of teaching staff, the services provided to students, integration into the European university area and finishing their studies, As well as the organization and exploitation of scientific research, the continuous aim is to achieve learning and scientific research results in accordance with the mission undertaken by IOSUD UTCB.

The main criteria for highlighting educational efficiency are the number, quality and diversity of candidates who came forward in the admission contest and the quality and diversity of those admitted.

Thus, as highlighted by the number dynamics of doctoral students presented in Table 19, IOSUD UTCB has the capacity to attract more students than the number of places available. Also, the percentage of successful candidates at master level from other higher education institutions in the country or abroad who have applied for admission to university studies for doctoral studies in the last five years is represented on average 8% of the number of places financed from the state budget at the doctoral School in IOSUD UTCB (Table 20)

Candidates admitted to doctoral studies are of the highest quality. Admission to any form of education in UTCB is based on non-discriminatory principles, promoting equal opportunities between candidates as regards gender, ethnicity and social origin.

PhD students from disadvantaged backgrounds with social problems receive financial support from UTCB through tax cuts.

IOSUD through its Doctoral School has a policy to stimulate the enrollment of doctoral students from disadvantaged social backgrounds, by organizing support programs to prevent university dropouts. PhD students from disadvantaged backgrounds with social problems receive financial support from UTCB through tax cuts.

Table 21 shows the ratio between the number of doctoral students who withdrew or dropped out of doctoral studies in the first two years after admission and the number of places financed from the state budget put up for competition in IOSUD UTCB by its Doctoral School. doctorate in the last five years. We can see that the maximum value of the percentage being in the case of IOSUD UTCB of 8%.

There is a gender balance ratio of candidates and they are diversified in terms of social representation and there is a balance between candidates from their own institution and candidates from other national and international institutions (Table 19)

Table 19. The distribution of doctoral candidates by gender and socio-economic categories

Gender and socio-economic categories (according to CNFIS)	Number of doctoral students	Percentage (%)
Female doctoral students	81	21%
Male doctoral students	173	86%
Doctoral doctoral studiesents of other ethnicities and foreign doctoral students	28	10%
Doctoral students with disabilities	0	0%
Doctoral students from urban ares	225	100%
Doctoral students from rural areas	3	1%
Doctoral students from cities under 10000 inhabitants	23	8%
Socio-economic low average doctoral students	0	0%

Table 20. Centralized situation of graduate candidates at master's level of other educational institutions who have entered the doctoral admission competition studies at UTCB

Nr. Crt.	Admission session	Total registered candidates	Candidates from other universities	Number of budget places allocated IOSUD	Percentage
1	2021	52	15	40	37%
2	2020	54	18	50	36%
3	2019	48	11	50	22%
4	2018	68	15	66	23%
5	2017	73	12	55	22%
6	2016	61	10	51	20%

Tabel 21. Distribution of doctoral students who have retired or abandoned their doctoral studies in the first two years after admission

Nr. Crt.	Admission session	Total registered candidates	Number of students retired in the first two years after admission	Percentage
1	2021	40	0	-
2	2020	54	2	3.70%
3	2019	48	3	6.25%
4	2018	68	5	7.35%
5	2017	73	3	4.11%

I.4. Domain proposed for Evaluation

Mission

The Doctoral field of Geodetic Engineering will be integrated under SD-UTCB and it has the formation of technical and scientific skills and expertise as main mission, being part of a national center for training new generations of specialists to contribute to the sustainable development of the country by using geospatial technologies.

Through this mission, it supports the use of infrastructure and material and human resources existing in UTCB, for a higher-level doctoral training offer (the third cycle of studies within the Bologna process; EQF/ISCED-8), with applications in key areas, such as: Romania's national geospatial information infrastructure, the integrated cadastre and land registration system, data banks at the level of local administrations, information systems specific to the fields of activity managed by central authorities in the fields of agriculture, forestry, transport infrastructure, mineral resources, real estate - public utility networks - green spaces, environment, protected natural areas, historical monuments and archaeological sites, development of geodetic space networks, monitoring the behavior in time of the movements and deformations of the built objectives, implementation of construction projects by using geodetic positioning tools and many others.

The mission and strategic objectives of the Doctoral program of Geodetic Engineering contribute to the production of the critical mass of human resources, with knowledge at the highest level, increased skills and competences regarding the know-how of geodetic technologies in Romania. Graduates of the doctoral program in this field will gain autonomy, capacities to develop and lead research and development projects in the fields of physical, ellipsoidal and spatial geodesy, engineering measurements in construction and industry, photogrammetry, remote sensing, digital cartography, cadastre and land administration, 3D modeling, etc.

Training for research and innovation will be matched by responsibility and respect for academic and professional integrity.

Specific Objectives:

- Training a generation of young people, professional researchers, endowed with the necessary skills to develop and lead research and technical development programs based on Geodetic Engineering;
- Stimulating research capacities and capabilities at the level of similar programs in the European Union or in other developed third countries, based on Geodetic Engineering;
- Involvement in the paradigm shift regarding Earth observation in accordance with the digital revolution and the new satellite measurement techniques;
- Obtaining scientific results that create useful innovations for human activities, as an engine of prosperity of knowledge-based societies;
- Development of applications based on CAD and GIS data to contribute to decision management;
- Reducing gaps in the academic, governmental and corporate areas related to Earth research missions using satellite technologies;

- Approaching projects in the transportation sector in accordance with the evolution of the concept "positioning, navigation, synchronization";
- The use of innovative technologies and new methods in interdisciplinary and transversal projects, integrated in Earth Sciences;
- Recognizing and stimulating the performance of young researchers through publications, participation in international and national research projects, conferences and integration into international professional societies in the field.

The Cumulative Objectives of the Geodetic Engineering Field are the following:

- Promoting creativity, competitiveness and scientific discoveries in a field in a permanent interaction with digital technology;
- Determination of the position/location of features by using satellite measurement methods;
- Performing specific topographic elevations necessary for the elaboration of topographical, situational, execution, cadastral maps and technical-urban networks, including the determination of the position with total robotic stations;
- Representation of the land surface on maps and realization of the digital elevation model of the land and the digital surface model;
- Design, retrieval and processing of photogrammetry and remote sensing data using LiDAR, UAV/UAS technology;
- Creation, maintenance, management of geospatial databases, Geographic Information Systems (GIS) and geospatial data infrastructures in the context of Smart City / Digital Twin;
- Advanced geospatial analysis, 2D, 3D, 4D modeling of the real world;
- Using complex technologies for retrieving data from the field;
- Analysis of land and construction displacements and deformations;
- Development and processing of geodetic space networks and support networks for topographic surveys, cadastral elevations and other engineering works;
- Application of projects of engineering works, civil and industrial constructions, communication ways, works of art, hydrotechnical constructions and land improvements, urbanism, etc. on the field and monitoring their behavior in time;
- Application of standards, norms, technical specifications and legislation specific to cadastre, geospatial representation at different levels of detail and property registration
- Design, development and exploitation of databases and interdisciplinary information systems based on cadastral data, property management and their use, including in real estate valuation.

The multidisciplinary curriculum of this program is designed to meet rigorous international research standards, as well as the academic requirements of higher education in Romania, in relation to the specific needs of the economic and social environment, public or private. The program integrates the multiple academic specialties, which represent the stages: taking over the measured elements from the field, processing these data through algorithms specific to precision measurements,

applying the mathematical support to determine three-dimensional coordinates and calculate the obtained accuracies, scientific interpretation of the results, performing spatial analysis, etc.

Because Geodetic Engineering is in itself a complex field, it is also a possible interface with other scientific fields, the program being thus open to master graduates who have bachelor's degrees in a wide range of specializations: Land Measurements and Cadastre, Cadastre and Property Management, Geodesy, Topo-Geodesy and Automation of Topo-Geodetic Insurance, Mining Surveying, etc.

The importance of the Geodetic Engineering field - Contributions that specialists in the field of Geodetic Engineering with PhD studies can have to the implementation of the National Recovery and Resilience Plan (PNRR)

The National Recovery and Resilience Plan (PNRR)) is a strategic document that sets out the investment priorities and reforms needed for sustainable recovery and growth, linked to the green and digital transition envisaged by the European Commission.

PNRR responds to sectoral needs in the main economic and social areas, and a number of important reforms have been promoted to increase the capacity to adapt to crisis situations. Sectoral reforms and investments are intertwined through integrated and sustainable approaches, which converge towards the strategies of the Romanian state:

- National Strategy for Sustainable Development of Romania 2030;
- National Health Strategy 2021-2027;
- National Strategy for the Prevention of Emergency Situations 2016-2025;
- National Strategy for Long-Term Renovation (2020-2050);
- Romania's Territorial Development Strategy (SDTR) 2018-2035;
- Transport Master Plan and Urban Mobility Plans;
- Urban Policy of Romania 2020-2035;
- National Strategy on the Digital Agenda for Romania - post 2020;
- National Housing Strategy 2018-2030.

Figure 8 – The Sustainable Development Goals and the four underlying dimensions Sustainable Growth Strategy

De facto, PNRR is a source of funding and a coherent putting in the same place of the development objectives adopted by Romania through these sectoral strategies.

The 2030 Agenda for Sustainable Development adopted by the UN in New York (2015) is a historical document, which was also adopted by Romania with what it has specific (2018) and aims through its 17 objectives a better future. Romania needs a change in the present development paradigm to face the challenges of the XXI century. PNRR meets urgent needs amid the COVID 19 pandemic.

in the next period the teaching staff of the Faculty of Geodesy envisages that the educational training of the students at the three cycles of training, BSc, MSc and PhD to be oriented towards the PNRR components in which the qualified services of the faculty graduates are needed. We consider a major contribution can be made by highly qualified people, who have gone through all the stages of a thorough professional training and who have the energy potential that youth and the desire for success offer.

The 6 doctoral supervisors, through the specializations they cover and through the expertise they have acquired in the 4 university centers they come from, assume a guidance of the PhD students that is comparable to what happens at international level, with current doctoral topics, through innovative working methods and research, with pragmatic case studies.

Our job has shifted in recent years towards a digital profession of the future, and the term digitalization fits very well with the concerns of bringing the real world into a virtual space that helps the community make sustainable decisions.

Professional Skills provided by Doctoral Training in the Domain of Geodetic Engineering

Depending on the doctoral research topics and the approaches to their treatment, the following competences related to:

- Acquisition and processing of geospatial data for integration into GIS;
- Collecting and analyzing geospatial data as a basis for achieving a GIS for sustainable development;
- Realization of geospatial data infrastructures;
- The correct use of geodetic engineering concepts and tools for collecting, processing and modeling geospatial data for sustainable development;
- Geospatial modeling;
- 2D, 3D representation and analysis of information in GIS;
- Dissemination of geospatial information;
- Spatial planning for sustainable development;
- Evaluation of the built heritage;
- Identifying the possibilities of managing and exploiting environmental information and real estate valuation in GIS for sustainable development.

PNRR proposes concerted actions in strategic areas aimed at modernizing and increasing the potential of the Romanian economy, by referring to the national strategic objectives in correlation with the contribution to climate change and the digital transition. Romania has to catch up with the European average in many areas. A contribution to these envisaged measures will also be made by the community of specialists in geodetic engineering, those who practice a profession with an important

social and economic impact for society. The contributions of phd graduates to the implementation of PNRR may be present in almost all 15 components of the plan through which Romania will be modernized, in accordance with the Recovery and Resilience Facility and in the context of recovery after the COVID-19 crisis:

- digital cartographic data at the level of local administration;
- property tax system based on cadastre and land registration;
- decision-making process based on concrete data from cadastre, orthophotomap;
- modernization and extension of the transport infrastructure – expropriations, set-aside of land, measurements for constructions;
- sustainable urban mobility – mobile mapping, traffic studies;
- the inventory of the forestry sector;
- measurements in the construction sector, one of the main drivers of economic growth;
- renovation of buildings, historical monuments and buildings located in protected areas – laser scanning, 3D modeling of historical monuments, archaeological sites;
- the digital transformation aimed at modernising the public administration by establishing the necessary framework for achieving the interoperability of the ICT systems of the various public institutions, ensuring coherence with the eIDAS Regulation and implementing the "once-only" principle, integrated in regulation (EU) 2018/1724 on the single digital gateway – geospatial data are fundamental;
- development/updating of spatial planning and urban planning documents in GIS format;
- the acquisition of advanced digital skills.

Romania's urban policy will be taken into account within the framework of the systematization and codification of the legislation through the Code of Spatial Planning, Urbanism and Constructions (CATUC). Through the CATUC, at least 10 normative acts in the fields of spatial planning, urbanism and constructions will be correlated, simplified, improved and reunited in a unitary structure, as well as related to the specific provisions in the related fields (environment, energy, transport, cadastre, property, protected built areas and historical monuments, management of natural and industrial risks, etc.).

According to the provisions that will be proposed by CATUC, the spatial planning and urbanism documentations will have to be elaborated and managed in digital, georeferenced format (in GIS), so as to allow the continuous updating of the data and a digitization of the processes of issuing urbanism certificates, of the building permits, but also the generation and management of a national register of constructions, containing administrative and technical data on the entire nationally built fund, in order to substantiate the actions and policies regarding its maintenance, rehabilitation, consolidation. The content of urban planning plans must also be accessible online to all citizens, so that there is full transparency regarding the established regulations and the limitations imposed on the property.

As can be seen, the 'spatial planning' component is present as a measure in the PNRR, and the involvement of specialists in this field is essential. Architects and urban planners propose urbanistic plans, builders put into operation investments in infrastructure, utilities and buildings, and geodesists participate both in the

topographical elevations, which constitute the support for PUD, PUZ, PUD, as well as in the drawing of topographical elements, in the stages of construction and in the tracking in time of the evolution of constructions. However, only now specialists trained at doctoral level can make a significant contribution through the data they can collect, process and store on the digital urban platform, created as a digital infrastructure containing up-to-date spatial data and information. The urban landscape changes from day to day, the problems that arise need to be solved quickly in order for living and living standards to correspond to a developed society.

PNRR will promote procedures based on the following principles:

- elaboration and management after approval of the spatial planning and urban planning documentations in GIS system;
- increasing road safety and increasing air quality;
- integration of spatial information from spatial planning and urban planning documentation with spatial information from databanks at the level of local authorities and other competent authorities;
- permanent maintenance of data in documentation;
- integration of approved lower-ranking documentation into higher-ranking ones (integration of PUZ and PUDs into PUGs);
- addressing urban resilience and natural and man-made disaster risks;
- integration of energy performance improvement components at urban level;
- integration of innovation elements – smart city;
- encouraging forms of soft mobility;
- integration of transport and land use for sustainable development;
- introduction of cost-benefit analyses - monetisation of direct and indirect social, economic and environmental benefits;
- the use of 3D modelling to substantiate the decision;
- quality assurance in constructions (approval of CATUC, technical regulations BIM, National Register of Buildings).

The proposed reforms will contribute to the operationalization of the concepts of "smart city" and "smart villages" respectively.

CATUC will implement, among others:

- a Guide for the elaboration of spatial planning and urban planning documentations that will facilitate the updating and transposition into geographic information systems (GIS) of all spatial planning and urban planning plans and alignment with the new principles of the Romanian Urban Policy and the ATUC Code (promoting sustainable transport and improving road safety, using green solutions and blue infrastructure, of energy efficiency and improvement of air quality);
- mandatory standards in all functional administrative-territorial units and urban and rural areas;
- concrete provisions in the urban planning documentations regarding a decrease of the time and commuting distance for the population of functional urban and rural areas (implementation of the "15-minute city" concept, i.e. focusing on increased access to the relevant facilities);
- developing a unitary and standardized conceptual model for the presentation of spatial data and information from the spatial planning and urban planning documentations, in order to be managed in GIS format, in compliance with

the provisions of the legislation in the field, including from the perspective of the INSPIRE directive.

- Creation of the digital urban standardised interoperable data platform as part of the *Territorial Observatory* https://ot.mdrap.ro/website/maps/, which contributes to the dynamic management of urban planning plans and to the digitization of the processes of issuing urbanism certificates and building permits; providing real-time data; integration and interoperability of data services within and between city systems through the exploitation of modern technologies, using the infrastructure from the government cloud established in the C7 component.
- The urban digital platform is developed for the implementation of the Urban Policy of Romania and will contain all the information from the local level in a standardized way, respectively data:
  - urban planning,
  - technical-urban,
  - historical monuments, archaeological sites,
  - restrictions and permissiveness on land use.
- The open urban platform allows cities to move quickly from fragmented operations to the inclusion of efficient predictive operations and new ways of engaging and serving the city's stakeholders to transform, in a tangible and measurable way, the results at local level (e.g. increase energy efficiency, reduce traffic congestion and emissions, create innovation - digital ecosystems). An interoperable urban platform built on open standards and open APIs will allow cities to avoid blocking suppliers and innovators and to develop portable applications and replicable solutions that can be reused and adapted to any city/community); this will allow data to be collected, organised and combined from different sources, such as municipal services and the private sector, while ensuring that cities can have control over the orchestration of their local digital ecosystem to ensure the sovereignty of their own data.
- MDLPA will ensure the implementation and monitoring of the milestones and targets related to this reform from own resources, with no budgeted amounts within the PNRR. The ANCPI is subordinated to MDLPA and, through its attributions, will be involved in the planned reforms.

The concept of Smart city/village involves the use of new technologies, in line with the field of intervention "Development of highly specialized services and support structures for public administrations and enterprises ":

- The use of drones to inspect areas or risk situations;
- Center for real-time monitoring of the situation in the city – provides real-time access to all cameras, sensors and other data collection devices;
- Intelligent management systems for green space systems;
- Monitoring and safety systems of the public space;
- Capitalization of heritage objectives through digitization or digital reconstruction: (VR/AR) virtual reality/augmented reality;
- GIS databases at metropolitan level;
- Open data – platform where data is available and accessible to the public at city level;
- "Cloud" services – online cloud platform for use by the public administration;

- System of registration and issuance of documents – allows the registration and issuance of documents online, electronic signatures, etc.;
- Urban data center and real-time monitoring of the state of the city (correlated with the GIS database from PUG);
- City application (application for informing citizens and identifying problems at local level);
- Online payment of taxes and duties;
- Online platform and/or mobile application for mapping energy consumption at neighborhood or city level;
- Automation of irrigation systems for green spaces;
- "Smart" sanitizing infrastructure – smart bins with sensors and GPS-based technology, which provide data on the degree of filling of the bins;
- Real-time monitoring of the state of the technical-municipal infrastructure and consumption.

Specialists in Geodetic Engineering have competences that allow obtaining information about location, positioning, cadastre, land use, real estate evaluation, etc. and can create live maps and applications for monitoring, so that decision makers can identify opportunities for economic growth, safety and efficiency.

The professional positions from which the graduates of the doctoral study program can get involved can be found in:

- universities and research institutes;
- companies with a profile of activity topography, cartography, cadastre, photogrammetry, GIS, urbanism;
- local governments, where there is an acute shortage of well-trained young staff and open to change;
- specialized compartments within: ANAR, ROMSILVA, CNAIR, ADS, APIA, OMV PETROM etc;
- specialized structures within: ANCPI, CNC, OCPI, AIGA etc.

Thus, in the doctoral training program in the field of Geodetic Engineering participate graduates of the master's studies of Spatial Planning and GIS for Sustainable Development, Geomatics, Information Systems in Cadastre and Real Estate Registration or from any other field of technical sciences.

The Doctoral program is carried out only within IOSUD under the coordination of a doctoral supervisor or in cotutela and includes:

- a training programme based on advanced university studies, PPUA (first year);
- an individual scientific research program, PCS (II and III years for Civil Engineering and Installations and Geodetic Engineering)

The training programs are centered on an active learning model oriented towards the acquisition by the Doctoral student of the necessary competences for the academic level of specialization through doctorate. For the first year, the curriculum of the doctoral school contains a series of courses with a scientifically appropriate content, updated according to the novelty of the research in each field. The feedback of doctoral students is very important in improving the educational process of the doctoral school.

The cycle of doctoral studies is composed of the "Advanced University Training Program" (PPUA), with a duration of one semester, and the "Scientific Research Program

(PCS)", with a duration of five semesters, finalized with the defense of the doctoral thesis.

The advanced university training program is carried out in UTCB based on a curriculum developed by CSD, endorsed by CSUD and approved by the Senate. It includes the discipline of Ethics and Academic Integrity and three compulsory disciplines (DO1 – complementary training disciplines, DO2 – general technical training disciplines and DO3 – specialized technical training disciplines), which provide all UTCB PhD students with a unitary vision in approaching scientific research specific to engineering sciences and, respectively, management skills of scientific research projects.

The scientific research program comprises two elective disciplines and three research reports.

Doctoral study programs ensure the formation of professional competences (content, cognitive and research) in specialized fields, as well as transversal competences.

The professional competences guide the PhD student in developing the capacity to elaborate a research plan including: the experimental module on which the doctoral thesis will be based; the synthesis of the specialized literature, the working methodology and the methods used, the equipment envisaged for carrying out the experiments; the methods of observation and measurement to be carried out in order to interpret the experimental results; the statistical-mathematical methods used for the calculation and interpretation of experimental results.

Transversal competences aim at developing capacities to: efficiently solve problem situations with a medium degree of difficulty, respecting the principles and norms of professional ethics and promoting a responsible attitude towards doctoral university training; the effective application of communication and networking techniques at organisational or professional group level under the conditions of assuming roles specific to the different hierarchical levels and of self-assessment of the need for vocational training, for evolution in the profession, for the development of the acquired competences and for adapting to the requirements of a dynamic society.

The competences provided by the PhD study programs of IOSUD – UTCB are:
Professional skills:

1. advanced knowledge in the field;
2. the ability to identify, formulate and solve research problems;
3. mastery of advanced research methods and techniques;
4. knowledge on the management of research projects;
5. mastery of new processes and solutions in research;
6. skills of documentation, elaboration and valorization of scientific works;
7. linguistic skills at academic level in languages of international circulation necessary for the documentation and elaboration of scientific papers;
8. understanding and ability to apply the principles and values of scientific research ethics in the respective field.

Transversal skills:

1. communication skills, written and oral, in the field of science and culture;
2. advanced language skills in languages of international circulation;
3. use of information and communication technology;

4. interrelationship and teamwork skills;
5. knowledge of human, material and financial resources management;
6. leadership qualities;
7. knowledge of career management;
8. knowledge of risk, crisis and failure management;
9. knowledge of the use of intellectual property rights legislation;
10. capacities of economic, technological and social entrepreneurship.

At the time of drafting the report, in the field of Geodetic Engineering there are 6 doctoral supervisors (2 women, 4 men). (Figure 11) Of the 6 doctoral supervisors, 3 are holders in UTCB and have obtained the habilitation certificate starting with 2017. (Figure 9)

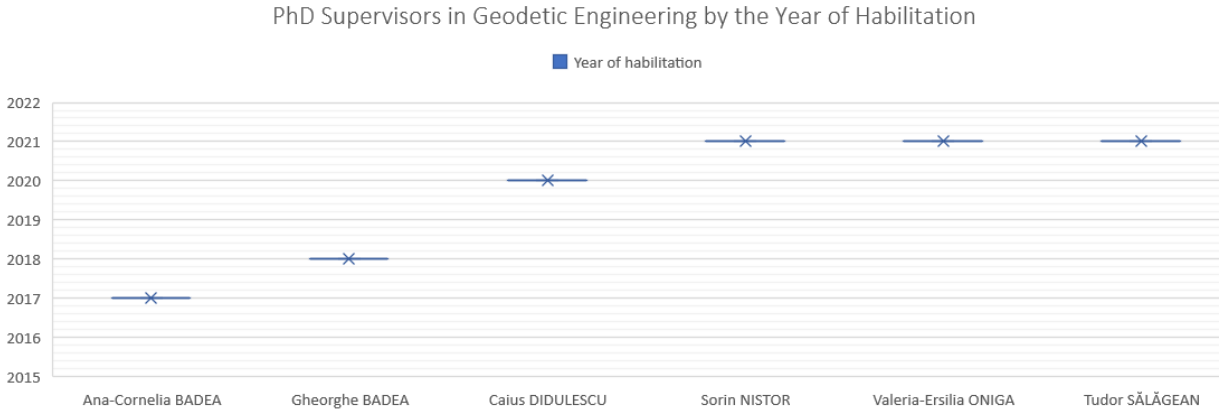


Figure 9 – PhD Supervisors in Geodetic Engineering by the Year of Habilitation

50% of Ph.D. supervisors in the field of Geodetic Engineering are aged between 30-35 years, 17% in the period 45-50 years and 33% over 50 years. This aspect shows a real tendency of continuity, thus ensuring the long-term training of PhD students. (Figure 12)

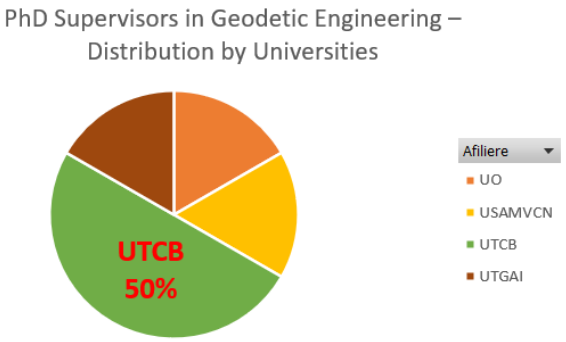


Figure 10 – PhD Supervisors in Geodetic Engineering – Distribution by Universities

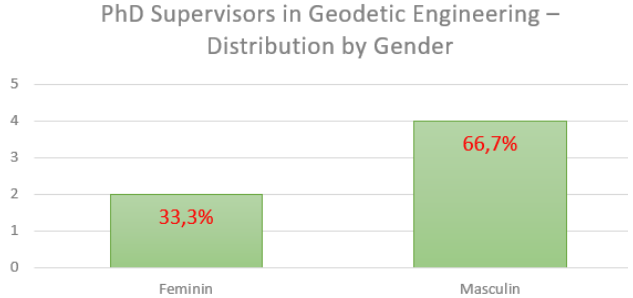


Figure 11 – PhD Supervisors in Geodetic Engineering – Distribution by Gender

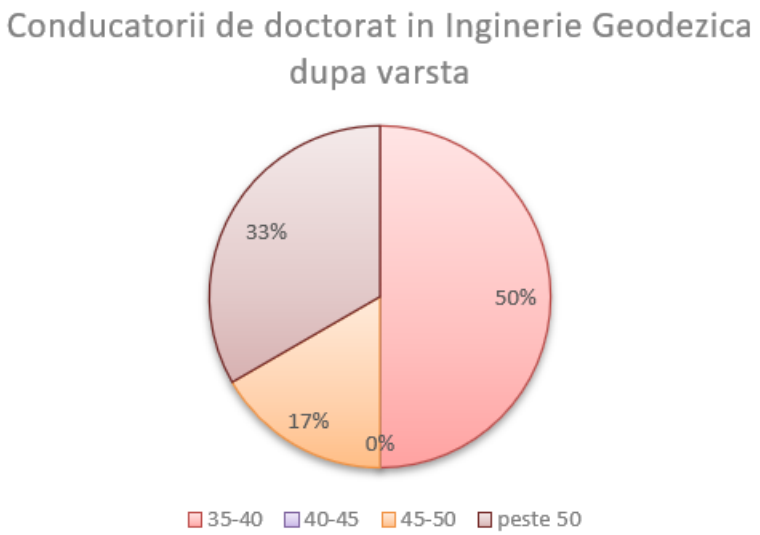


Figure 12 – PhD Supervisors in Geodetic Engineering – Distribution by Age

Ph.D. supervisors in the field of Geodetic Engineering have remarkable achievements in terms of scientific visibility. Thus, for all activity, the number of articles Web of Science indexed varies between 11 and 33. (Annex II.21 - Annex II.21 Vizibilitate stiintifica internationala criteriul 3.2.1)

All Ph.D. supervisors in the field of Geodetic Engineering meet the empowerment standards for Commission 12, Geological Engineering, Geodetic Engineering, Mines, Oil and Gas.

At the time of reporting, doctoral supervisors in the field are involved in national and international projects.

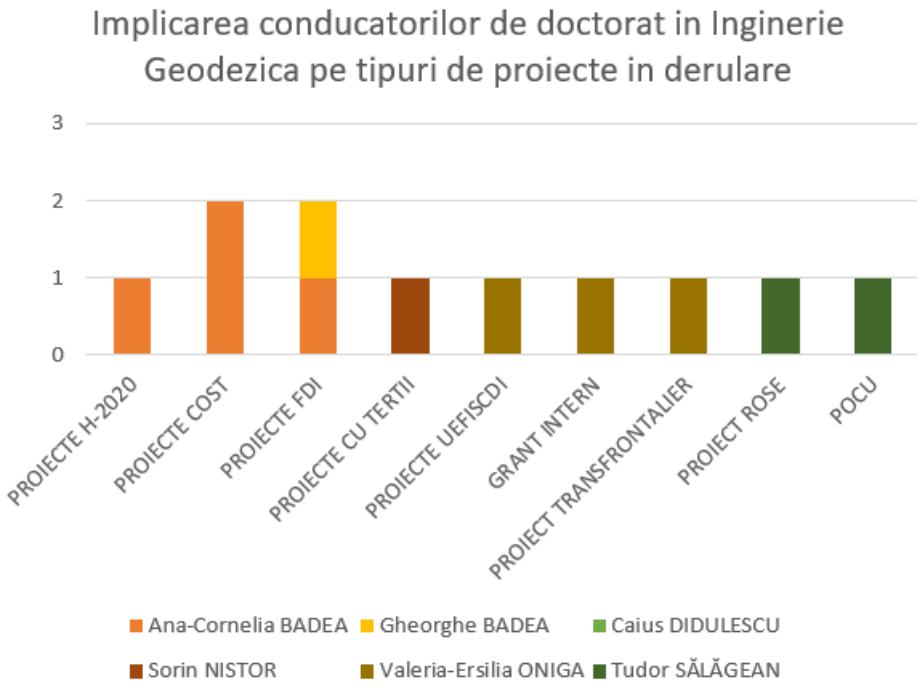


Figure 13 – PhD Supervisors in Geodetic Engineering – Involvement by Types of Ongoing Projects

II. Criteria, standards and critical performance benchmarks

II.1. Criterion A. Institutional capacity of IOSUD – UTCB

II.1.1. Criterion A.1. – Institutional, administrative, managerial and financial resources structures

A.1.1. The institution organising university doctoral studies (IOSUD) has implemented the effective functioning mechanisms provided for in the specific legislation on the organisation of doctoral studies.

IOSUD – UTCB has effective operating mechanisms in place at the level of The University Doctorate Studies.

A.1.1.1. Existence of specific regulations and their application at the level of the doctoral school of which the field of doctoral studies belongs:

a) doctoral school regulations;

UTCB Doctoral School has Its own organization and operation regulation approved by the UTCB Senate (Annex I.70_UTCB_ROF SD Revizia 10.pdf).

b) the methodology for holding the elections for the position of Director of the Doctoral School Council (CSD), as well as the choice by students of the representative in the CSD and evidence of their progress;

The CSD comprises 9 members (Annex I.76_UTCB_METODOLOGIE DE DESEMNARE A DIRECTORULUI SCOLII DOCTORALE si CSD.pdf):

- Director of the CSD who is appointed by the CSUD among the PhD advisors
- Members:
  - PhD advisors, up to 50%, full professors or researchers who must have the right to conduct PhDs, at home or abroad. The proportion of PhD advisors in the CSD is determined by the CSUD. The members of the CSD PhD advisors are elected by the General Assembly of PhD advisors. If the general meeting of phD advisors is not statutory (no more than 50% +1 members participate) only proposals of CSD members will be made in that meeting and the vote will be conducted electronically.
  - Scientific personalities with national recognition or personalities from industrial sectors in the proportion of 30%, appointed by the CSUD
  - Doctoral students at least 20%.

Currently the CSD consists of (Annex I.64_UTCB_Hotarare Senat -Validarea CSUD+CSD.pdf Annex I.65_UTCB_Hotarare senat 11411 - 10.12.2020 - completare CSUD CSD.pdf Annex I.66_UTCB_Hotarare senat 3649 - 28.04.2021, Hotarare senat 4170 - 19.05.2021- completare CSUD CSD.pdf Annex I.91_UTCB_Numire director SD.pdf, Anexa I.103 PV CSUD CSD):

- Director of the Doctoral School: Conf. dr. ing. Ilinca Năstase
- Doctoral advisors members of UTCB:
    - Professor Ph.D. Eng Horațiu Popa
    - Professor Ph.D. Eng Oana Luca
    - Professor Ph.D. Eng Andrei Georgescu
- Personalities members from outside UTCB:
    - Professor Ph.D. Eng Cosmin Chiorean (UT Cluj-Napoca)
    - Phd. Arch. Vasile Meiță (INCERC București)
- Doctoral stundents members:
    - Phd. Student Eng. Silviu Ionescu Lupeanu
    - Phd. Student Eng. Alexandra Angelescu
    - Phd. Student Eng. Catalin Sima

c) methodologies for organizing and conducting doctoral studies (admission of doctoral students, completion of doctoral studies, etc.);

Within the Doctoral School of UTCB apply the methodologies of admission, completion of the doctoral studies, as well as other necessary methodologies and regulations, all developed and updated whenever necessary and approved by the UTCB Senate:

- The evaluation of candidates for doctoral studies is made through anual contest organized by UTCB, in September of each academic year, in accordance with the approved methodology (Annex I.21 – Anexa I.21_UTCB_Metodologie admitere Doctorat 2022_2023.pdf)
- the Methodology for the completion of doctoral studies (Annex I.25 - Annex I.25_UTCB_Metodologie finalizare SUD.pdf)
- the Regulation for the organisation of doctoral studies at UTCB (Annex I.27 - Anexa I.27_UTCB_ROF SUD rev 2_2020.pdf)
- UTCB Doctoral School has Its own organization and operation regulation approved by the UTCB Senate (Annex I.70_UTCB_ROF SD Revizia 10.pdf)
- the Code of Ethics of the Doctoral School (Annex I.73 - Annex I.73_UTCB_COD-DE-ETICA-SD-UTCB.pdf)

d) the existence of mechanisms for the recognition of the status of doctoral advisor and the equivalence of Ph.D. obtained in other states;

- As of January 2019 UTCB recognises the status of doctoral advisor obtained in other states through the specific methodology adopted by the UTCB Senate elaborating the procedure for the recognition of the status of doctoral advisor obtained in other states (Annex I.75_UTCB_Procedura_Recunoastere abilitare _final.pdf)

The equivalence of the PhD obtained in other states is done only by CNRED.

e) functional management structures (The Doctoral School Council), including proving the regularity of the convening of meetings;

CSD consists of 9 members (Annex I.76 - Annex I.76_UTCB_METODOLOGIE DE DESEMNARE A DIRECTORULUI SCOLII DOCTORALE si CSD.pdf):

- Director of the CSD who is appointed by the CSUD among the PhD advisors
- Members:
  - PhD advisors, up to 50%, full professors or researchers who must have the right to conduct PhDs, at home or abroad. The proportion of PhD advisors in the CSD is determined by the CSUD. The members of the CSD PhD advisors are elected by the General Assembly of PhD advisors. If the general meeting of phD advisors is not statutory (no more than 50% +1 members participate) only proposals of CSD members will be made in that meeting and the vote will be conducted electronically.
  - Scientific personalities with national recognition or personalities from industrial sectors in the proportion of 30%, appointed by the CSUD
  - Doctoral students at least 20%.
- Currently the CSD consists of (Annex I.91_UTCB_Numire director SD.pdf, Anexa I.65_UTCB_Hotarare Senat -Validarea CSUD+CSD.pdf, Anexa I.66_UTCB_Hotarare senat 11411 - 10.12.2020 - completare CSUD CSD.pdf, Anexa I.67_UTCB_Hotarare senat 3649 - 28.04.2021 - completare CSUD CSD.pdf Anexa I.104 PV 14.02.2022):

  Director of the Doctoral School: Conf. dr. ing. Ilinca Năstase
  Doctoral advisors members of UTCB:
  - Professor Ph.D. Eng Horațiu Popa
  - Professor Ph.D. Eng Oana Luca
  - Professor Ph.D. Eng Andrei Georgescu

  Personalities members from outside UTCB:
  - Professor Ph.D. Eng Cosmin Chiorean (UT Cluj-Napoca)
  - Phd. Arch. Vasile Meiță (INCERC București)

  Doctoral students members:
  - Phd. Student Eng. Silviu Ionescu Lupeanu
  - Phd. Student Eng. Alexandra Angelescu
  - Phd. Student Eng. Catalin Sima

In accordance with the Rules of Organization and Functioning of the Doctoral School (Anexa I.70_UTCB_ROF SD Revizia 10.pdf), the CSD has the following duties and responsibilities:

a. draw up the Rules of the Doctoral School;
b. implements the doctoral school strategy (General Strategic Plan, Medium-Term Strategic Plan, Annual Implementation Plans);
c. develop the Advanced University Training Programme (PPUA)
d. proposes the CSUD to set up or abolish specializations;
e. periodically reviews the way in which the activities carried out within the Doctoral School are carried out and takes appropriate measures to increase their effectiveness;
f. analyse the regulatory orders corresponding to the PhD advisors and guidance committees;
g. grant or revoke, as appropriate, membership of the Doctoral School to PhD advisors;

h. establish minimum standards of scientific performance with a view to granting or revoking the membership of the Doctoral School to phD advisors;
i. proposes the registration and expulsion of Doctoral students, on the proposal of PhD advisors, members of the Doctoral School;
j. assist the external assessor in the evaluation process with a view to accreditation/re-accreditation or provisional authorisation of the Doctoral School;
k. adopt decisions on any other matter within its jurisdiction.

CSUD, CSD meet regularly, also convene annually the general meeting of PhD advisors (Annex II.1_Proces verbal Adunare generala Scoala Doctorala 18_10_2016_final.pdf, Annex II.2_Proces verbal al Adunarii generale 11.05.2017.pdf, Annex II.3_Proces verbal al sedintei membri UTCB CSUD+CSD_30.01.pdf, Annex II.4_PV CSUD+CSD_17.05.18.pdf, Annex II.5_Proces verbal al adunarii generale alegeri CSUD, CSD_8.12.2020_semnat.pdf, Annex II.6_PV sedinta CSUD si CSD_11.03.20 .pdf Anexa I.103 PV CSUD CSD).

f) doctoral studies contract

The updated doctoral degree contract is presented in Annex II.7_Contract de studii universitare de doctorat 2020-2021.pdf

g) internal procedures for the analysis and approval of proposals on the subject of the programme of disciplines proposed through the Advanced Universitary training PPUA

The CSUD provides in its regulation for the existence of a mechanism for revising and updating the disciplines of the PPUA. It was implemented by the CSD through the audit procedure presented in Annex I.94 - Annex I.94_UTCB_Procedura de audit discipline PPUA.pdf. The disciplines of the PPUA are audited every 5 years according to the Audit Program developed by the Doctoral School and approved by the CSD (Annex I.98_UTCB_Calendar audit discipline PPUA 2020-2024.pdf). The purpose of the evaluation is to: balance the volume of knowledge transmitted and requested, corresponding to the number of course hours, the number of hours of individual study and the number of credits granted to the discipline; ensuring the link between the content of applications (seminar, laboratory, homework, projects, practice) and the content of lectures; correlation of the way students assess their knowledge with the structure and volume of teaching activities: course, applications, individual study; Assessment of the skills acquired by the student after the promotion of the discipline.

A.1.1.2. The doctoral school regulation shall include mandatory criteria, procedures and standards for the matters specified in Article 17(1) of The Directive. 5 of HG 681 / 2011 with subsequent modifications and additions.

Article 17 (5) The doctoral school rules shall lay down mandatory criteria, procedures and standards covering at least the following aspects:
(a) the acceptance of new doctoral advisors, as well as regulations on how a doctoral advisor may be withdrawn as a member of the doctoral school;

Regulation for the organisation and conduct of university doctoral studies; (Annex I.27_UTCB_ROF SUD rev 2_2020.pdf) contains provisions relating to:

- Acceptance of new PhD advisors – Article 19:
- Withdrawal of membership of the Doctoral School – art. 23

Also in IOSUD – UTCB there is an Habilitationt Regulation for PhD advisors (Annex I.71_UTCB_Regulament abilitare rev4.pdf) as well as a Recognition of the status of PhD advisor obtained in other Member States (Annex I.75_UTCB_Procedura_Recunoastere abilitare _final.pdf)

b) the mechanisms by which decisions are taken as to the appropriateness, structure and content of the training programme based on advanced university studies;

Regulation on the organisation and conduct of university doctoral studies; (Annex I.27_UTCB_ROF SUD rev 2_2020.pdf) contains provisions relating to this in Articles 9 (2) and 13 (15).

The advanced university training program is carried out in UTCB on the basis of an educational plan drawn up by the CSD, approved by the CSUD and approved by the Senate. The disciplines of the PPUA are audited every 5 years according to the Audit Program developed by the Doctoral School and approved by the CSD. On the basis of the CSD audit report it will analyse the results obtained by the PPUA and be able to propose to modify the structure of the PPUA. It will be subject to debate by the General Assembly of PhD advisors and the approval of the CSUD. Subsequently, the new PPUA will be approved by the UTCB Senate. The introduction of new disciplines inPPUA can be proposed by the CSD, including on the basis of proposals from PhD advisors or PhD students. The CSD analyses the appropriateness of the proposed changes, including on the basis of the priority areas of development in the National Development Strategy and the development priorities of the UTCB.

c) procedures for changing the doctoral advisor of a particular student-doctor and procedures for conflict mediation;

Regulation for the organisation and conduct of university doctoral studies (Annex I.27_UTCB_ROF SUD rev 2_2020.pdf) contains provisions relating to:

- the procedures for the change of doctoral advisor in Articles 27 and 34
- the procedures for the mediation of conflicts in Article 33

d) the conditions under which the doctoral programme may be interrupted;

Regulation for the organisation and conduct of university doctoral studies (Annex I.27_UTCB_ROF SUD rev 2_2020.pdf) contains provisions relating to the conditions for the interruption of the doctoral programme in Article 25.

e) ways of preventing fraud in scientific research, including plagiarism;

Regulation for the organisation and conduct of university doctoral studies (Annex I.27_UTCB_ROF SUD rev 2_2020.pdf) contains provisions on ways to prevent fraud in scientific research, including plagiarism in the head, 7 Articles 35 and 36.

Code of Ethics of the Doctoral School (Annex I.73_UTCB_COD-DE-ETICA-SD-UTCB.pdf) and Strategia de Etică a Şcolii Doctorale contain provisions on ways to prevent fraud in scientific research, including plagiarism.

f) ensuring access to research resources;

Regulation for the organisation and conduct of university doctoral studies (Annex I.27 – Annex I.27_UTCB_ROF SUD rev 2_2020.pdf) contains provisions on ensuring access to research resources in the head. 8 Articles 37 to 39.

In IOSUD-UTCB students – PhD students can access Internal Grants for PhD students (GID) granted by UTCB from their own income for the financing of research or for participation in international conferences.

g) the frequency obligations of doctoral students, according to a methodology developed by the Ministry of Education, Research, Youth and Sport.

Regulation for the organisation and conduct of university doctoral studies (Annex I.27 –Anexa I.27_UTCB_ROF SUD rev 2_2020.pdf) contains provisions relating to the frequency obligations of Article 24 – paragraph 9 – (12).

A.1.2. IOSUD has the logistical resources necessary to carry out the mission of doctoral studies

A.1.2.1. Existence and effectiveness of an appropriate IT system for the record of doctoral students and their academic background.

Within the Doctoral School of IOSUD UTCB the electronic records of Doctoral students and their academic background are carried out through an own electronic system consisting of a suite of databases and the National Matriculation Register (RMU). In addition, other main features are found in the National Matriculation Register such as: doctoral students' studies, school history, accommodation status and transport ticket records. For those who have supported the doctoral thesis in the RMU, all the information can be found from admission to public support of the thesis, as attached files.

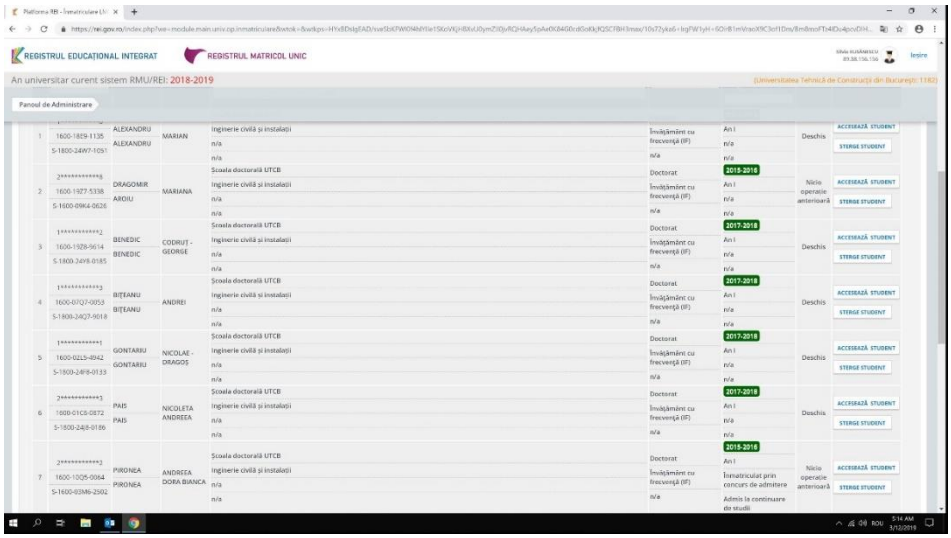


Figure 14 – Screenshot of the National Matriculation Register

Primary databases are made on years of registration in Excel and Access. The databases include information on candidates enrolled in admission, candidates admitted, Doctoral students registered.

In order to modernize and streamline the system of recording of PhD students and their journey, ensuring the possibility of direct access to information by them and PhD advisors, an online electronic platform has been developed. The platform was created through the FDI-2018-0125 Project - Supporting Tools for Increasing the Quality of Scientific Results and Promoting Academic Ethics and Ethics at IOSUD UTCB level. The platform allows data to be collected from the doctoral admission phase until the doctoral thesis is completed. The platform was designed with three levels of access: - secretariat/administrator; - PhD advisors; - PhD students. The platform has beenoperationalized andupdated through the CNFIS-FDI-0354-2019 and CNFIS-FDI-0370-2020 projects so that at presentthere isa module for the electronic management of the admission of candidatestothe doctoral studies.

The features of this platform are described in the Anexa II.8_ Descrierea PLATFORMEI electronice a SD.pdf

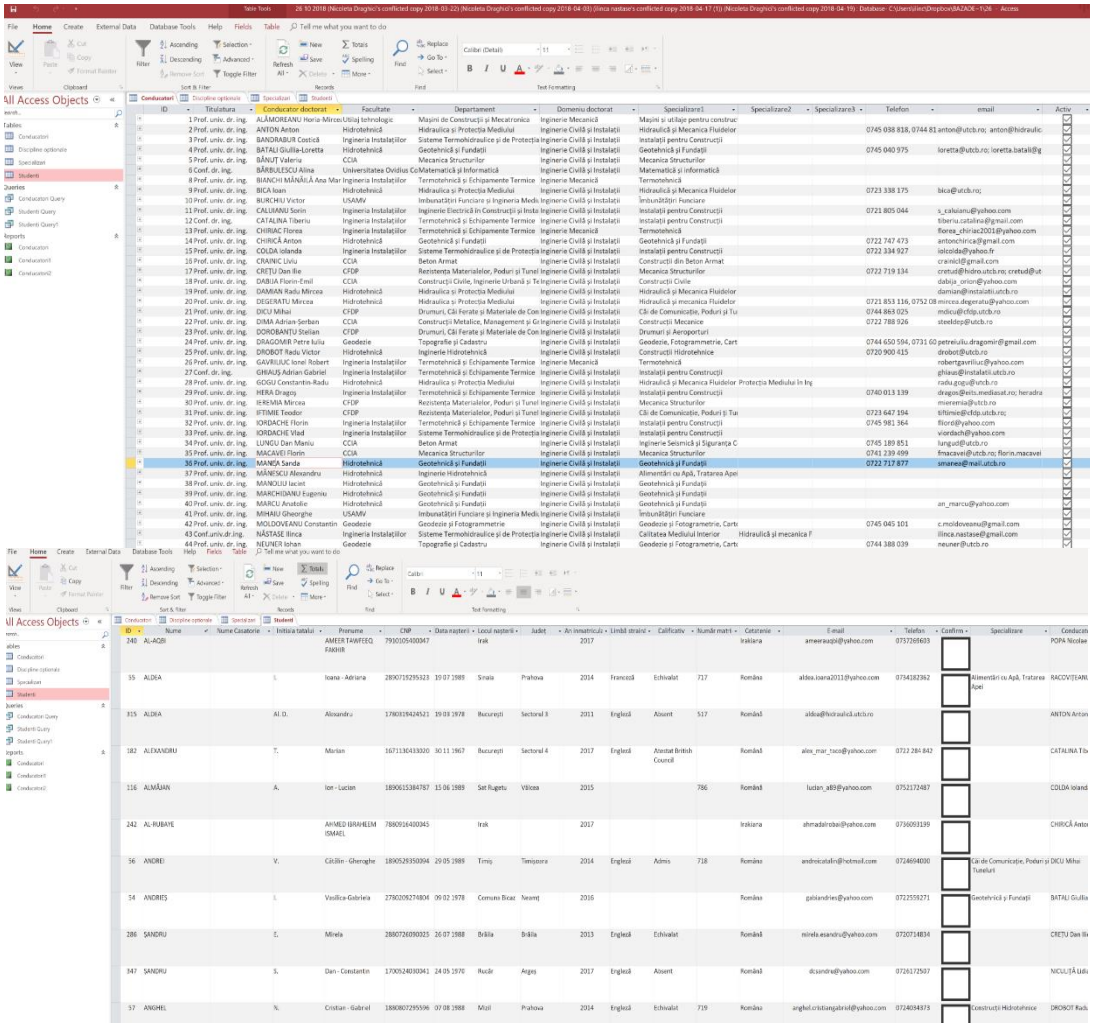


Figure 15 – Screenshots from thePrimary Access Database

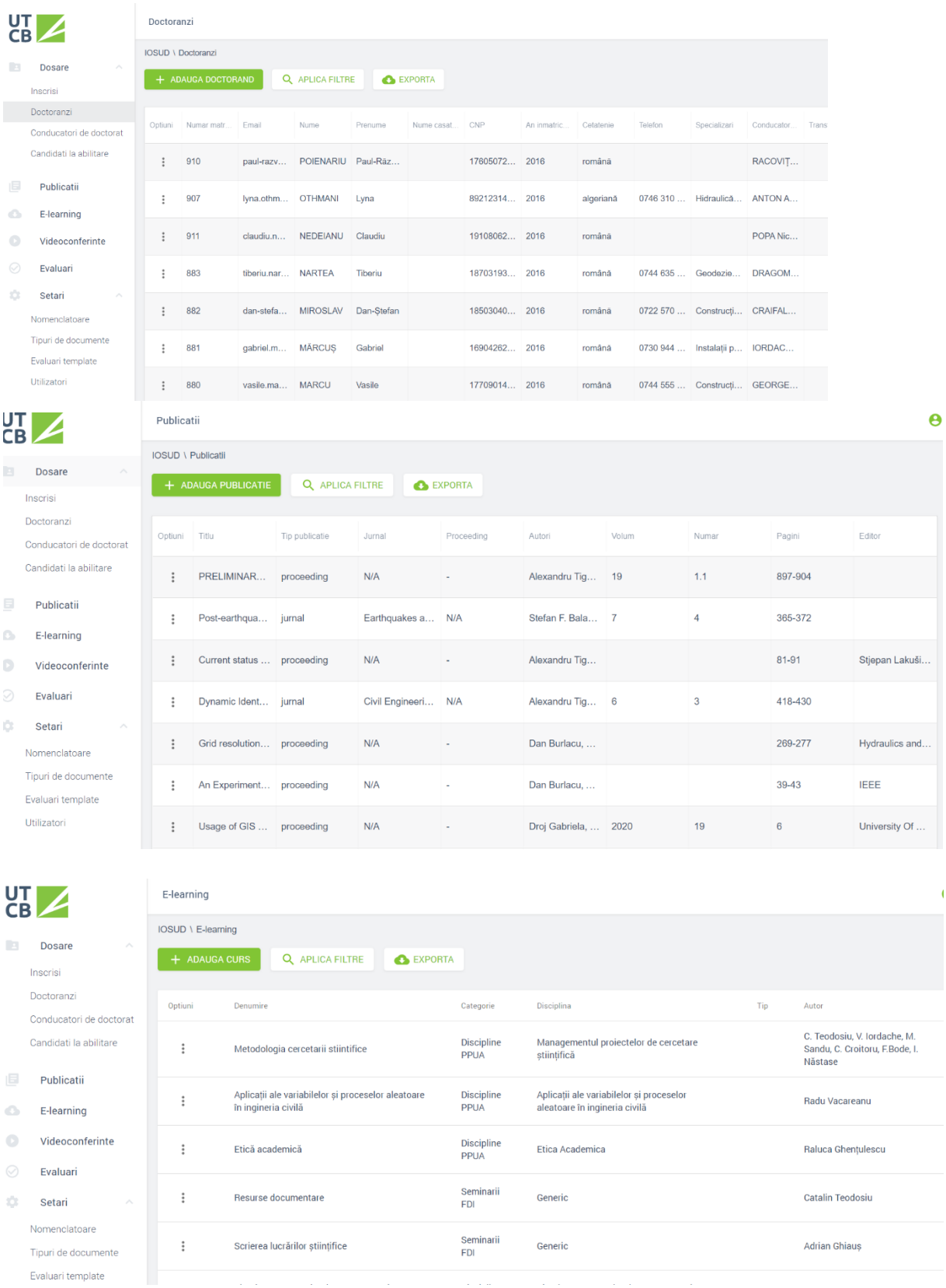


Figure 16 – Screenshots from the Main Database developed under the FDI-2018-0125 Project

For registered PhD students, the following information is included in the databases dedicated to them: matrix number, field, doctoral student name and surname, doctoral advisor name and surname, date of registration, period of doctoral student (study, extension, grace), doctoral form, date of birth, sex, stable domicile, social status, CNP, email address, telephone., number of credits obtained so far, titles of reports and elective disciplines in the Scientific Research Program , information on periods of study, extension or grace, any change in the form of education, as well as any change that may occur during the course of the university doctoral studies (Change of the advisor, Change of the thesis title, etc.), evidence of payment of study fees. These databases are created and generated by the Secretariat of the UTCB's Doctral School.

The new platform also contains a videoconferencing module where from March 2020 the public support of graduates is archived.

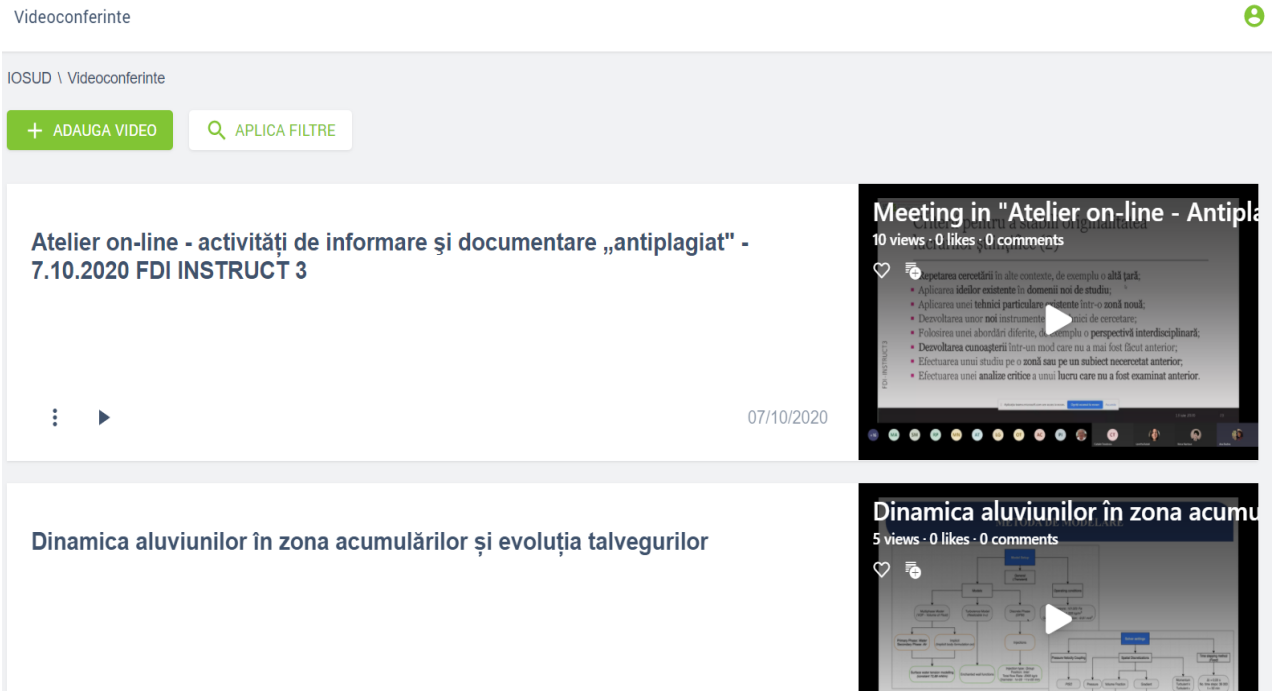


Figure 17 - Screenshots from the Main Database developed under the FDI-2018-0125 Project

The doctoral thesis "in extenso" can be accessed through the UTCB electronic library, from the following link: http://digilib.utcb.ro/tinread.jsp.

A.1.2.2. Existence and use of a computer program and evidence of its use to verify the percentage of similarity in all doctoral thesis.

Within IOSUD UTCB was implemented the system of verifying the originality of theses and scientific works developed by PhD students through the electronic comparison of documents offered by sistemantiplagiat.ro. The purchase of this service has been the subject of several successive contracts, the last contract in force is presented in Anexa II.9_ Contract antiplagiat 2022.pdf

The verification has a preventive role, to report possible irregularities and to inform the doctoral student and the doctoral advisor of those irregularities in order to rectify by correctly signalling the quotations from other scientific papers and in this way avoiding the suspicion of plagiarism.

Figure 18 – Screenshot from the sistemantiplagiat.ro platform

In addition, during the academic year 2017-2018, also within the project FDI-2018-0125 Support tools for increasing the quality of scientific results and promoting academic ethics and ethics at the level of IOSUD UTCB, a database was developed in the national semPlag platform containing at present 250 doctoral theses, 15 empowerment theses and 30 dissertations.

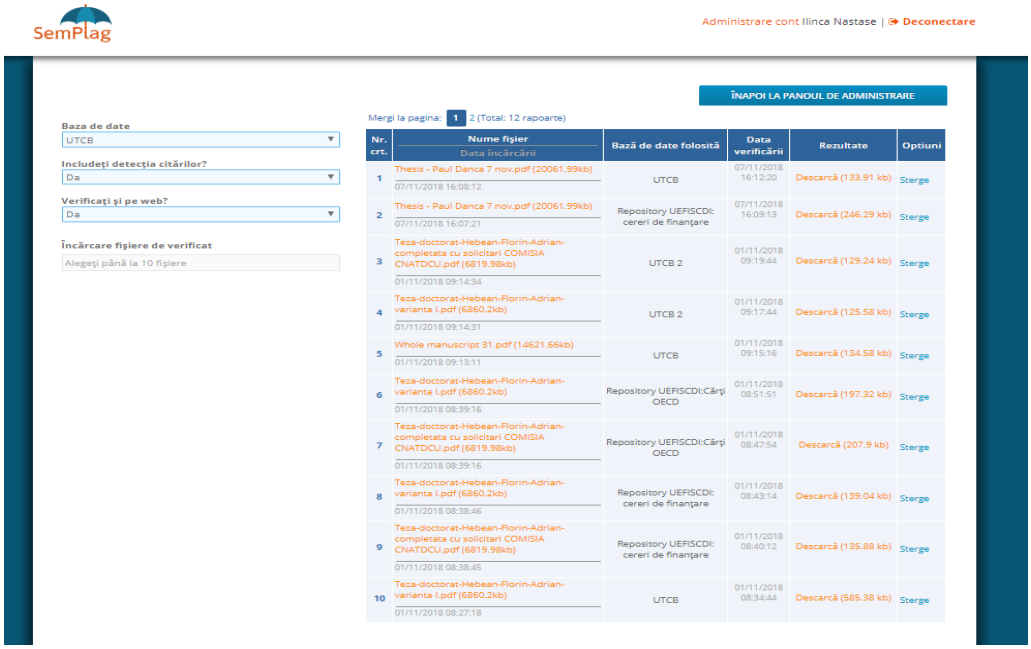


Figure 19 – Screenshot from the Semplag Platform

II.1.2. Criterion A.2. – Research Infrastructure

A.2.1. IOSUD/Doctoral schools have a research infrastructure to support the conduct of activities specific to doctoral studies.

A.2.1.1. The spaces and material equipment of the doctoral school allow the carrying out of research activities, in the field evaluated, in accordance with the mission and objectives assumed (computers, specific software, equipment, laboratory equipment, library, access to international databases, etc.). Research infrastructure and the offer of research services are presented publicly through a profile platform. The research infrastructure described above, acquired and developed over the past 5 years, will be highlighted separately.

UTCB is an accredited higher education institution, according to HG 26/2017 and OG no. 41/2015 for the amendment and completion of Government Ordinance No. 57/2002 on scientific research and technological development, on the basis of Decision ANCS No 57/2002 on scientific research and technological development. 9673/17.06.2008, as a higher education institution carrying out research activities and is part of the National Research and Development System. Scientific research, technological development and innovation is a key component of the higher education processes in utcB. Research, development and innovation (CDI) activities are included in the university's framework programmes (IDCs), faculties, departments, research centres, etc. These programmes also include the theme of scientific research, technological development and doctoral innovation programmes.

The main research activity for all doctoral studies in IOSUD UTCB takes place on the campuses of Tei, Pache Protopopescu and Colentina. UTCB's current land and real estate portfolio is contained in six sites:

- The location in Lacul Tei Blvd. no. 122-124 (Cadastral Judgment No. 7029 / 11.06.2002, District Court 2);
- The location of Lacul Tei Blvd. no. 143 (Cadastral Judgment No 7028/11.06.2002, District Court 2);
- The location of B-dul Pache Protopopescu, no. 66 (Cadastral judgment No. 7030 / 11.06.2002, District Court 2);
- The location of the Plevnei Way, no. 59;
- The location in Colentina, str. The 1907 Uprising, No. 5 (Cadastral judgment No 7031 / 11.06.2003, District Court 2);
- Location of the Space Research Laboratory in Murighiol – Tulcea County (Cadastral Judgment No. 4560 / 07.08.2002, Tulcea Court).

These lands amount to a total area of 9.07 ha and a built-up area of 93690 sqm respectively. Of this built area 51851 sqm represent teaching spaces and 41839 sqm administrative spaces or annexes.

The situation of the educational spaces that are the property of UTCB by faculties is shown in the following table:

Table 22. Spaces for educational and research activities in IOSUD UTCB

Denumire clădire	**Suprafaţa desfăşurată** (mp)	**Suprafaţa utilă** (mp)
1	2	3
FACULTATEA DE CONSTRUCŢII CIVILE INDUSTRIALE ŞI AGRICOLE	10344	6135
FACULTATEA DE HIDROTEHNICĂ	**12670**	**8037**
FACULTATEA DE CĂI FERATE DRUMURI ŞI PODURI ŞI FACULTATEA DE GEODEZIE	10400	5127
FACULTATEA DE INSTALAŢII	15411	7659
FACULTATEA DE UTIAJ TEHNOLOGIC	5086	3353

UTCB's ownership of the land and premises that make up the UTCB's assets are presented in the Annex I.37_UTCB_Amplasament UTCB.pdf.

A.2.1.2. IOSUD/ The Doctoral School has collaboration agreements with higher education institutions, research institutes, research networks for the partnership operation of various research infrastructures and publicly presents its offer of research services through profile platforms such as ERRIS.

The scientific research, technological development and innovation activities of the Technical University of Civil Engineering of Bucharest are also carried out in partnership with other higher education and research institutes in the country or abroad, including within research networks or consortia.

UTCB is part of the following clusters:

1. Different Angle Cluster. This cluster aims to support, promote and encourage research, education and innovation in order to develop and implement solutions that transform Bucharest into a smart city.

   The main objectives are the following:

   - Supporting initiatives aimed at creating solutions to add Bucharest to the list of smart cities
   - promoting the transfer of knowledge between academia and private;
   - opportunities for collaboration between Cluster and partners.
   - The secondary objectives are as follows:
   - Supporting the development of the field, innovation and positioning of the Bucharest-Muntenia region as a high-performance destination for IT;
   - Forming and developing a functional network between SMEs, academia, research institutions, policy makers and business makers;
   - Increasing the number of software specialists in a market with very high demand;
   - Familiarity of the international market with the Romanian IT market as a reliable source of sustainable and quality products and services;
   - Promotion and implicit development of member companies;
   - Capitalisation of regional IT&C skills and
   - their representation at national, European and global level.

2. Since 2016 UTCB is part of the Magurele High Tech Cluster. It has as areas of activity:
    - Advanced research
    - Nuclear physics
    - Physics of lasers and plasma
    - Materials physics
    - Physics of the Earth
    - Optoelectronics
    - Nuclear methods and technologies for health and the environment
    - Preservation of cultural heritage through nuclear technologies and lasers
    - Information and communication technologies,
    - Energy
    - Security
    - Technologies for agriculture
    - Training & Educational Products & Promoting Science
3. "Cluster for the promotion of buildings with almost zero energy consumption in Romania (Pro-nZEB)". The objectives are as follows:
    - Promoting the economic competitiveness of cluster members through investments financed from the cluster's own resources or from national or/and Community/international funds;
    - Development of knowledge and promotion of the application of technical and management solutions for the construction of buildings with almost zero energy consumption in Romania;
    - Supporting local industry and technology: schemes for the development of the local supplier chain industry under the conditions of free competition. Promoting the development of a strong local industry of energy-efficient materials and for the use of renewable sources;
    - Stimulating the work of IDCs in order to promote new high-performance materials or technologies that contribute to reducing energy consumption in buildings;
    - Stimulating the implementation activity of the results obtained from the completion of r&d projects;
    - Stimulating the involvement of research bodies and higher education institutions in research activities in the field of construction/building materials/energy efficiency;
    - Improving the professional skills of staff employed within association members and, in general, construction sector staff;
    - Representation of the interests of association members and development of economic relations, transfer of knowledge, best practices and exchange of experiences at national and international level

Through the portal "National Register of Research Infrastructures" (ERRIS – Engage in the Romanian Research Infrastructures System) the following infrastructures are registered:

1. Boundary Layer Wind Tunnel 1 (TASL 1)
2. Structural testing equipments
3. Seismic characterization of soils.
4. IN-SITU INVESTIGATION MOBILE LABORATORY FOR CONTAMINATED SITES
5. Seismic monitoring network
6. Research Center for Energy Efficiency in Buildings (EEC)
7. Research infrastructure for monitoring the impact of roads and railways on the environment
8. Research facility for indoor environmental quality and building physics
9. Water and wastewater pilot plants and research facilties.
10. Combustion Processes and Thermal Equipments Laboratory
11. Research Center on Mineral Wastes Valorization in Civil Engineering Materials (CC-VADEMC)
12. Research Centre and Laboratory for Geotechnical Engineering, Foundations and Environmental Geotechnics
13. Advanced Research Center in Strength of Materials "Prof. Panaite Mazilu" - CAREM
14. Thermal Engineering Research Center
15. Technological equipment engineering in construction
16. Research Infrastructure for Building Materials
17. ENVIROMENTAL PROTECTION LABORATORY - ATM- ECO- LAB
18. Geodetic engineering measurements and spatial data infrastructures research center (C.C.M.G.I.I.D.S.)

Their detailed presentation can be found in Annex II.11_Prezentare infrastructuri ERRIS.pdf

IOSUD UTCB has a consequent number of collaboration agreements with the main research institutes in the field of engineering: national Institute for Research and Development in Civil Engineering, Urbanism and Sustainable Territorial Development "URBAN-INCERC", National Institute of Aerospace Research INCAS, National Institute of Research in Earth Physics, National Institute of Research and Development for Mechatronics and Measurement Technique (INCDMTM), etc.

II.1.3. Criterion A.3. Quality of Human Resources

A.3.1. At the level of each doctoral school there are sufficient qualified staff to ensure a quality educational process.

A.3.1.1. Within the doctoral field, at least 3 doctoral advisors work and at least 50% of them (but not less than 3) meet the minimum standards of the National Council for the Attestation of University Titles, Diplomas and Certificates (CNATDCU) in force at the time of the evaluation, necessary and mandatory for obtaining the certificate of habilitation.

In the field of Geodetic Engineering, 6 doctoral supervisors are affiliated, out of the total of 6 doctoral supervisors, 3 are holders, and also a number of 3 doctoral supervisors are affiliated from other universities.

The average of the total score obtained on the basis of the CNATDCU minimum standards in force and respectively the averages for the A1, A2 and A3 scores respectively are:

MEDIA A1	MEDIA A2	MEDIA A3	MEDIA TOTAL
286.2	527.2	427.7	1241.0

Figure 20 – PhD Supervisors in Geodetic Engineering – the Average Score

The average of the ratio between the total score obtained based on the minimum CNATDCU standards in force and the minimum score required for the empowerment for the Doctoral field Geodetic Engineering is 2.76.

Table 23. The situation of the leaders in the field of Geodetic Engineering, affiliated to the UTCB Doctoral School 2021-2022

2021-2022 Total number of doctoral advisors	Advisors with students in coordination - cotutela	Advisors without students in coordination	Tenured doctoral advisors	Doctoral advisors that are meeting the requirements for habilitation
6	2	4	3	6

Table 24. PhD Supervisors in Geodetic Engineering, having PhD students in Cotutela on 7.05.2022
PhD Coordinator of Civil and Building Services Engineering

	Active doctoral advisors	Specialization	Status	No. of Students in coordination - Cotutela	Cotutela with PhD Coordinator of Civil and Building Services Engineering
1.	BADEA Gheorghe	Geodetic Engineering	Tenured	1	DRAGOMIR Petre Iuliu
2.	BADEA Ana-Cornelia	Geodetic Engineering	Tenured	3	DRAGOMIR Petre Iuliu
				1	IORDACHE Vlad

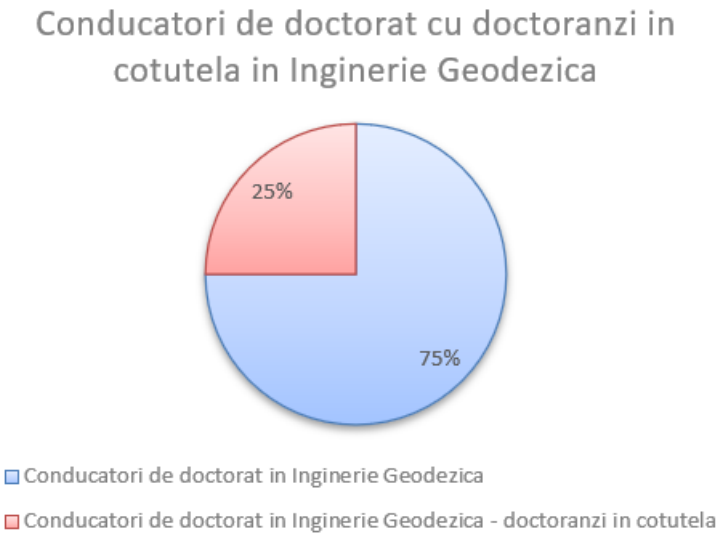


Figure 21 – PhD Supervisors in Geodetic Engineering with PhD Students in Cotutela

***A.3.1.2. At least 50% of the teaching/research staff involved in teaching and research activities related to advanced university training programmes or in individual scientific research or art creation programs are full or tenured professors of IOSUD, employed with a work contract of indefinite duration.**

According to the data presented in point A.3.1.1, at the time of elaboration of the self-evaluation report, out of the total of 6 doctoral supervisors, 3 are holders in the Technical University of Civil Engineering Bucharest and 3 supervisors are holders at: University of Oradea, Gheorghe Asachi Technical University of Iasi, University of Agricultural Sciences and Veterinary Medicine of Cluj Napoca.

Thus, the percentage of holders affiliated to the Doctoral School of IOSUD UTCB in the field of Geodetic Engineering is 50%.

The members of the guidance committees are added to this teaching staff.

As it can be seen in Annex II.12, most of them are full professors at UTCB (Annex II.12_Membri în comisiile de îndrumare la momentul raportarii.pdf).

A.3.1.3. Disciplines in the training programme based on advanced university studies related to the field are supported by teachers or researchers who have the status of doctoral/empowered leader, professor/CS I or university lecturer/CS II with proven expertise in the field of subjects taught or other specialists in the field who meet the standards set by the institution for the abovementioned teaching and research functions, under the law.

The doctoral degree in Geodetic Engineering is composed of the "Advanced University Training Program" (PPUA) with a duration of one semester and the "Scientific Research Program (PCS)",with a duration of five semesters, completed with the support of the doctoral thesis.

The advanced university training program is carried out in UTCB on the basis of an educational plan developed by the CSD, approved by the CSUD and approved by the Senate. El comprises the Ethics and Academic Integrity discipline and three mandatory disciplines (DO1 – complementary training disciplines, DO2 – general technical training disciplines and DO3 – specialized technical training disciplines), which provide all UTCB PhD students with a unified vision in addressing scientific research specific to

engineering sciences and management skills of scientific research projects, respectively.

The scientific research report comprises two elective disciplines and three research reports.

University doctoral programs provide the training of professional skills (content, cognitive and research) in specialized fields, as well as cross-cutting skills.

As it results from the Advanced University Training Program, it is presented in Annex I.92_UTCB_Plan_Invatamant_Scoala_Doctorala_PPUA_2021.pdf and the associated discipline programme description (Annex I.93_UTCB_Fise_discipline_Scoala_Doctorala_PPUA_2021.pdf) In table 23 is presented the list of academic staff responsible for modules from PPUA in the academic year 2020-2021 is presented. The minimum didactic degree is that of university lecturer. The main majority of teachers who have given lectures in ppua disciplines have doctoral habilitation or meet the conditions of.

Table 23. List of PPUA subjects activated in the academic year 2021-2022

Compulsory Subject

1	Ethics and academic integrity	Coordinator Conf.univ.dr.ing. Raluca GHENTULESCU

Optional Subject 1

1	Management of scientific project	Coordinator Conf.univ.dr.ing. Ilinca NĂSTASE
2	Scientific writing	Coordinator Prof.univ.dr.ing. Vlad IORDACHE and Lector dr. Mirel ANGHEL

Optional Subject 2

1	Modelling of Transfer phenomena	Coordinator Prof.univ.dr.ing. Florin IORDACHE
2	Mathematical and numerical modeling	Coordinator Prof.univ.dr.ing. Andrei GEORGESCU

Optional Subject 3

1	Hazard and sesmical risk	Coordinator Prof.univ.dr.ing. Radu Sorin VĂCĂREANU
2	Geografical Information Systems	Coordinator Prof. univ.dr.ing. Ana-Cornelia BADEA
3	Experimental techniques for the quality of the built environnment	Coordinator Prof.univ.dr.ing.Vlad IORDACHE

A.3.2. PhD advisors in the field carry out an internationally visible scientific activity.

A.3.2.1. At least 50% of PhD advisors in the field under evaluation present at least 5 Web of Science or ERIH indexed publications in journals with impact factor or other achievements of relevant significance for that field, which include international contributions showing progress in scientific research - development - innovation for the field evaluated. The mentioned doctoral

advisors have international visibility in the last 5 years, consisting of: membership in the scientific committees of international publications and conferences; membership on the boards of international professional associations; guestine at conferences or expert groups held abroad or membership of committees supporting doctoral thesis at universities abroad or in cotutele with a university abroad. For the branches of science Arts and Science of Sport and Physical Education, PhD advisors will prove international visibility in the last 5 years by membership in the boards of professional associations, by membership in committees organizing artistic events and international competitions, respectively by membership in juries or arbitration teams in artistic events or international competitions.

Table 24 presents the list of PhD advisors in the field of Civil Engineering and installations that present at least 5 publications indexed Web of Science or ERIH in journals with impact factor or other achievements, with relevant significance for that field, which contains international contributions that reveal a progress in scientific research - development - innovation for the evaluated field.

The 6 PhD advisors mentioned have international visibility in the last 5 years, consisting of: membership in the scientific committees of international publications and conferences; membership on the boards of international professional associations; guestine at conferences or expert groups held abroad or membership of committees supporting doctoral thesis at universities abroad or in cotutele with a university abroad. The percentage of PhD advisors with *international visibility and scientific activity in the last 5 years* in the field of Geodetic Engineering and Installations exceeds 50%.

Table 24. PhD advisors with international visibility and scientific activity in the last 5 years

	Active PhD supervisors at the time of the evaluation	Specialization	Status	Meets minimum standards
1	Ana-Cornelia BADEA	Geodetic Engineering	Tenured	yes
2	Gheorghe BADEA	Geodetic Engineering	Tenured	yes
3	Caius DIDULESCU	Geodetic Engineering	Tenured	yes
4	Sorin NISTOR	Geodetic Engineering	External	yes
5	Valeria-Ersilia ONIGA	Geodetic Engineering	External	yes
6	Tudor SĂLĂGEAN	Geodetic Engineering	External	yes

*A.3.2.2. At least 50% of PhD leaders awarded a field of doctoral studies continue to be scientifically active, obtaining at least 25% of the score required by the MINIMUM CNATDCU standards in force at the time of evaluation, necessary and mandatory for obtaining the certificate of empowerment, based on the scientific results of the last 5 years.

Out of the 6 doctoral supervisors in the field of Geodetic Engineering, all 6 meet the conditions for habilitation.

The average of the total score for all the academic staff in the field of Geodetic Engineering, obtained on the basis of the CNATDCU minimum standards in force and the averages for the A1, A2 and A3 scores respectively are:

MEDIA A1	MEDIA A2	MEDIA A3	MEDIA TOTAL
286.2	527.2	427.7	1241.0

Figura 22 – PhD Supervisors in Geodetic Engineering – the Average Score

The average of the ratio between the total score obtained based on the minimum CNATDCU standards in force and the minimum score required for the empowerment for the Doctoral field Geodetic Engineering is 2.76.

II.2. Criterion B. Educational Performance

II.2.1. Criterion B.1. - The number, quality and diversity of the students that presented at the entrance examination

B.1.1. The institution organizing doctoral studies has the capacity to attract candidates from outside the higher education institution or in greater numbers than the number of places financed from the state budget.

B.1.2. The candidates admitted to doctoral studies demonstrate academic, research and professional performance.

*B.1.2.1. Admission to doctoral study programs is based on selection criteria that include: the academic, research and professional performance of the candidates, their interest in scientific or artistic / sports research, publications in the field and a research topic proposal. An interview with the applicant is a mandatory part of the admission procedure.

The organization of didactic activity, starting with the admission of candidates for university doctoral studies, following with the design, administration, funding and development of study and research programs, the selection and promotion of teaching staff, the services provided to students, integration into the European university area and ending with the finalization of their studies, as well as the organization and exploitation of scientific research, the continuous aim is to achieve learning and scientific research results in accordance with the mission undertaken by IOSUS UTCB.

The admission of candidates for university doctoral studies consists of a contest organized annually by UTCB, usually in the last two decades of September (https://admitere.utcb.ro/admitere-sud/, Annex I.21_UTCB_Metodologie admitere Doctorat 2021_2022.pdf).

The entrance examination is organized by doctoral fields and specializations. The admission of candidates is made within the limits of the places open for competition, in the order of the average obtained at the contest. The admission contest includes a written examination of linguistic competence and an oral examination, made up of two tests (Annex I.21_UTCB_Metodologie admitere Doctorat 2021_2022.pdf)

In order to support the candidates, to ensure proper information and understanding of the activities they carry out in the whole complex admission process are elaborated, printed, distributed and displayed on the website of UTCB. Presentation of UTCB and details of admission to bachelor and master (https://utcb.ro/studiaza/doctorat /admitere/).

Various activities related to the admission process are rigorously described in internal procedures which are distributed and explained to faculty members in a special convocation dedicated to the admission process.

The main criteria for highlighting educational performance are the number, quality and diversity of candidates who were present in the admission contest and the quality and diversity of those admitted.

Thus, as highlighted by the dynamics of the number of doctoral students, IOSUD UTCB has the capacity to attract more candidates than the number of places available. Also, the percentage of graduate candidates at master degree level from other higher education institutions in the country or abroad who have enrolled for admission to university doctoral studies in the last five years is represented on average 25% of the number of places funded from the state budget at the Doctoral School in IOSUD UTCB (Table 19).

Candidates who were admitted to doctoral studies are of the highest quality. Admission to any form of education in UTCB is based on non-discriminatory principles, being promoted equal opportunity between candidates as regards gender, ethnicity and social origin.

There is a gender equality report of candidates and they are diversified in terms of social representation and there is a balance between candidates from their own institution and candidates from other national and international institutions (Table 20).

Candidates who were admitted to doctoral studies are of the highest quality. Admission to any form of education in UTCB is based on non-discriminatory principles, being promoted equal opportunity between candidates as regards gender, ethnicity and social origin.

There is a gender equality report of candidates and they are diversified in terms of social representation and there is a balance between candidates from their own institution and candidates from other national and international institutions (Table 20).

Doctoral students from disadvantaged backgrounds with social issues receive financial support from UTCB through tax reductions.

II.2.2. Criterion B.2. - The Content of the Curriculum of University Doctoral Studies

B.2.1. The training program based on advanced university studies is appropriate to improve the research competences of doctoral students and to strengthen ethical behavior in science.

The advanced university training program is carried out in UTCB on the basis of an educational plan developed by the CSD, endorsed by the CSUD and approved by the Senate. It comprises Ethics and academic integrity and three compulsory subjects (CS1 – complementary training subjects, CS2 – General Technical training subjects and CS3 – specialized technical training subjects) which provide all UTCB doctoral students with a unified view to addressing scientific research specific to engineering sciences and, respectively, management abilities of scientific research projects. Optional subjects are activated every year depending on the options of doctoral students expressed at the

time of registration. In the 2018-2019 academic year the following subjects were activated:

Compulsory subject - ETHIC AND ACADEMIC INTEGRITY
Optional subject 1
- Management of research projects;
- The technique of carrying out and drafting scientific paper

Optional subject 2
- Modeling transfer processes
- Mathematical modeling and numerical calculation

Optional subject 3
- Environmental quality and energy efficiency
- Hazard, vulnerability and seismic risk
- Geographic Information Systems
- Sources of risk in Geotechnical engineering
- Modern experimental techniques for the quality of the built environment

The curriculum for the Advanced University Training Program is presented in (Annex I.92_UTCB_Plan_Invatamant_Scoala_Doctorala_PPUA_2021.pdf) and the associated discipline programme description (Anexa I.93 - Annex I.93_UTCB_Fise_discipline_Scoala_Doctorala_PPUA_2021.pdf)

B.2.1.1. Training program based on advanced university studies includes at least three relevant subjects for training in the field of scientific research for doctoral students, of which at least one subject is allocated to profoundly study of research and/or statistical data processing of the methodology.

As it results from the Advanced University Training Program, it is presented in Annex I.92_UTCB_Plan_Invatamant_Scoala_Doctorala_PPUA_2021.pdf and the associated discipline programme description Annex I.93_UTCB_Fise_discipline_Scoala_Doctorala_PPUA_2021.pdf. the training program based on advanced university studies includes relevant subjects for training in scientific research of the doctoral students, of which one subject is allocated to the profoundly study of research methodology and two subjects are allocated to statistical data processing and physical and mathematical modeling (Table 23).

B.2.1.2. There is at least one discipline dedicated to ethics in scientific research and intellectual property or well-defined topics on these subjects within a discipline taught in the training programme.

As it results from the Advanced University Training Program, it is presented in Annex I.92_UTCB_Plan_Invatamant_Scoala_Doctorala_PPUA_2021.pdf and the associated discipline programme description (Annex I.93_UTCB_Fise_discipline_Scoala_Doctorala_PPUA_2021.pdf) the training program based on advanced university studies includes relevant subjects for training in scientific research of the doctoral students, of which one subject is allocated to Ethics and academic integrity (Table 23). Elements related to intellectual property are approached within the subject “Management of scientific research projects”.

The main specific measures to promote professional ethics and deontology are a part from the compulsory ethics course for all first year doctoral students, were completed within the FDI project CNFIS-2018-0125 INSTRUCT, with a series of measures that other doctoral students from higher years can benefit from:

- creating a course support for the subject Ethics and academic integrity
- elaborating guides for writing doctoral and habilitation theses with applicability from the academic year 2018-2019
- informing and making responsible the second and third year doctoral students and the future doctoral advisors by organizing introductory courses in the deontological norms of academic ethics
- improving the level of knowledge regarding the creation and writing rules and norms of a scientific paper, knowledge on the rules of bibliographic reference, etc .;

B.2.1.3. IOSUD has created mechanisms to ensure that the training program based on advanced university studies, related to the evaluated field, aims at "learning outcomes", specifying the knowledge, abilities and responsibility and autonomy that doctoral students should acquire after completing each subject or through research activities.

University doctoral studies programs provide the creation of professional competences (subject matter, cognitive and research) in speciality fields, along with transversal competences.

Provided competences by university doctoral studies programs from IOSUD – UTCB are:

Professional competences:

a. advanced knowledge of the field;
b. capacity to identify, form and resolve research problems;
c. mastering advanced research methods and techniques;
d. knowledge related to the management of research projects;
e. mastering new procedures and solution in research;
f. abilities of documentation, elaboration and exploitation of scientific works;
g. linguistic abilities at a academic level in international languages necessary for the documentation and elaboration of scientific works;
h. understanding and ability to apply the principles and values of the ethics of scientific research in that field.

Transversal competences:

a. communication competences, written and oral, in the field of science and culture;
b. advanced language competences in international languages;
c. use of information and communication technology;
d. interpersonal and teamwork abilities;
e. management knowledge of human, material and financial resources;
f. advisorship;
g. knowledge regarding career management;
h. knowledge regarding risk, crisis and failure management;
i. knowledge regarding the use of legislation in the field of intellectual property rights;
j. economic, technological and social entrepreneurship abilities.

The subjects of PPUA are audited every 5 years according to the audit program developed by the Doctoral School and approved by the CSD (Anexa I.94_UTCB_Procedura de audit discipline PPUA.pdf).. The purpose of the evaluation consists in: balancing the volume of transmitted and requested knowledge, corresponding to the number of course hours, the number of hours of individual study and the number of credits granted to the subject; ensuring the connection between the content of the applications (seminar, laboratory, homework, projects, practice) and the content of the lectures; correlating the way of evaluating students' knowledge with the structure and volume of teaching activities: course, applications, individual study; Evaluation of the competencies acquired by the student after the promotion of the subject.

The evaluation is performed within the Doctoral School Council, based on a File, prepared by the Evaluation Committee. The evaluation committee is appointed by the CSUD director. The committee is formed of: a member of CSD or CSUD who is also the chairman of the Committee; a titular of PPUA subjects (Subject of complementary scientific training or Subject of general technical training or Subject of speciality technical training); a representative of the students from CSD or CSUD, who promoted the discipline in the previous years.

II.3. Criterion C. Quality management

II.3.1. Criterion C.1. – The existence and regular operation of the internal quality assurance system

C.1.1. There is an institutional framework and a procedure for monitoring internal quality assurance is applied, as well as relevant internal quality assurance policies.

IOSUD-UTCB promotes the excellence concept of training and research and development services (Annex I.82_UTCB_Politica universitatii MC.pdf).

IOSUD - UTCB applies The Quality Management System for all activities (teaching, research and development), developed on the basis of ISO 9001 (Annex I.81_UTCB_Certificat SRAC 2018.pdf).

Quality assurance actions are carried out systematically, through the involvement of management structures at all levels, quality assurance structures, teaching and research staff, students, and other staff. The quality assessment and assurance system comprises specific processes, mechanisms and procedures and tools (Annex I.95_UTCB_Harta proceselor MC.pdf, Annex I.96_UTCB_Interactiunea proceselor MC.pdf, Annex I.83_UTCB_Lista inregistrarilor calitatii.pdf) used in all university structures. These tools are constantly reviewed and improved.

At the IOSUD-UTCB level, the Quality Assessment and Assurance Commission operates (Annex I.78_UTCB_Decizie CEAC 16.12.2020.pdf, Annex I.77_UTCB_ROF CEAC UTCB 2020.pdf, Annex I.79_UTCB_CEAC-X.pdf).

Within the quality assurance system, an internal procedure for analyzing and approving the proposals on the topics of the doctoral study programs and for carrying out the examinations within the Scientific Research Program was elaborated, as well as an operational procedure for the audit of the disciplines from the advanced university training program (PPUA) Anexa I.94_UTCB_Procedura de audit discipline PPUA..

Also, a general framework for the elaboration of measures to remedy the reported deficiencies and to stimulate the scientific and academic performance was elaborated. It defines the policies for stimulating performance within the Doctoral School of UTCB.

C.1.1.1 **The doctoral school in which the field of university doctoral studies falls provides proof of the constant conduct of the process of evaluation and internal assurance of its quality in accordance with a procedure developed and applied at the level of IOSUD, among the criteria evaluated being mandatory:**

a) **the scientific activity of PhD advisors;**

For the evaluation of the work of PhD advisors, the CSUD has developed a set of evaluation criteria that are presented in Annex II.14_Fisa de autoevaluare a activitatii si a performantelor profesionale PO-10_F-01.pdf, in addition to the criteria generally applicable to UTCB teaching staff (Annex I.16 - Annex I.16_UTCB_Evaluare personal didactic.pdf).

b) **the infrastructure and logistics necessarry for carrying out the research activity;**

The Research, Development and Innovation Management Center (CMCDI) of IOSUD UTCB implements the quality management system with which UTCB was certified according to the SR standard EN ISO 9001:2015 in 2020 (from 2005, 2011, 2014 and 2017), with the certification of the management system for higher education and scientific research according to ISO 9001:2015.

CMCDI is coordinated by the scientific research prorector and by a Scientific Research Council of 7 members assigned by the UTCB Senate at the proposal of the Administration Council (Annex I.97_UTCB_Consiliul cercetarii stiintifice.pdf). The Scientific Research Council makes decisions on the organization of research and the definition of research objectives, based on consultations with the Deans, directors of departments and directors of the Research Centers.

The Research Centers are established by the UTCB Senate on the basis of the methodology approved by the UTCB Senate. They can be accredited by the Ministry of National Education through its specialized structures. The research centers are regularly evaluated and ranked by the UTCB on the basis of their own methodology in accordance with the agreed methodologies at a national and European level. The Research, Development and Innovation Management Department provides the organizational framework for the evaluation of research centers in IOSUD UTCB in which their doctoral managers and doctoral students opperate, in accordance with the ethics of scientific research in the UTCB, according to the Rules of organization and operation of the research, development and innovation activity in the UTCB. (Annex I.17 -- Annex I.17_UTCB_ROF-CDI.pdf)

c) **the regulations and procedures under which doctoral studies are organized;**

All the procedures and standards on the basis of which doctoral studies is organized in the UTCB are reviewed regularly following the CSUD analysis, the CSD's comments and the General Assembly of Doctoral supervisors. The CSUD provides in its regulation the existence of a mechanism for review and update disciplines in the PPUA. It has been implemented by the CSD through the audit procedure presented in Annex

I.94_UTCB_Procedura de audit discipline PPUA.pdf. The disciplines in the PPUA are audited every 5 years according to the Audit Program developed by the Doctoral School and approved by the CSD. The purpose of the evaluation consists in: the balance of the volume of the submitted and requested knowledge, corresponding to the number of hours of courses, the number of hours of individual study and the number of credits granted to the discipline; the ensuring of the connection between the content of applications (seminary, laboratory, homeworks, projects, practice) and the content of lecturing; correlation of the assessment of students knowledge with the structure and volume of didactic activities: Course, applications, individual study; assessment of students competences after the promotion of the subject.

The evaluation is carried out within the Doctoral School's Council on the basis of a Dossier, created by the Evaluation Committee. The Evaluation Committee is appointed by the Director of CSUD. The commission involves: a member of the CSD or the CSUD who is also the the president of the Commission; a holder from PPUA subjects, of the same type of subjects (Complementary scientific training subject or General technical training subject, Specialized technical training subject); a representative of the students of the CSD or the CSUD who has promoted the subject in the previous years.

d) scientific activity of doctoral students;

Within the scientific research program, the PhD student has the following obligations correlated with the type of doctoral study program:

- to elaborate at least 3 scientific papers in the thematic field of the doctoral thesis, in which he synthesizes the intermediate scientific results that he has obtained and which he will capitalize in the doctoral thesis;
- to publish at least 3 articles (according to the doctoral study contract - Annex II.7_Contract de studii universitare de doctorat 2020-2021.pdf) from the thematic field of the doctoral thesis in journals/conferences in international databases (BDI - Scopus, Wiley, Springer, Science Direct, IEEE, Engineering Village, Proquest, EBSCO) or in the volumes of scientific events indexed to BDI;
- the expenses occasioned by the publication of the results of the scientific research during the doctoral studies, be borne by utcb, under the conditions of the existence of research projects involving the phd student and/or the doctoral supervisor.
- the publications will be specified in the doctoral thesis when disseminating the research results.

e) the training program based on advanced university studies of the Doctoral students;

All the procedures and norms on the basis of which SUD is organized in UTCB are periodically reviewed following the analysis carried out by CSUD, the observations of the CSD and the General Assembly of doctoral supervisors. Thus, the Regulation for the organization of doctoral studies reached the 2nd revision (Annex I.27 - Annex I.27_UTCB_ROF SUD rev 2_2020.pdf), The regulation of organization and functioning of the Doctoral School at the 10th revision (Annex I.70_UTCB_ROF SD Revizia 10.pdf), and the Regulation on the empowerment of doctoral supervisors at the 4th revision (Annex I.71_UTCB_Regulament abilitare rev4.pdf)

CSUD provides through its regulation the existence of a mechanism for reviewing and updating the disciplines of the PPUA. It has been implemented by the CSD through the audit procedure presented in the Anexa I.94_UTCB_Procedura de audit discipline PPUA.pdf. The disciplines in the PPUA are audited every 5 years according to the Audit Program developed by the Doctoral School and approved by the CSD (Anexa I.98_UTCB_Calendar audit discipline PPUA 2020-2024.pdf). The purpose of the evaluation consists in: balancing the volume of knowledge transmitted and requested, corresponding to the number of classes, the number of hours of individual study and the number of credits granted to the discipline; ensuring the connection between the content of the applications (seminar, laboratory, homework, projects, practice) and the content of the lectures; correlation of the way of evaluating the students' knowledge with the structure and volume of didactic activities: course, applications, individual study; Evaluation of the competences acquired by the student after the promotion of the discipline.

The evaluation is carried out within the Doctoral School Council, based on a File, drawn up by the Evaluation Committee. The evaluation committee shall be appointed by the DIRECTOR of the CSUD. The committee shall comprise: a member of the CSD or CSUD who is also the Chairman of the Commission; a holder of ppua disciplines, within the same type of disciplines (The discipline of complementary scientific training or the discipline of general technical training, the discipline of specialized technical training); a representative of the students from the CSD or CSUD, who promoted the discipline in previous years.

f) social and academic support services (including participation in various events, publication of articles, etc. and counseling services made available to doctoral students.

IOSUD-UTCB promotes the excellence concept of training and research and development services (Annex I.82_UTCB_Politica universitatii MC.pdf).

In IOSUD - UTCB the Quality Management System is applied for all activities (didactics, research and development), developed on the basis of ISO 9001 (Annex I.81_UTCB_Certificat SRAC 2018.pdf).

Quality assurance actions are carried out systematically, by involving management structures at all levels, quality assurance structures, teaching and research staff, students, as well as other categories of staff. The evaluation and quality assurance system includes specific processes, mechanisms and procedures and tools (Annex I.95_UTCB_Harta proceselor MC.pdf, Annex I.96_UTCB_Interactiunea proceselor MC.pdf, Annex I.83_UTCB_Lista inregistrarilor calitatii.pdf) used in all structures of the university. These tools are constantly being reviewed and improved.

At the level of IOSUD-UTCB operates the Evaluation and Quality Assurance Commission (Annex I.78_UTCB_Decizie CEAC 16.12.2020.pdf, Annex I.77_UTCB_ROF CEAC UTCB 2020.pdf, Annex I.79_UTCB_CEAC-X.pdf).

*C.1.1.2. During the doctoral training period, evaluation mechanisms are being implemented targeting needs identification, as well as the general level of satisfaction with the doctoral university study program of doctoral students, in order to improve constantly the academic and administrative processes. After the obtained results review, a development and implement of a plan of measures is being proved.

At the level of IOSUD UTCB and Doctoral School, a collection mechanism of doctoral student's feedback was implemented by developing half-yearly questionnaires

(on-line) to quantify the extent that UTCB is a learning and education environment appropriate to the realities and expectations of students. Thus, on-line satisfaction questionnaires for disciplines in the PPUA were developed and implemented. The assessment form from the first semester of the 2018-2019 academic year is visible here: https://form.jotformeu.com/90632242817354.

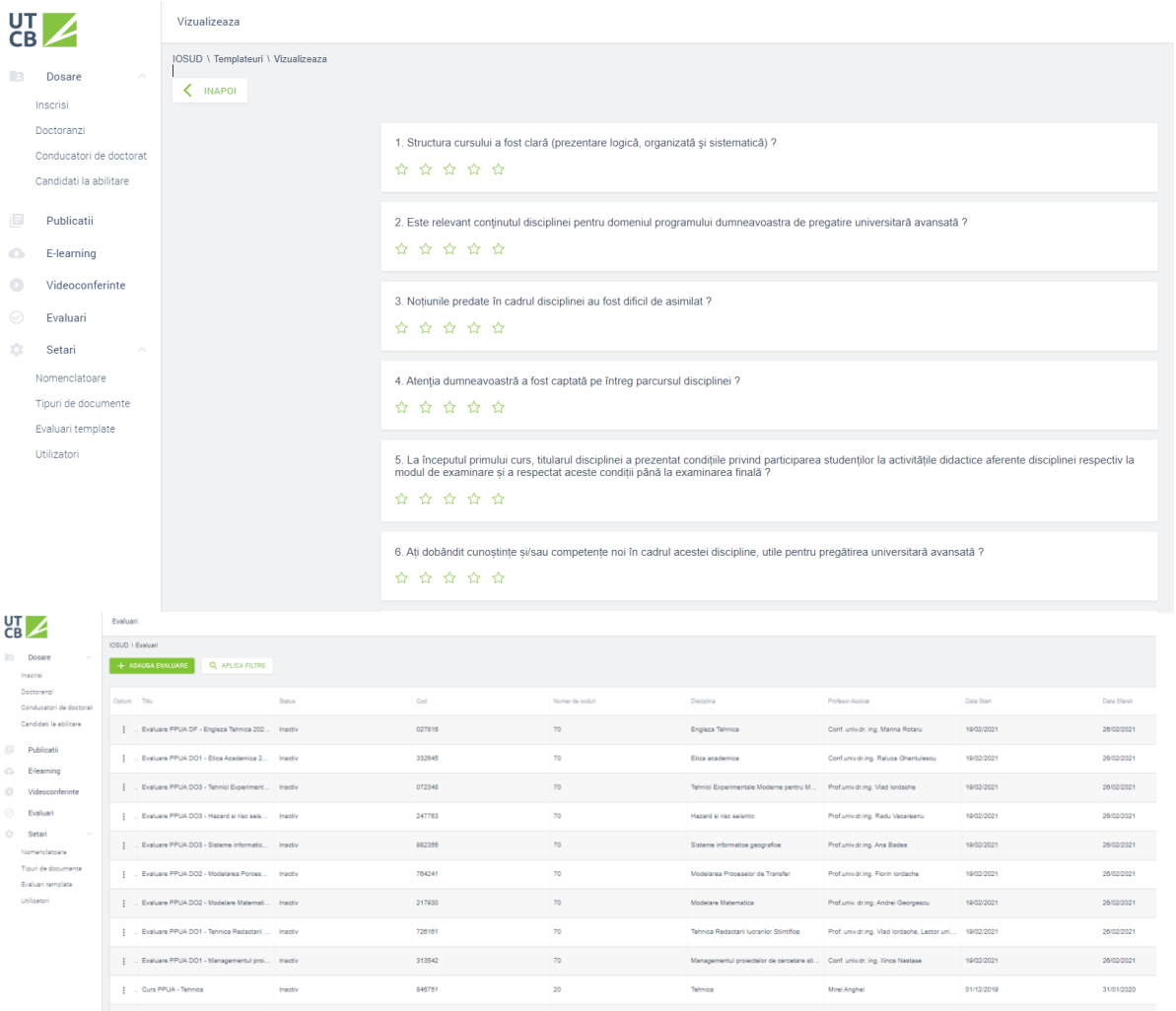
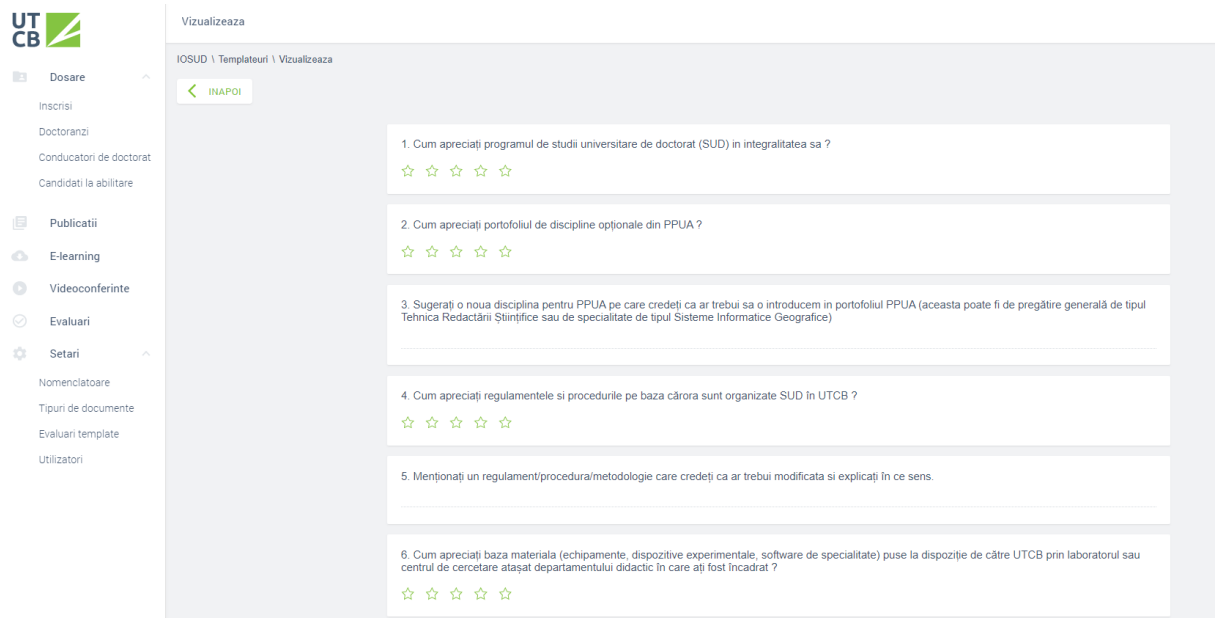


Figura 23. Module for PPUA evaluation through the Doctoral School's Integrated Electronic Platform

The assessment process by the students is carried out as follows:

- The Doctoral School's council carries out the programming of the evaluation;
- The submission of the questionnaires and the collection of the replies is made online by a CSD Member accompanied by a person from the secretary;
- The centralization of the results is done by a CSD Member assisted by a person from the secretary and signed by the Doctoral School's and CSUD's directors.
- The Centralizers are attached to the Synthesis Report of the Evaluation Commission.



7. In ce măsură ați accesat literatura de specialitate prin intermediul platformei e-nformation (proiectul ANELIS) ?

8. În ce măsură v-a ajutat obținerea titlului de doctor în cariera profesionala ?

9. În ce măsură sunteți satisfăcut/satisfăcută de rezultatele obținute pe parcursul tezei de doctorat în termeni de producție științifica (lucrări scrise, articole, participări la manifestări științifice de specialitate, etc) ?

10. Credeți ca ați fi putut obține mai multe rezultate științifice pe parcursul SUD daca nu ar fi intervenit diferite obstacole ? Daca DA, care dintre aceste elemente au influențat evoluția SUD cel mai mult: accesul la infrastructura de cercetare, comunicarea cu conducătorul de doctorat, accesul la literatura științifică de specialitate, posibilitatea de a avea bursa, lipsa unor stagii de mobilitate internațională, lipsa finanțării unor proiecte de cercetare). menționați maxim trei elemente, in ordinea importantei acestora.

11. Ati beneficiat de participarea la mobilități internaționale (de exemplu prin programul Erasmus, cotutela, stagiu practic, etc.) pe parcursul SUD ? Daca, DA, menționați care au fost aceste mobilități.

12. Cum apreciați efortul depus de către conducătorul de doctorat (implicarea acestuia în programul de cercetare științifică, comunicarea cu acesta)

13. Ați fost implicat în programe de cercetare pe parcursul tezei de doctorat (contracte din Planul National sau de tip FP/Horizon, contracte cu terții, alte tipuri de proiecte). Daca, DA, menționați si tipul acestora

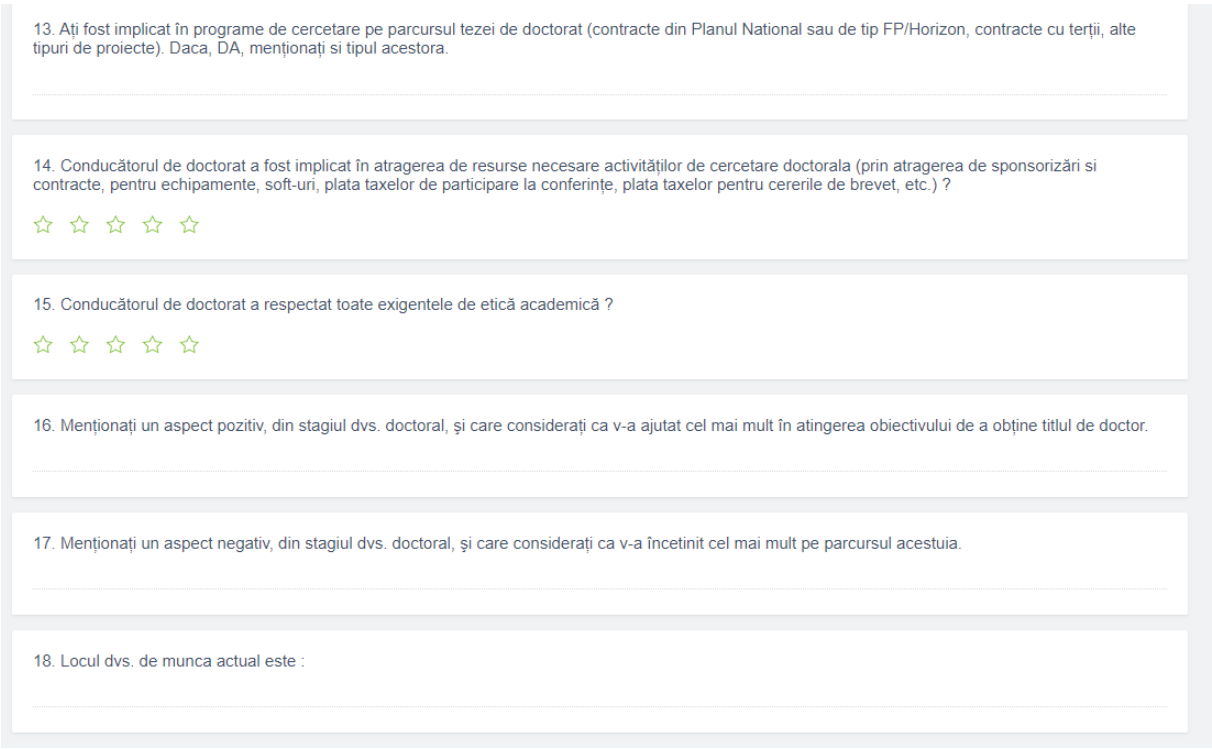


Figura 24. Module intended for doctoral studies evaluation by the integrated electronic platform of the Doctoral School

From the academic year of 2020-2021, the PPUA evalauation process has been taken over through its own document management platform, which has been specially developed for the Doctoral School under the Projects FDI-CNFIS-2018-0125 and FDI-CNFIS-2019-0354, operationalized by FDI-CNFIS-2020-0370. The results are completed anonymously by generating unique codes for each evaluation campaign. The resulting files are protected.

The platform also allows the evaluation of the overall level of satisfaction by the graduates. This approach signes up through the evaluation mechanisms aimed at identifying needs, as well as the general level of satisfaction with the doctoral degree program of doctoral students, in order to improve constantly the academic and administrative processes. Following the analysis of the obtained results, the quality assessment and assurance system regularly improves the specific processes, mechanisms and procedures.

C.1.1.3. Following the internal evaluation, both IOSUD and doctoral schools develop strategies and policy of action in order to remedy the deficiencies reported and to stimulate the scientific and academic performance of IOSUD.

CSUD has developed a general framework of measures to remedy deficiencies in doctoral work and to boost scientific and academic performance - (Annex II.15_ Cadrul general de masuri de remediere.pdf)

II.3.2. Criterion C.2. – Transparency of information and accessibility to learning resources

C.2.1. Information of interest for doctoral students, future candidates and information of public interest are available for consultation in electronic form.

C.2.1.1. IOSUD publishes on the website of the higher education institution, in compliance with the regulations in force on data protection, information such as:

a) Doctoral School Regulation;
Regulament de organizare şi funcţionare Școala Doctorală

b) Admission Regulation;
Metodologie de admitere studii universitare de doctorat

c) Doctoral studies contract;
Contract-de-studii-universitare-de-doctorat

d) the regulation for the completion of studies, including the procedure for public support of the thesis;
Metodologie finalizare SUD

e) the content of training programmes based on advanced university studies;
https://sd.utcb.ro/doctorat/programa/

f) academic and scientific profile, thematic areas/research themes of doctoral advisors in the field, as well as their institutional contact data;
https://sd.utcb.ro/doctorat/domenii-specializari-conducatori/

g) list of the doctoral students in the field with basic information (year of registration, advisor);
https://sd.utcb.ro/doctorat/domenii-specializari-conducatori/

h) information on the standards for the doctoral thesis elaboration;
https://sd.utcb.ro/doctorat/regulamente/

i) links to summaries of doctoral thesis which are going to be publicly supported, as well as the date, time, location where they will be supported, at least 20 days before the support;
https://sd.utcb.ro/category/blog/teze-de-doctorat/

j) information on opportunities for Doctoral students aimed at attending conferences, publishing articles, granting scholarships, etc.;
https://sd.utcb.ro/category/blog/anunturi-pentru-doctoranzi/
https://www.facebook.com/sd.utcb

C.2.2. IOSUD / Doctoral School provides the doctoral students with access to the resources needed for doctoral studies in progress.

C.2.2.1. All the doctoral students have free access, based on a user name and password account, to a platform with academic databases relevant to the fields of organized doctoral studies.

All doctoral students have access to the international databases specific to the activity field on any UTCB computer provided through the ANELIS Plus program.

Ensuring access to scientific documentation resources by continuing the association with ANELIS + Under the conditions of closing on December 31, 2016 the ANELIS Plus project and therefore the expiration of any obligations existed or collaboration between Anelis Plus Association and publishing houses to continue access to electronic resources. Access to the databases available to the U.T.C.B. it is done either from the computers on the university campus, based on the IP of the computers, or through mobile access. On July 18, 2017, the Anelis Plus Association, MDRAPFE and MCI, signed, within the Competitiveness Operational Program, the financing contract for the National Access to Scientific Literature Project to support the research and education system in Romania - Anelis Plus 2020 .

Through this Project, the Association provides 75% of the total costs, through the absorption of non-refundable funds, and the percentage of 25 will be ensured by co-financing by the member institutions participating in the Project. The UTCB contribution exceeds 150,000 Euros. The project is developed on two major, binding and equivalent components in importance: Component 1: Development of a national storage of scientific documents, through the acquisition of archives of specialized electronic publications, to ensure the scientific community's access to information that will cover extended time periods by various fields/types of documents.

Component 2: Ensuring the access of the Romanian scientific community to electronic scientific resources (the most important electronic platforms of full text scientific Journals in the world, so as to ensure continuity of access to at least 60% of the scientific research literature with an relevant Impact Factor Thomson ISI and bibliographic and bibliometric databases), in order to support research, innovation and stimulate their own scientific production.

Component 1 is included for the first time in a project of this kind, it is a mandatory condition for accessing non-refundable funds and has not been the subject of previous contracts concluded for the period 2009 and 2013-2016 respectively. In this context, one of the achievement indicators foreseen in Anelis 2020 is also the number of archives with fully purchased full-text specialty Journals.

Under the new project, UTCB has access to IP-based scientific information and documentation resources and mobile access to digitalinformation and electronic information resources, namely ScienceDirect Freedom Collection Journals ACCES, Springelink Journals, Thomson Web of Knowledge.

The access to the archives of scientific Journals and purchased e-books, according to the subscribed resources and the paid contribution, available in the national document storage and/or on the website of the supplier ScienceDirect NATIONAL ARCHIVES, Springer Archive, Thomson Web of Knowledge Archive, ScienceDirect CURRENT ARCHIVES 2016, e-books.

All optional subjects within the Advanced University Training Program contain modules for which the discipline managers have made the course support available to the first-year Doctoral students in electronic format. Starting with the 2017-2018 academic year, a centralized action was undertaken for all year 1 students to gain access to the e-nformation documentation resource portal. In this respect, all Year 1 doctoral students have received EDUROAM access and institutional email addresses nume.prenume@phd.utcb.ro to facilitate the intitutional access to the ANELIS Plus platform.

C.2.2.2. Each doctoral student has free access, upon request and with the consent of the PhD advisor, to an electronic system to verify the degree of similarity with other existing scientific or artistic creations.

Within IOSUD UTCB was implemented the system of verifying the originality of theses and scientific works developed by the doctoral students through the electronic document comparison service offered by the sistemantiplagiat.ro (Annex II.9_ Contract antiplagiat 2022.pdf). Each student has access, on request, to an electronic system for verifying the degree of similarity. On a second request, the degree of similarity is checked against payment.The purchase of this service has been the subject of several successive contracts.

The verification has a preventive role, to report possible irregularities and to inform the doctoral student and the doctoral advisor of those irregularities in order to rectify by correctly signalling quotations from other scientific papers and avoiding in this way the suspicion of plagiarism.

In addition, during the academic year 2017-2018, also within the project FDI-2018-0125 Support-tools for increasing the quality of scientific results and promoting deontology and ethics at the level of IOSUD UTCB, a database was developed in the national SemPlag platform containing at present 250 doctoral theses, 15 empowerment theses and 30 dissertations.

C.2.2.3. All the doctoral students have access to scientific research laboratories or other facilities depending on the specifics of the field/fields within the doctoral school, according to rules of internal order.

The scientific research, technological development and innovation represent a main component of the higher education processes in the UTCB. The research activities within the UTCB, which aim to achieve excellence in research, are carried out through the contribution of the university teaching staff and research staff within the research standard and beyond, on the basis of research projects accessed in the competition system or through projects contracted directly with various beneficiaries. Research, development and innovation (CDI) activities are included in the university's framework programmes (CDI), faculties, departments, research centres, etc. These programmes will also include the program's theme of the scientific research, technological development and doctoral innovation programmes.

All the doctoral students from IOSUD UTCB are arronded to a laboratory or research centre in the department where the Doctoral advisor works. They all have access to scientific research laboratories or other UTCB facilities, in accordance with

the internal regulations of laboratories or research centres (Annex I.17_UTCB_ROF-CDI.pdf)

II.3.3. Criterion C.3. – Degree of internationalization

C.3.1. IOSUD/The Doctoral School has a strategy and implements it in order to increase the degree of internationalization of doctoral studies.

UTCB has developed a Strategic plan for the internationalization of UTCB (Annex II.16_UTCB_Plan strategic internationalizare.pdf) which is implemented at the doctoral studies and UTCB Doctoral School level. At Doctoral School level, there have been taken several measures to facilitate the access of foreign students to doctoral studies, even more so for the ones that need study equating and an acceptance letter, by providing a document submission deadline that allows them to obtain the necessary documents in due time. And, for the candidates outside of EU and EEA, it was provided the possibility to participate in the entrance examination via teleconference, if they already have the acceptance letter but not the Romanian visa.

The existing measures have been enhanced so that a larger number of doctoral theses to be elaborated/defended in international languages, for doctoral committees to include foreign members and in order to increase the visibility of UTCB.

Thus, specific procedures for the admission of foreign students to doctoral studies have been issued (Annex II.17_Metodologie de primire la studii_cetateni straini.pdf) as well as specific stipulations to facilitate the access of candidates coming from outside of EU and EEA (Annex I.21_UTCB_Metodologie admitere Doctorat 2022_2023.pdf).

In September 2020, five foreign doctoral students were enrolled in the doctoral programme, three of which will have their thesis written in English and two in French.
In December 2020, there were 32 foreign doctoral students expected to have their thesis written in an international language, the above-mentioned doctoral students coming from both inside and outside of EU, from: France, Belgium, Turkey, Morocco, Algeria, Tunisia, Libya, Syria, Iraq, Egypt and Turkmenistan.

*C.3.1.1. IOSUD has concluded mobility agreements for each Doctoral School with universities from abroad, research institutes, companies that work in the field of study, agreements which target the mobility of doctoral students and faculty members (e.g. ERASMUS agreements for the third cycle of studies). At least 35% of the doctoral students have completed a training internship abroad or another type of mobility, such as the participation in international scientific conferences. IOSUD elaborates and implements measure policies and plans which target the increasement in numbers of doctoral students who participate in training internships abroad, up to at least 20%, which is the target in the European Higher Education Area.

At the Centre of International Relations, the process of closing new bilateral agreements for the academic exchange of students, faculty members and administrative personnel and of further extending the existing agreements (new fields of interest, mobility types, time period) was constantly conducted in the Erasmus+ mobility project. The list of ERASMUS mobility agreements for the doctoral studies cycle is highlighted in Annex II.19_UTCB_ acorduri_interinstitutionale_ERASMUS.pdf

The list of outside mobility participations, containing the names of the doctoral students, can be found in Annex II.20_ Cotutele internationale.pdf

It is also to be mentioned that the Technical University of Civil Engineering Bucharest (UTCB) is part of the EU-CONEXUS – The European University for Smart Urban Coastal Sustainability (website), along with 5 other partner universities: University of La Rochelle, France; Agricultural University Of Athens, Greece; Klaipeda University, Lithuania; Catholic University of Valencia "San Vicente Mártir", Spain; University of Zadar, Croatia, and other 3 associate universities: Waterford Institute of Technology, Ireland; University of Rostock, Germany; Frederick University, Cyprus. EU-CONEXUS represents an initiative supported through the European Universities, Erasmus Plus (website) call by the European Commission, being a priority for the development of the European Higher Education Area and the European Research Area (ERA). Within the alliance the work is divided in 8 fields, each having several more work groups: Management, Joint Study Programmes, Mobilities, Research, External Relations, Life on campus, Virtual Campus and Communication. UTCB coordinates the 5th field – External Relations and has 35 representatives consisting of faculty members, students and administrative personnel among the 30 EU-CONEXUS committees.

During the current academic year, in the doctoral area of the alliance, it has been worked on cataloguing doctoral topics based on the EU-CONEXUS theme, developing a long-term joint doctoral programme, initiating some joint doctoral programmes between the universities in the alliance, and organizing a summer school for doctoral students in July-August 2021.

C.3.1.3 The internationalization of activities within the doctoral studies is also supported by IOSUD through other specific measures (e.g. the participation in educational fairs in order to attract international doctoral students; the inclusion of international experts in doctoral advisory committees or in doctoral evaluation committees etc.).

Promotion measures taken by the CSUD/CSD were diverse. In these measures have participated both the doctoral advisors, members of the CSUD and CSD, and the student representatives within these structures. Thus, it was ensured the participation in different expositional manifestations, having an audience potentially interested in doctoral studies, and being organized with an exhibition stand and a marketing portfolio containing the activity of the Doctoral School. For this purpose, a visual identity of the Doctoral school was customized by developing a roll-up, flyer and marketing brochure design. Among the targeted manifestations, a few examples are: the first edition of the Construct Fest 2017 manifestation, Salonul Cercetării 2017, Forumul Inovării 2017, International Electric and Automation Show IEAS 2017, Construct Fest 2018, Salonul Cercetării 2018, Forumul Inovării 2018, Construct Expo 2019.

The admission to doctoral studies was also promoted on the Doctoral School website, as well as on its Facebook page, where special attention was given to the attractiveness of the conducted activities by promoting some general announcements.

In 2020, given the pandemic situation, the promotion of the educational offer of the Doctoral School was conducted exclusively online.

The admission to doctoral studies was also promoted on the Doctoral School website, as well as on its Facebook page, where special attention was given to the attractiveness of the conducted activities by promoting some general announcements. An international advertising campaign was also conducted via KEYSTONE platform, funded for 1 year through the DI-CNFIS-2020-0370 project.

III Strategies and procedures implemented according to IOSUD, as a measure of continuous improvement for the quality of doctoral programs, other than those provided by the minimal standards, stipulated in the annex no. 4 in the guide.

The Technical University of Civil Engineering Bucharest displays a policy regarding quality focused on internal clients (students, Master's studies, doctoral students) and oriented towards the excellence of the services and activities performed.

UTCB's quality objectives are:

- identifying and applying the best practices for the keeping under control and the continuous improvement of the educational process (teaching-learning, monitoring and supporting the progress made by students and evaluating the knowledge and skills acquired by them);
- the implementation of criteria and procedures for quality assessment on every segment of the educational process;
- introducing feedback from students, graduates and employers, on the structure and quality of educational provision and improving it accordingly;
- identifying the real requirements and expectations of the socio-economic environment regarding the competence of the graduates of each specialization, their correlation with the university experience and with the international (European) practice.

The policy statement regarding the competence of the Rector of the Technical University of Civil Engineering of Bucharest is stated below:

The main mission of the Technical University of Civil Engineering Bucharest is to train specialists who have the necessary capacity and skills to use valuable scientific, technical and managerial knowledge, in order to integrate in the economic processes of the Romanian, European and international society.

The Technical University of Civil Engineering Bucharest promotes the concept of excellence in training and research and the development of services and is consistent with its mission to train, at the highest level, specialists in order to contribute to scientific and technological progress, to the development of professionalism and efficiency. to increase the usefulness of this training in the real economy, in order to increase the standard of living.

Our main goal is to contribute to the overall satisfaction of our customers (students and society) by providing quality education and training services.

Every UTCB employee is responsible for achieving the proposed objectives, in order to achieve, in addition to the satisfaction of customers and of society, the satisfaction of every one of out peers.

Student satisfaction, i.e. the full realization of their requirements is necessary because they are the reason we exist. Everything we do, must be aiding our students, supporting them in carrying out their activities and welcoming them, so that, on the training services market we will be their first choice.

Satisfaction of society is necessary because science and technology must be considered priorities of society. Our management system is designed and oriented as to have the necessary flexibility to adapt to change and to correspond to the national strategy of higher education.

We want the personal satisfaction of our employees because the quality of the services offered is always determined and created by people. Employee satisfaction contributes thr most in increasing the quality of our activities. The procedures, techniques and rules are inadequate in gaining a competitive advantage. The elements that ensure success are laying in all of us, in our attitudes and actions, in the way we cooperate with our peers and in the way we cooperate with our clients.

In order to obtain the general satisfaction, we have created a Quality Management System that ensures that we will maintain a high quality of training, research and development services.

The implementation of the quality policy is ensured by fulfilling the following objectives:

1. defining the requirements of our internal and external clients;
2. training capable graduates to succeed in the labor market competition;
3. increasing the performance of the process of education by completing it with high-level scientific research activities, in accordance with the needs and expectations of current science and technology, by involving both teachers students, Master's students and Doctoral students;
4. the use of informational technology, as a support for the continuous improvement of the quality of the educational process generated by all the factors involved;
5. the involvement of the entire staff of the university in the comprehansion, understanding and improvement of the entire process of education and training of our students.

In the implemention of the quality policy, we respect the following principles that must be learned by each employee:

- the transparency of our policy and its knowledge by all stakeholders;
- consistent and current use of the Quality Management System in order to inspire confidence that our policy will be implemented;
- making full use of our professional training and resources to deliver quality services;
- keeping this system under control and measuring the performances obtained.

The general objectives of quality assurance are:

- The use of new systems for the continuous improvement of the quality of educational and research processes in UTCB;
- Use of appropriate methods and tools to meet the criteria set out in the ARACIS Methodology;
- Improving professional performance through the assesment, self-evaluation and annual ranking of teachers, based on evaluation criteria of maximum demand;
- Improving the quality of study programs and analytical programs by periodically evaluating them, based on internal and international assesment criteria;
- Improving the quality of institutional management;
- Increasing the level of satisfaction of all employees by developing the management of activities, by establishing a modern ranking system, by correlating the volume and quality of activities and skills with the level of remuneration, etc .;
- Accomplishing a modern system for dissemination and communication with every parties involved (society, academia, authorities, students, trainees, doctoral students, etc.);

- Increasing the level of preparation of students for their integration in the European space and for ensuring compatibility and comparability with European diplomas in the fields of studies of UTCB;
- Implementing a system for tracking (monitoring) the employment capacity of graduates;
- The establishment and management of a database on institutional quality assessment and assurance;
- Improving the system of transferable credits, including in doctoral studies;
- Continuous improvement of teachers through external studies or through research activities, consultancy, or collaborations with administrative or production units;
- Increasing the number and volume of international and European collaborations both in teaching and research;
- Increasing the computerization of the teaching process trough equipping the classrooms, computer communication with students and trainees, online lecture of courses, etc .;
- Equipping research and teaching laboratories in order to update the level of knowledge of students and the level of research within UTCB;
- Ensuring improvement in the fields of UTCB through master studies, Master's studies, doctoral studies at a high scientific level in order to compete on the domestic and European market;
- Design and implementation of a quality management system (QMS) for the teaching and administrative process;
- Updating and improving the quality management system for the research-development process.

IOSUD UTCB and the Doctoral School attests a continuing concern with increasing the scientific level of doctoral theses through specific measures related to ethics and academic integrity, as well as the accountability of doctoral supervisors and doctoral students regarding the use of documentary resources. In this sense, through the featured projects CNFIS-FDI-0125-2018, CNFIS-FDI-0354-2019, CNFIS-FDI-0370-2020, measures have been implemented to support the increase of quality, quantity and visibility of scientific activities and the encouragement of academic ethics at IOSUD level. These refer to: efficient management of activities through digitization, information of Master's students, doctoral students, postdoctoral students and their access to documentary sources, the diversification of the courses offered to doctoral and Master's students, increasing the level of information on research activity, rules for developing an international scientific paper and the use of documentary tools, as well as on the validation of anti-plagiarism and academic ethics and deontology.

Through the CNFIS FDI 2021 project, an Ethics Research Center applied to research in engineering sciences will be created during this academic year within a partnership between the Doctoral School and FILS-DLSC. The laboratory will allow teachers involved in the disciplines of Academic Ethics and Scientific Research Methodology to cooperate for the development of studies and research in order to increase the quality of scientific papers and optimize the educational processes of doctoral students.

The correlation and the stage of fulfilling the management objectives at the level of IOSUD UTCB during the year 2020 illustrates the constant preoccupation for the continuous improvement of the quality of the doctoral programs:

Objectives in the educational field

- Promoting the educational offer of UTCB

Due to the pandemic situation in the year of 2020, the educational offer of the Doctoral School was only promoted online. Admission to doctoral studies was advertised on the website of the Doctoral School, as well as on the Facebook page, with particular emphasis on the attractiveness of the activities carried out by promoting announcements of general interest. In addition, the FDI-CNFIS-2020-0370 project funded an international promotion through the KEYSTONE platform for 1 year.

- Using web portals to attract students

Due to the pandemic situation, the educational offer of the Doctoral School was only promoted online. Admission to doctoral studies was advertised on the website of the Doctoral School, as well as on the Facebook page, with particular emphasis on the attractiveness of the activities carried out by promoting announcements of general interest. In addition, the FDI-CNFIS-2020-0370 project funded an international promotion through the KEYSTONE platform for 1 year.

- Examining curricula and subject sheets for compliance with ARACIS standards and removing overlaps between cycles.

An Audit Plan for the PPUA subjects was developed at the Doctoral School level, as well as the way in which curriculum revisions can be made was clarified.

- Applying the implementation of the strategic plan for the internationalization process of bachelor's/master's/doctoral studies

At the Doctoral School level, measures have been taken to facilitate the access of foreign students to doctoral studies, especially for those who require equivalence of studies and acceptance letter, by providing document submission periods to enable them to obtain the necessary documents on time. Candidates from outside the EU and EEA were also given the option of taking the entrance exam via teleconference, if they had already obtained the acceptance letter but not the Romanian entry visa. To expand the awareness of UTCB, measures have been intensified to increase the number of doctoral theses elaborated/presented in foreign languages, for the co-optation of foreign members into doctoral commissions. In September 2020, five foreign PhD/doctoral students were enrolled in the doctorate studies, three of whom would write their thesis in English and two in French.

In December 2020, 32 foreign PhD/doctoral students were working on a thesis intended to be written in a foreign language. The PhD/doctoral students mentioned above come both from EU and other countries outside EU: France, Belgium, Turkey, Morocco, Algeria, Tunisia, Libya, Syria, Iraq, Egypt, and Turkmenistan. Three foreign meetings were held in December 2020, with the Universities of Montpellier and Rennes in France, as well as the Royal Military Academy in Brussels, Belgium. In the academic year of 2019-2020, we had invited three members from abroad to participate in the commissions for public presentation of PhD/doctoral theses,: Prof. Eng. Moulay Said El Youssoufi, Ph.D. - University of Montpellier; Prof. Eng. Ahmed Loukili, Ph.D. - Institut de Recherche en Génie Civil et Mécanique, Prof. Eng. Rachid Zentar, Ph.D. - Institut Mines Télécom Lille Douai. We had various invited representatives from abroad in the steering committees in December 2020. Assoc. Prof. Eng. Vincent Huon, Ph.D., University of Montpellier, France, Assoc. Prof. Eng. Frédéric Jamin, Ph.D., University of Montpellier,

France, Assoc. Prof. Eng. Bart Janssens, Ph.D., Royal Military Academy in Brussels, Belgium, Prof. Risto Kosonen, Ph.D., Aalto University, Finland, Prof. Stefan Van Vaerenbergh, Ph.D. Université Libre de Bruxelles – Von Karman Institute, Belgium, Assoc. Prof. Eng. Paul Byrne, Ph.D., University of Rennes, France.

Several public defenses for habilitation theses are currently being prepared, for which we have the invited members from abroad: Prof. Walter Bosschaerts, Ph.D., Royal Military Academy Brussels / Université Libre de Bruxelles, Belgium, Prof. Risto KOSONEN, Ph.D., Aalto University, Finland, Prof. Richard DE DEAR, Ph.D., Sydney University, Australia, Assoc. Prof. Ashish SHUKLA, Ph.D. Loughborough Universtity / Coventry University, United Kingdom.

- Increasing the number of internships available through ERASMUS+ mobility and expanding the double degree system with prestigious universities (INSA)

Several ERASMUS + conventions have been extended to the third cycle – PhD. Unfortunately, physical mobility was not feasible due to the pandemic situation.

- Increasing the number of qualified PhD/doctoral supervisors

In 2021 there were new habilitated doctoral supervisors: Lect. Dr.eng. Cristiana Croitoru, Assoc.Prof.Valeria-Ersilia Oniga and Assoc.Prof. Sorin Nistor. In 2022 Prof. Tudor Sălăgean, from USAMV Cluj Napoca was affiliated to the Doctoral School of UTCB.

- The offer of educational resources available online and in the UTCB library

Within the FDI-CNFIS-2020-0370 project carried out by the Doctoral School, the course support for the optional discipline from PPUA(advanced university training program) "Applications of variables and random processes in civil engineering" was established. Both this course support and those previously developed through the FDI 2018, 2019 projects are submitted to the virtual management platform of the Doctoral School. In addition, the course support for the PPUA compulsory discipline „Metodologia cercetării şiintifice" ("Scientific research methodology") was introduced.

Objectives in the field of universitary scientific research

- Increasing the responsibility of the departments for the scientific quality of PhD/doctoral theses and the publicist requirements prior to the presentation of PhD/doctoral theses

1. Revision of the doctoral studies, SD Regulations
2. Establishment of the Admission Methodology 2022- 2023
3. Revision of the doctoral studies Completion Methodology
4. Implementation of previously adopted measures for raising the scientific standard of PhD/doctoral theses, as follows:

- A better connection/coherence between PhD/doctoral thesis topics with funded research projects and priority research areas
- Gradual improvement in minimum publishing requirements
- More detailed information on publishing opportunities for PhD/doctoral students and supervisors
- Holding an internal competition to award grants to PhD/doctoral students for funding research (equipment, materials) and conference attendance

- Promoting internships abroad (ERASMUS or others) and co-supervision theses

Through the CNFIS-FDI-2021-0144 project, an Editorial Management Module for articles for UTCB Journal of Modeling in civil and environmental engineering was created in the Doctoral School Management Platform.

Thus, 3 online informative seminars were held in 2020 (within the FDI-CNFIS-2020-0370 project), with a total of 76 participants:

- Online training seminar on the rules and regulations for designing and writing a scientific paper - Friday, November 6, 2020 at 10:00
  Efficient communication of scientific results/findings: Assoc. Prof. Adrian - Gabriel Ghiauș: Writing a scientific article; Lecturer Marina Rotaru: Writing the thesis manuscript
  Assoc. Prof. Tiberiu Catalina: The main regulations of the peer review procedure

- On-line training seminar on the use of necessary documentation resources for the elaboration of scientific papers - Thursday, December 10, 2020 at 15:30, held by Conf. Ilinca Năstase and Conf. Cătălin Teodosiu.

- Online workshop - "Anti-plagiarism" documentation and information activities - July 13, 2020 at 16:30, held by Prof. Ana-Cornelia Badea, Assoc. Prof. Cătălin Teodosiu, Assoc. Prof. Ilinca Năstase

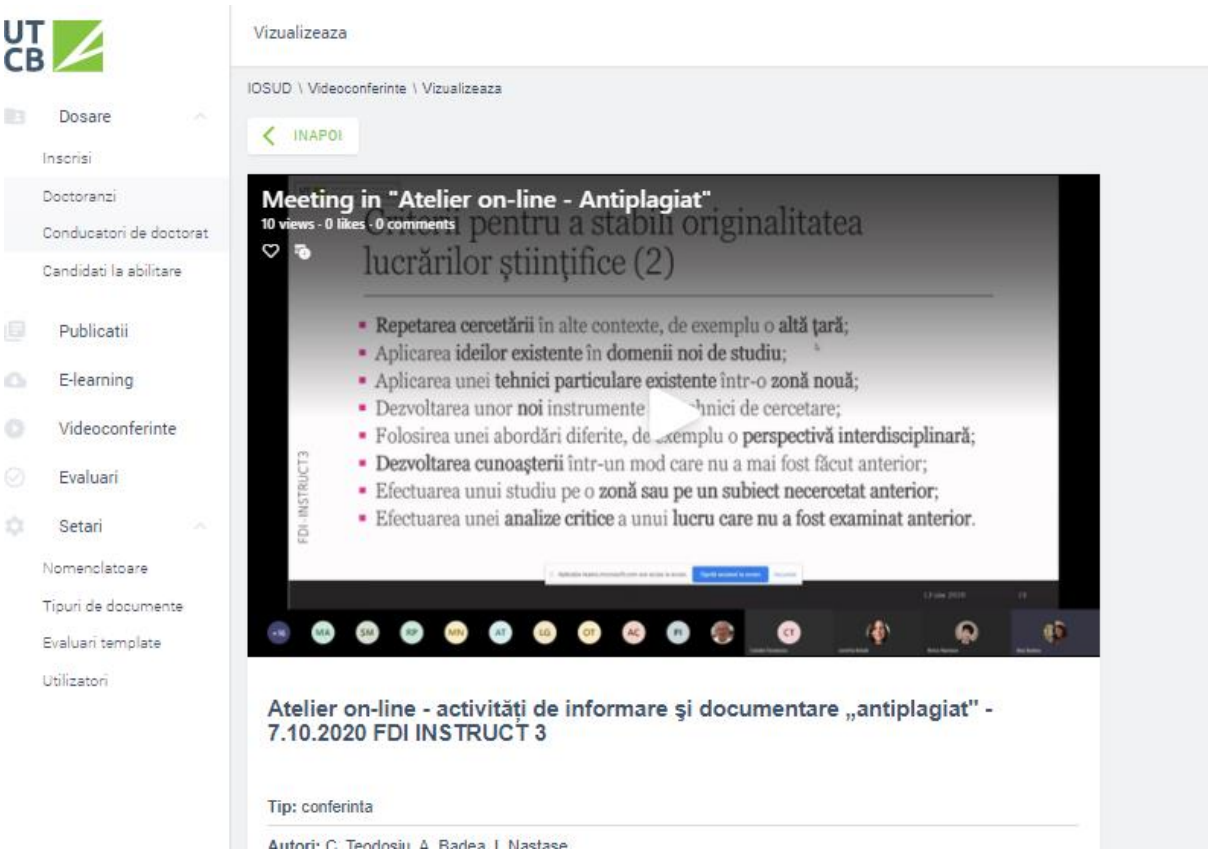


Figure 25. Online workshop - "Anti-plagiarism" information and documentation activities

A commission was also established within the FDI-CNFIS-2020-0370 project in order to support the PhD/doctoral students and young teachers regarding publication in listed and visible journals. On-line workshops were conducted by Assoc. Prof. Adrian - Gabriel Ghiauş, Prof. Ioan Bica, Prof. Oana Luca, Prof. Ana-Cornelia Badea.

In 2020, a new round of the Internal Doctoral Grants (GID) competition was held, but it remained unfinished/was put off due to the coronavirus epidemic. The projects from the competition's 2019 round were implemented in 2020.

The third edition of the UTCB Doctoral School Conference was held online on November 27, 2020, and featured two keynote lectures (Dr. eng. Dan GHIOCEL - President and Chief of Engineering at Ghiocel Predictive Technologies, Inc. and Adjunct Professor of Structural Engineering at Case Western Reserve University) (Cleveland, USA and Prof. Risto KOSONEN - Aalto University, Finland), as well as 26 doctoral student papers, which were later published in an ongoing volume in the IOP Conference Series: Earth and Environmental Science Series, which is indexed by SCOPUS and ISI.

In 2021, 3 online information seminars were organized (within the FDI-CNFIS-2021-0144 project) in which a total of 76 people participated:

- Online training seminar on the rules and regulations for designing and writing a scientific paper - 19.11.2021
- Efficient communication of scientific results: Assoc. Prof. Adrian - Gabriel Ghiauș
- Writing a scientific article; Writing the thesis manuscript: Lecturer Marina Rotaru
- The main directions of the peer review procedure: Assoc. Prof. Tiberiu Catalina
- On-line training seminar on the use of documentation resources necessary for the elaboration of scientific papers - 25.11.2021 held by Conf. Cătălin Teodosiu.
- Online workshop Documentation and information activities "anti-plagiarism" - 11.11.2021 held by Prof. Ana-Cornelia Badea, Assoc. Prof. Cătălin Teodosiu, Prof. Ilinca Năstase

Also within the FDI-CNFIS-2021-0144 project, online workshops were organized by Assoc. Prof. Adrian – Gabriel Ghiauş, Prof. Ioan Bica, Prof. Oana Luca, Prof. Ana-Cornelia Badea – for the support of PhD students and young teachers in publishing in quoted and visible magazines.

In 2021, a new round of the internal grants competition for PhD students (GID) was organized.

On 26.11.2021, the 4th edition of the UTCB Doctoral School Conference was organized online, at which were presented two keynote lectures (Prof. Frédéric Thevenet, IMT Nord Europe France, Assoc. Prof. Thomasz Cholewa, Lubin University of Technology Poland), as well as 26 articles of the PhD students, which were subsequently published in a volume that is being indexed scopus and ISI in the IOP Conference Series: Earth and Environmental Science Series.

In 2021 the Doctoral School organized a competition to finance the publication of scientific articles in open science journals – 3 articles in Q1/Q2 funded by the CNFIS-FDI-2021-0144 project and 9 articles funded by the research fund (4 articles of PhD students together with teachers from UTCB and 5 articles of some candidates for

empowerment). A Special Issue was also initiated in the journal Applied Sciences (Q2, FI 2.67) in which articles by empowerment candidates and PhD students would be published on an Open Science basis. Guest editor of this special issue was Prof. Ilinca Năstase.

- *Objectives regarding the relationship with students, administration, financial and personnel policy, connection with society*
- Quantifying the importance and accessibility of the information conveyed using the outcomes of the semester (online) questionnaires presented to students, as well as adherence to the content of the discipline sheets, the timetable, and the assessment/evaluation modalities

First-year PhD students are sent online satisfaction questionnaires after completing the PPUA (first semester) via its own document management platform which was operationalized by FDI-CNFIS-2020-0370 and specifically designed for the Doctoral School within the FDI-CNFIS-2018-0125 and FDI-CNFIS-2019-0354 projects.

By generating unique codes for each assessment campaign, the results are completed anonymously. The resulting files are protected.

- Providing IT support for administrative and secretarial tasks

The Doctoral School's secretariat has its own document management platform, which was specifically designed for the Doctoral School within the projects FDI-CNFIS-2018-0125 and FDI-CNFIS-2019-0354 and operationalized by FDI-CNFIS-2020- 0370.

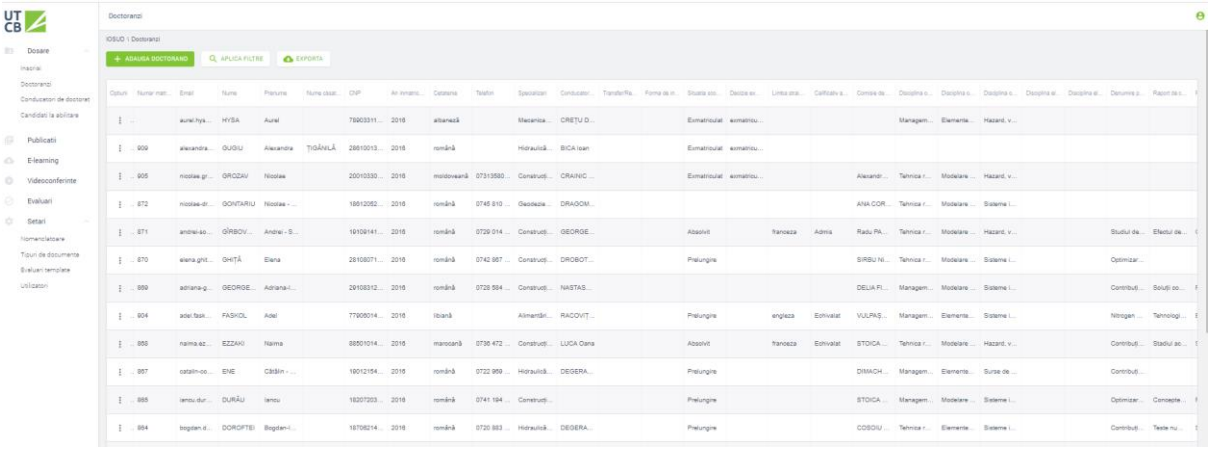


Figure 26. Integrated platform of the Doctoral School

- Maintenance and development of UTCB heritage; completion of construction and rehabilitation works/projects is being implemented

Through the FDI-CNFIS-2020-0370 project, information and documentation points were arranged/provided for PhD/doctoral students in the 3 UTCB campuses.

Thus, within the Doctoral School secretariat on the Tei campus, a multi-functional information and documentation point has been set up, which is accessible to all PhD/doctoral students and equipped with furniture, laptops, video conferencing system (screen, camera), video projector, etc.

Figure 27. Multi-functional information and documentation point within the secretariat of the Doctoral School

Through the FDI-CNFIS- 2021-0144 project, the information and documentation point for PhD students from the Pache Protopopescu campus was arranged.

Through the FDI projects from 2018 – 2021, video projectors, projection screens, laptops, graphic tablets, videoconferencing system were purchased.

IV List of annexes in electronic format, with access through links included in the text of the internal evaluation report

List of Annexes included in the Report

- Annex I.1_UTCB-01_01 Decret 175
- Annex I.2_UTCB-01_02 Ordin 1948
- Annex I.3_UTCB_Facultati departamente
- Annex I.4_UTCB HG 580_2014 Anexele 2-8
- Annex I.4.1_UTCB_Domenii HG 2021 2022
- Annex I.5_UTCB_HG 326
- Annex I.6_UTCB_HG 318
- Annex I.7_UTCB_Facultati specializari
- Annex I.8_UTCB_Cursuri postuniversitare
- Annex I.9_UTCB_Programul de cercetare al centrelor de cercetare stiintifica
- Annex I.10_UTCB_Plan-strategic-UTCB-2020-2024
- Annex I.11_UTCB_Carta-universitara
- Annex I.12_UTCB_Regulament-de-Organizare-și-Funcționare
- Annex I.13_UTCB_COD-ETICA-01-09-11
- Annex I.14_UTCB_Metodologie_Alegeri_UTCB_2019
- Annex I.15_UTCB_Regulament selectare promovare
- Annex I.16_UTCB_Evaluare personal didactic
- Annex I.17_UTCB_ROF-CDI
- Annex I.18_UTCB_ROF DRI
- Annex I.19_UTCB_Metodologie-admitere-licență
- Annex I.20_UTCB_Metodologie-admitere-master
- Annex I.21_UTCB_Metodologie admitere Doctorat
- Annex I.22_UTCB_Regulament-privind-desfasurarea-activitatii-studentilor-in-UTCB
- Annex I.23_UTCB_Metodologie-finalizare-studii-licență
- Annex I.24_UTCB_Metodologie-finalizare-studii-master
- Annex I.25_UTCB_Metodologie finalizare SUD
- Annex I.26_UTCB_Regulament-burse-cu-anexa
- Annex I.27_UTCB_ROF SUD rev 2_2020
- Annex I.28_UTCB_Regulament DPPD_2017
- Annex I.29_UTCB_Regulament Biblioteca
- Annex I.30_UTCB_Regulament-privind-organizarea-și-funcționarea-căminelor-și-cantinei-studențești
- Annex I.31_UTCB_REGULAMENTUL INTERN
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