

SELF - ASSESSMENT REPORT
of doctoral field
Mechanical Engineering
in
IOSUD – Politehnica University Timișoara

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Part I

GENERAL INFORMATION

1.1. General information on the Doctoral School for Engineering Studies from IOSUD-UPT (establishment, structure, evolution, research mission, vision, level of quality certification, etc.), existing resources (managerial, administrative, logistical, and financial);

Within the Politehnica University of Timișoara Organizing Institution of Doctoral Studies (with the abbreviation IOSUD-UPT in Romanian), in accordance with the Institutional Regulation for the organization and development of doctoral studies at the Politehnica University of Timișoara (RIODSUD-UPT), developed under Law 1/2011 and GD 681/2011, the activity of doctoral studies is carried out within a single doctoral school, **the Doctoral School of Engineering Studies**, established with the approval of RIODSUD-UPT of the UPT Senate in 2011 (RIODSUD-UPT is Annex 10 to the UPT Charter). The headquarters of the Doctoral School of Engineering Studies is inside the Rectorate UPT building, Victoriei Square, no. 2, Timișoara, floor 1, rooms 103 A, B and C.

The IOSUD-UPT decision of establishing a single doctoral school proved to be suitable for the development of doctoral university study programs and being in accordance with the mission of the Politehnica University Timișoara. Thus, a unified approach to the development of doctoral study programs became possible, with a beneficial impact on the quality standards for all doctoral fields accredited in IOSUD-UPT. For example, there is a requirement in IOSUD-UPT of a minimum performance criterion for the public defense of doctoral theses, according to Art. 83 of RIODSUD-UPT, the publication (or proof of acceptance for publication) of at least 2 scientific papers indexed Web of Science with an explicit affiliation of the Politehnica University of Timișoara. This requirement is also included in the doctoral studies contract starting with 2011, and from 2018 it is completed as follows: “The public defense of the doctoral thesis is conditioned by the fulfillment of the minimum national standards for granting the doctoral degree, corresponding to the doctoral field (according to the Order of the Minister of National Education no. 5110/2018), but not less than the minimum performance criterion of IOSUD UPT (according to Art. 83 of the Institutional Regulation for organizing and conducting doctoral studies in UPT, No. 18874 / 16.12.2011). It is assumed that the minimum performance criterion of IOSUD UPT is the publication or acceptance for publication, under UPT affiliation of 2 (two) papers in specialized journals or proceedings of scientific events indexed Web of Science, of which at least one the work has the doctoral student as the first author.” The publication of the results of the doctoral research project before the public defense of the doctoral thesis confers not only international visibility (through Web of Science indexing) but also an external, independent validation of their originality and scientific quality. As a result of this option assumed by IOSUD-UPT, all doctoral theses elaborated in IOSUD-UPT were validated by the specialized committees of the National Council for the Approval of Academic Title, Diplomas and Certificates (with the abbreviation CNATDCU in Romanian), with the confirmation of the doctoral title.

In IOSUD-UPT, the Council of Doctoral Studies (with the abbreviation CSUD in Romanian) is managed by a director, appointed through the public competition organized by UPT, in accordance with the Institutional Regulation for organizing the elections for the organizational structures and management positions of doctoral studies at the level of IOSUD-UPT, no. 6937 of 22.05.2012, approved by the UPT Senate Decision no. 13 from 10.05.2012. According to Decision no. 914/112 / C of 30.08.2012 of the Rector of UPT, the Director of CSUD was appointed Prof. Romeo SUSAN-RESIGA, starting with 03.09.2012, for a term of 4 years. Following the public competition for the position of CSUD Director organized by UPT in 2016, the mandate of Prof. Romeo SUSAN-RESIGA was renewed for another 4 years by the Decision of the Rector of UPT no. 1116/112 / C of 16.09.2016.

Following the competition organized in 2020, according to a decision no. 1840/112 / C of 20.10.2020 of the Rector of UPT, the Director of CSUD was appointed Prof. Radu-Emil PRECUP for a term of 4 years.

Following the elections for CSUD members, organized in June 2012, in accordance with the Institutional Regulation related to the elections for the Organizational Structures and Management Functions of the Doctoral Studies at IOSUD-UPT Level (approved by Senate Decision 13 / 10.05.2012), http://www.upt.ro/Informatii_alegeri-consiliu-csud_299_ro.html, the structure of the CSUD for 2012-2016 term was as follows:

- o Prof. Liviu MARȘAVINA
- o Prof. Mircea ȘTEFĂNESCU
- o Prof. Ștefan-Gheorghe PREITL
- o Prof. Ion BOLDEA
- o PhD student Attila SIMO

The Director of the Doctoral School, Prof. Gheorghe-Daniel ANDREESCU was appointed by the Rector of UPT, at the proposal of CSUD, by Decision no. 668/112 / C of 10.07.2012, for a term of 5 years, 2012-2017. The Interim Council of the Doctoral School (CSD) was formed at the proposal of CSUD, and it consisted of

- o Prof. Daniel Mihai GRECEA
- o Prof. Nicolae FAUR
- o Prof. Dorin LELEA (included after obtaining the habilitation certificate)

The technical secretariat of CSUD / CȘD was provided in the period 2012-2016 by Dr. Liliana MOȘTEORU, while the transmission of doctoral files to CNATDCU was coordinated by Mrs. Simona DAMIAN.

In January 2017, the elections were organized for CSUD members and CSD members, in accordance with the Institutional Regulation for Organizing the Elections for the Organizational Structures and Management Functions of Doctoral Studies at IOSUD-UPT Level (approved by Senate Decision 207 / 26.11.2015), with the following results for the structure of CSUD and CSD,

http://www.upt.ro/img/files/alegeri_2016/mcsud_mcsd/Raport_comisie_electorala_CSUD_CSD.pdf:

CSUD:

- o Prof. Aldo DE SABATA
- o Prof. Lăcrămioara STOICU TIVADAR
- o Prof. Ion BOLDEA
- o Prof. Francisc PETER
- o Prof. Anca DRĂGHICI
- o Prof. Marius MARCU
- o PhD student Magdalena BANDA

CSD:

- o Prof. Dorin LELEA
- o Prof. Florea DINU
- o PhD student Cezara-Liliana RAȚ

After completing the 5-year term (2012-2017) as Director of the Doctoral School for Prof. Daniel ANDREESCU, at the proposal of CSUD, the Rector of UPT by decision no. 1494/112 / C of 19.10.2017, appointed Prof. Dorin LELEA as Director of the Doctoral School for a term of 5 years, 2017 - 2022. Prof. Daniel ANDREESCU remained as a member of the CSD.

Considering GD no. 3/2021 regarding the extension of the alert status on the Romanian territory starting with January 13, 2021, the Institutional Regulation for organizing and conducting elections for the organizational structures and management functions of doctoral university studies at the level of the IOSUD-UPT, the Council of Administration of UPT approved the extension of the term for the members of the Council for Doctoral University Studies and of the members of the Doctoral School Council until 17.07.2021.

Currently, the technical secretariat of the Doctoral School of Engineering Studies consists of 3 members: Eng. Monica JURJIU (admission, study contracts, current problems of doctoral students and doctoral supervisors, referred to also as Ph.D. supervisors, monitoring the doctoral students' files), Eng. Steliana CUCU (defense of doctoral theses and transmission of doctoral files to CNATDCU in the RMU / REI system of MEC, development of advanced university training program) and Dr. Nicoleta NEMEȘ (activities regarding the reporting of information to MEC, INS ANS, admission).

1.2. The Field of doctoral studies coordinated by the Doctoral School of Engineering Studies within IOSUD-UPT

The main objective of the Doctoral School of Engineering Studies in IOSUD-UPT and of the doctoral fields coordinated by it, is the training of human resources, within the third cycle of university studies, for the qualification of independent scientific researcher certified by Ph.D. title,

defending the doctoral thesis and following the doctoral program composed of (a) the training program based on advanced university studies (1 year) and (b) the individual doctoral scientific research program (at least 2 years).

The mission of the Doctoral School of Engineering Studies in IOSUD-UPT is to coordinate the doctoral studies in UPT using the same academic criteria and performance standards applied to all accredited doctoral fields in IOSUD-UPT. The Doctoral School offers an adequate organizational framework for the development of training programs based on advanced university studies, of individual programs of doctoral scientific research as well, and finalization and public defenses of doctoral theses. Also, the Doctoral School provides the organizational framework for the public defenses of the habilitation theses, and the sustainable development of the Ph.D. supervisors affiliated to IOSUD-UPT. The Doctoral School provides, to all Ph.D. students in IOSUD-UPT, transversal courses within the training program based on advanced university studies, which offers the necessary knowledge to Ph.D. students and promotes the appropriate skills and attitudes for scientific research, stimulating the academic standards of performance, originality, respecting the research ethics and deontology.

The Doctoral School of Engineering Studies from IOSUD-UPT manages 13 fields of doctoral university studies, according to GD 778/2015, GD 376/2016, GD 140/2017, GD 158/2018, GD 326/2019 and GD 299/2020. These doctoral fields are presented in the table below, together with the CNATDCU specialized committees to which they are assigned.

D#	The field of doctoral university studies in IOSUD-UPT	CNATDCU committee
D01	Chemistry	4. Chemistry
D02	Civil Engineering and Installations	6. Civil Engineering and Construction Management
D03	Materials Engineering	7. Materials Engineering and Science
D04	Chemical Engineering	8. Chemical Engineering
D05	Electrical Engineering	9. Electrical Engineering
D06	Energy Engineering	10. Energy Engineering
D07	Electronic Engineering, Telecommunications and Information Technologies	11. Electronic Engineering and Telecommunications
D08	Computers and Information Technology	15. Computers, Information Technology and Systems Engineering
D09	Systems Engineering	

D10	Industrial Engineering	16. Industrial Engineering and Management
D11	Engineering and Management	
D12	Mechanical Engineering	17. Mechanical Engineering, Mechatronics, Robotics and Military Engineering
D13	Architecture	33. Architecture and Urban Planning

The Doctoral School of Engineering Studies has a team of Ph.D. supervisors consisting of:

- 148 total IOSUD-UPT affiliated Ph.D. supervisors at the date of this report, of which:
 - 78 full-time Ph.D. supervisors (professors with an employment contract for an indefinite period in IOSUD-UPT), 53 associate Ph.D. supervisors (with a fixed-term employment contract).
 - A small part of the associated Ph.D. supervisors does not have a contract with IOSUD-UPT at the date of this report because they do not currently coordinate Ph.D. students, but are professionally active.
 - 61 full-time Ph.D. supervisors who have obtained the habilitation certificate.

The table below shows the distribution of Ph.D. supervisors, which are affiliated to IOSUD-UPT at the date of this report, and coordinate doctoral studies in the field of **Mechanical Engineering**.

D#	The field of doctoral university studies in IOSUD-UPT	Ph.D. supervisors affiliated with the Doctoral School of Engineering Studies in IOSUD-UPT					
		Total	From which, women	Full-time in UPT	From which, women	Habilitation certificate	From which, women
D12	Mechanical Engineering	20	5	10	4	9	3

Within the field of **Mechanical Engineering**, 20 IOSUD UPT affiliated Ph.D. supervisors are coordinating the doctoral students. Among them, 10 are with an employment contract for an indefinite period ([Annex A.3.1.2](#), from the self-assessment sheet of the doctoral field).

No.	Habilitation certificate	Ph.D. supervisors	Order	STATUS
1	-	ANTON Liviu Eugen	4697/14.08.2009	CDA
2	YES	ARGEŞANU Veronica	3688/13.04.2017	CDA
3	-	BERETEU Liviu	4963/31.07.2008	CDA
4	YES	BERNAD Ianos Sandor	5129/28.09.2017	CDFC

5	-	BORDEAȘU Ilare	3292/26.02.2008	CDT
6	-	DAVIDESCU Arjana	1437/02.07.2007	CDT
7	-	DOLGA Valer-Ioan	4963/31.07.2008	CDA
8	YES	DUMA Virgil-Florin	166/07.04.2014	CDA
9	-	FAUR Nicolae	1657/02.08.2007	CDA
10	YES	GRUESCU Corina Mihaela	4628/30.07.2019	CDT
11	YES	HERIȘANU Nicolae Horațius	3216/18.02.2015	CDT
12	-	IONEL Ioana	3982/11.06.2001	CDT
13	YES	LELEA Dorin	3570MD/18.04.2013	CDT
14	YES	LOVASZ Erwin Christian	3281/02.03.2016	CDT
15	-	MANIU Inocențiu	4963/31.07.2008	CDA
16	-	MARȘAVINA Liviu	1805/20.08.2007	CDT
17	YES	MUNTEAN Sebastian	5130/28.09.2017	CDA
18	-	NAGI Mihai	3982/11.06.2001	CDFC
19	YES	STOIAN Floriana Daniela	5131/28.09.2017	CDT
20	-	SUSAN-RESIGA Romeo Florin	1437/02.07.2007	CDT

CDT - Ph.D. supervisor with an employment contract for an indefinite period in IOSUD-UPT

CDA - Ph.D. supervisor with a fixed-term employment contract

CDFC – Ph.D supervisor without an employment contract in IOSUD-UPT

The evolutions of the number of doctoral students and the number of doctors in the last 5 years is presented in the tables below.

The evolutions of the number of doctoral students in the last 5 years

The doctoral field	Admitted students									
	2015/ 2016	From which, women	2016/ 2017	From which, women	2017/ 2018	From which, women	2018/ 2019	From which, women	2019/ 2020	From which, women
Mechanical Engineering	12	5	14	2	21	4	26	3	20	8

The evolutions of the number of doctors in the last 5 years

The doctoral field	Doctoral Theses defended / Doctoral Theses confirmed									
	2016	From which, women	2017	From which, women	2018	From which, women	2019	From which, women	2020	From which, women
Mechanical Engineering	4	1	6	2	5	2	1	0	1	0

The research infrastructure

The research infrastructure of UPT is available to doctoral students, according to the institutional commitment assumed by the doctoral studies contract (Art 6B). The IOSUD-UPT policy embraces the idea of including the doctoral students in research groups, where the doctoral supervisor and/or the members of the coordinating commission are the members. It is supposed that in this case, they will acquire a high level of knowledge, techniques and experimental methods, numerical simulation techniques, and fast familiarization with the research infrastructure to be used in the framework of the doctoral research program.

The following research centers and institutes are established and accredited internally in the Politehnica University Timișoara, http://www.upt.ro/Upt-Timisoara_centre-si-institute-de-cercetare-_153_ro.html:

- o Research Institute for Renewable Energies
- o Research Center for Complex Fluid Systems Engineering
- o Research Center for Materials Mechanics and Construction Safety
- o Research Center in Automatic Systems Engineering
- o Research Center in Intelligent Control of Energy Conversion and Storage
- o Research Center for Inorganic Materials and Alternative Energies
- o Research Center in Chemistry and Engineering of Macromolecular and Natural Organic Compounds
- o Research Center for the Analysis and Optimization of Electric Power Systems
- o Computer and Information Technology Research Center
- o Research Center for Processing and Characterization of Advanced Materials
- o Center for Research in Materials and Advanced Technologies
- o Mechatronics and Robotics Research Center
- o Research Center for Thermal Machinery and Equipment, Transport and Pollution
- o Research Center in Construction Installations
- o Medical Engineering Research Center
- o Research Center for Advanced Methods in Study of Physical Phenomena

- o Multimedia Research Center
- o Urban Planning Research Center
- o Research Center for Construction Rehabilitation
- o Intelligent Electronic Systems Research Center
- o Intelligent Signal Processing Research Center
- o Engineering and Management Research Center
- o Environmental Science and Engineering Research Center
- o Research Center in Hydrotechnics and Environmental Protection
- o Integrated Engineering Research Center
- o Research Center in Infrastructures for Constructions and Transports

The research infrastructure in IOSUD-UPT is described in the platform "Engage in the Romanian Research Infrastructures - ERRIS", at the link <https://erris.gov.ro/UNIVERSITATEA-POLITEHNICA-TI>. For each research center listed above, the major research equipment and research services available are presented.

The development of UPT's research infrastructure is achieved through research and development contracts carried out in the university, obtained through national and international competitions, but also UPT's internal research grants, organized in the last years and financed from own revenues of UPT and intended for young researchers.

The main achievements in the activity of scientific research and technological development in UPT are summarized annually in the "Annual Research Report - Politehnica University Timisoara", publicly available since 2012 at the link http://www.upt.ro/Informatii_rapoarte-de_recherche_170_en.html.

Presentation of the research infrastructure - Mechanical Engineering

Within the field of **Mechanical Engineering**, the research infrastructure can be consulted at:

<https://eeris.eu/ERIO-2000-000R-0036>

A detailed presentation of the research infrastructure can be found in [Annex A.2.1.1](#), in the self-assessment sheet of the doctoral field of **Mechanical Engineering**.

1.3. The internal quality assurance system at the level of the doctoral field

- **Objectives, general structure and consistency of the internal quality assurance system:**

At the level of the doctoral field, the main objective of the quality system for doctoral study programs is the development of doctoral studies that ensure a high success rate in obtaining the doctoral degree. Generally speaking, the doctoral diploma attesting the capability of the scientific researchers to undertake independent research activities.

The structure of the quality management system is presented on the UPT website (http://www.upt.ro/Informatii_asigurarea-calitatii-in-upt_12_en.html) and is described in the Quality Manual (http://www.upt.ro/img/files/2017-2018/calitate/180730_apt_Manualul_Calitatii.pdf), which considers the quality assurance as part of the coherent quality management system.

- **Quality assurance policies and the definition of procedures, beneficiaries and their responsibilities:**

Doctoral studies are an essential part of the educational process in UPT. Taking this into account, implementation of the activities associated with doctoral studies is achieved by: "The institutional regulation for organizing and conducting doctoral studies at the" Politehnica "University Timisoara - Annex 10 to the UPT Charter (http://www.upt.ro/Information_regulations-regarding-the-doctoral-cycle_271_en.html), general documents of the quality system (Strategic Plans, Quality Manual) and documents specific to quality assurance (procedures and working instructions). All the specific stages of the doctoral studies are carefully documented so that they can be monitored and, if necessary, corrected in time. The UPT website regarding doctoral studies (http://www.upt.ro/Informatii_studii-universitare-de-doctorat_266_en.html) contains clear and useful information for the doctoral students, indispensable for their integration in the university community, including information regarding the documents that must be considered at various stages of the doctoral studies (http://www.upt.ro/Informatii_documentele-doctoranzilor-inmatriculati-incepand-cu-anul-201_286_en.html).

The quality assurance policies are stated in the Rector's declaration (http://www.upt.ro/img/files/2014-2015/calitate/Declar_Rector_2014.pdf) and the accompanying documents (http://www.upt.ro/Informatii_asigurarea-qualities-in-upt_12_en.html). They are detailed in the strategic plan of UPT (http://www.upt.ro/Informatii_planuri-strategice_59_ro.html) and in terms of a separate chapter (4.1.3. Doctoral studies) in the operational plans (http://www.upt.ro/img/files/po/2018/Planul_operational%20al_UPT_2018.pdf).

In the process of completing the mission and defining the UPT strategy, the UPT Board of Directors is advised by a UPT Steering Committee composed of 17 people¹, which is an advisory, autonomous and independent body of the UPT.

- **The staff, Ph.D. students and external stakeholders involvement in the quality assurance process:**

UPT regulations and procedures, for example, the procedure regarding the defense of the doctoral thesis (http://www.upt.ro/Informatii_studii-universitare-de-doctorat_266_ro.html) and information regarding the participation in international scientific events (http://www.upt.ro/international/Mobilitati-Si-Cooperari-Internationale_Programul-de-finantare-ISI_27_ro.html) and, in general, the links in the section "Forms and Regulations" in the webpage of the Department of International Relations of UPT

¹ http://www.upt.ro/Informatii_comitet-director_254_ro.html

(http://www.upt.ro/international/Departamentu_Mobilitati_Si_Cooperari_Internationale_ro.html) contain clear evidence that certifies that the activity of the staff that interacts with the UPT Doctoral School is part of a quality assurance system. Ph.D. students have their representatives in the UPT Ethics Commission. The Steering Committee, which represents the interest of employers for training highly qualified human resources, including doctoral students, contributes to the identification of research topics to be engaged through doctoral research.

In UPT, the training of human resources for research through doctoral studies has been constantly considered in correlation with the research requirements of different companies and institutions. Solving their requests result in qualitative doctoral research, implicitly in a quality assurance system. So the Doctoral School undertook the measures for the association of the companies like Continental S.A., RAAL-Bistrița, and ICEMENERG in IOSUD-UPT.

- **The interaction between the quality assurance system and university management:**

The quality assurance system in UPT is coordinated by the Rector of UPT through the Quality Assessment and Assurance Commission (CEAC – UPT²) and the Department for Quality Assurance (DGAC³). The interaction between the Board of Directors of UPT and DGAC, a department with an executive role that ensures the functioning of the quality management system in UPT, is permanent and involves the quality system in all basic processes and support in UPT. With this in mind, DGAC cooperates directly with all university entities and departments including the UPT Rectorate, and Doctoral School. The Board of directors uses the monitoring reports of the CEAC and the DGAC, initiates new procedures and instructions with the DGAC, operates based on the analysis reports submitted by the DGAC and the self-assessment reports of the programs and areas of study.

- **Transparency and access to information specific to the internal quality assurance system for internal and external beneficiaries:**

In the UPT website, there is a separate section on quality assurance (http://www.upt.ro/Informatii_asigurarea-calitatii-in-upt_12_en.html). It contains information on the documents of the quality system, the structure, and references regarding the national and international standards in the field of quality assurance in university education. DGAC has the task of verifying and posting in the UPT website the information related to almost all the sections that appear in the UPT webpage (<http://www.upt.ro/>). Among the topics of interest for internal and external beneficiaries are those related to the organization of the teaching procedure (see page "study programs") and the educational and research offer of UPT (see page "research").

- **The efficiency of the internal quality assurance procedures and structures and their impact on the activities within the doctoral studies:**

Within the UPT the various activities are organized mainly by regulations. They cover the main processes in the university. Operational procedures and work instructions control essential or

² http://www.upt.ro/administrare/dgac1/file/2012-2013/hs/2013/HS_83_12-12-2013.pdf

³ http://www.upt.ro/img/files/calitate/Regulament_DGAC.pdf

critical aspects of the processes. DGAC and the Doctoral School collaborate in the development of procedures directly related to the basic activities of doctoral students and provide support for various activities of doctoral students (information through the UPT website, administrative activities, and activities related to services offered to students). The efficiency of the quality system documents is revealed by the results obtained by UPT, in particular by the UPT Doctoral School.

- **The information produced by the internal quality assurance system managed as a tool for quality management and improvement of education and other activities:**

Annually, CEAC organized audits on topics related to the conditions that UPT makes available to students (http://www.upt.ro/Informatii_asigurarea-calitatii-in-upt_12_en.html). The results of the audits are sent, together with proposals for corrective measures, to the Rector of UPT. Starting with 2018, the evaluation of teachers by students is performed online. Procedures for internal self-assessment have been developed to be used for external evaluation by ARACIS.

- **Monitoring, evaluation and continuous development of the internal quality assurance system:**

The quality assurance system is coordinated by the Rector of UPT who interacts with CEAC-UPT, and on the other hand, monitors the activity of DGAC by subordinating DGAC to a Vice-rector. The monitoring activity of the quality assurance system is carried out by analyzing how the working procedures and instructions are applied. Every year, CEAC-UPT presents a report on quality assurance. The report is discussed by the Senate-UPT within the annual report of the Rector of UPT regarding the state of the university and becomes public at the following link: http://www.upt.ro/Informatii_asigurarea-calitatii-in-upt_12_ro.html. The Rector of UPT constantly requests the DGAC to develop procedures and work instructions for the emerged activities or those that have to be strengthened.