EDUCATIONAL PLAN

Valid from the academic year 2025-2026

Faculty:	Physics and Mathematics
The cycle of university studies:	Master
Name of the master's degree program:	Metode avansate de cercetare în fizică/Advanced research methods in physics
Type of program[1]:	Research
Name of the qualification[2] acquired after graduating from the study program:	Specialist in physics
Level of qualification (CNC/CEC):	Level 7
Title awarded:	Master's in physics
Duration of studies (in years):	2 years
Number of credits (ECTS):	120
Form of education:	Full-time education
Language of instruction:	English
Geographical location of studies:	Timișoara
The framing of the study program in science fields	
Fundamental field:	Mathematics and natural sciences
Science Branch:	Physics
The field of university master's studies:	Physics
Name of the broad field of study (according to DL-ISCED F-2013):	Natural sciences, mathematics and statistics
Name of the restricted field of studies (according to DR-ISCED F-2013):	Physical sciences
Name of the detailed field of study (according to DDS-ISCED F-2013):	Physics

[1] Professional / Research / Didactic

[2] *Calificarea (qualification)* este rezultatul formal al unui proces de evaluare și validare, care este obținut atunci când un organism/o autoritate competent/ă stabilește că o persoană a dobândit rezultate ale învățării corespunzătoare unor standarde prestabilite. Calificările dobândite de absolvenții programelor de studii din învățământul superior sunt atestate prin diplome, prin certificate și prin alte acte de studii eliberate numai de către instituțiile de învățământ superior acreditate.

GENERAL PRESENTATION OF THE PROGRAM OF UNIVERSITY STUDIES

1. The mission of the study program[3]

The mission of the master's studies in **"Advanced research methods in physics"** is to prepare qualified personnel for higher education and researchers in a field - closely related to condensed matter physics and theoretical physics. The master's program is open to students with a background in physics who are eager to expand their knowledge and experience in a modern physics research environment. Thanks to the experimental and theoretical skills acquired during the study, students will also have the ability to respond to the needs of the industrial community in areas such as materials technology, automotive industry, chemical engineering, IT and others.

Within the master's specialization two tracks could be chosen by students:

1. Theoretical physics: we will convey to students the current view (Standard Model) about the fundamental building blocks of Matter, about the elementary forces, about cosmic objects, about the future and the past of the Universe. As is known, the main research center in fundamental physics, CERN, is the largest civilian consumer of computing power in the world. We will talk about the modern technologies involved in these activities at the frontiers of Science.

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[3] *Misiunea și obiectivele programului de studii trebuie să fie în concordanță cu misiunea Universității de Vest din Timișoara și cu cerințele identificate pe piața muncii.*

Conform *Cartei universitare* (articolul 5), **misiunea generală a UVT este de cercetare științifică avansată și educație, generând și transferând cunoaștere către societate** prin:

a) cercetare științifică, dezvoltare, inovare și transfer tehnologic, prin creație individuală și colectivă, în domeniul științelor, al științelor inginerești, al literelor, al artelor, prin asigurarea performanțelor și dezvoltării fizice și sportive, precum și valorificarea și diseminarea rezultatelor acestora;

b) formare inițială și continuă, la nivel universitar, în scopul dezvoltării personale, a inserției profesionale a individului și a satisfacerii nevoilor de competențe ale mediului socio-economic.

UVT își asumă misiunea proprie de catalizator al dezvoltării societății românești prin crearea unui mediu inovativ și participativ de cercetare științifică, de învățare, de creație cultural-artistică și de performanță sportivă, transferând spre comunitate competențe și cunoștințe prin serviciile de educație, cercetare și de consultanță pe care le oferă partenerilor din mediul economic și socio-cultural.

Realizarea misiunii UVT se concretizează în (*articolul 6 din Carta UVT*):

- promovarea cercetării științifice, a creației literar-artistice și a performanței sportive;
- formarea inițială și continuă a resurselor umane calificate și înalt calificate;
- dezvoltarea gândirii critice și a potențialului creativ al membrilor comunității universitare;
- crearea, tezaurizarea și răspândirea valorilor culturii și civilizației umane;
- promovarea interferențelor multiculturale, plurilingvistice și interconfesionale;
- afirmarea culturii și științei românești în circuitul mondial de valori;
- dezvoltarea societății românești în cadrul unui stat de drept, liber și democrat.

2. Physics of advanced materials: a basic training is provided in the field of theoretical and experimental physics, the physics of crystallization processes, nanosystems, physical methods for characterizing materials, transport phenomena, technologies for obtaining advanced materials, and numerical modeling and simulation methods. Also, special attention is paid to current trends in scientific research and demand both nationally and internationally, such as obtaining new materials with improved properties, relaxation processes, nanosystems in electromagnetic fields, obtaining crystals with laser potential, control of the flow of a melt with the help of magnetic and electric fields.

2. Competencies and expected learning outcomes formed within the study program

A. COMPETENCIES[4]

Key-Competences[5]:

- multilingual competences;
- competences in the field of science, technology, engineering and mathematics;
- digital competences;
- personal, social and learning competences.

Professional Competencies[6]:

Theoretical physics track:

- analyse telescope images - examine images taken by telescopes in order to study phenomena and objects outside Earth's atmosphere;
- operate telescopes - set up and adjust telescopes in order to look at phenomena and objects outside Earth's atmosphere;
- carry out scientific research in observatory - perform research in a building equipped for the observation of natural phenomena, especially in relation to celestial bodies;

[4] *Competența (competence)* reprezintă capacitatea dovedită de a selecta, combina și utiliza adecvat cunoștințe, aptitudini și abilități personale, sociale și/sau metodologice și alte achiziții constând în valori și atitudini, pentru rezolvarea cu succes a unei anumite categorii de situații de muncă sau de învățare, precum și pentru dezvoltarea profesională ori personală în condiții de eficacitate și eficiență.

[5] *Competențele-cheie pentru învățarea pe tot parcursul vieții sunt* acele competențe de care au nevoie toți cetățenii pentru împlinirea și dezvoltarea personală, ocuparea unui loc de muncă, incluziune socială și cetățenie activă, fiind dezvoltate în perspectiva învățării pe tot parcursul vieții, începând din copilăria mică și pe tot parcursul vieții adulte, prin intermediul învățării formale, non-formale și informale.

[6] *Competențele profesionale* reprezintă capacitatea de a realiza activitățile cerute la locul de muncă la nivelul calitativ specificat în standardul ocupațional. Acestea se dobândesc pe cale formală, respectiv prin parcurgerea unui program organizat de o instituție acreditată.

- observe celestial objects - study the relative positions and movements of stars and planets, by using and interpreting data provided by specialised software and publications such as ephemeris;
- define celestial bodies - analyse data and images to calculate the size, shape, brightness, and motion of celestial bodies;
- design scientific equipment - design new equipment or adapt existing equipment to aid scientists in gathering and analysing data and samples;

Physics of advanced materials track:

- analyse experimental laboratory data - analyse experimental data and interpret results to write reports and summaries of findings;
- apply scientific methods - apply scientific methods and techniques to investigate phenomena, by acquiring new knowledge or correcting and integrating previous knowledge;
- apply statistical analysis techniques - use models (descriptive or inferential statistics) and techniques (data mining or machine learning) for statistical analysis and ICT tools to analyse data, uncover correlations and forecast trends;
- gather experimental data - collect data resulting from the application of scientific methods such as test methods, experimental design or measurements;
- perform laboratory tests - carry out tests in a laboratory to produce reliable and precise data to support scientific research and product testing;
- operate scientific measuring equipment - operate devices, machinery, and equipment designed for scientific measurement. Scientific equipment consists of specialised measuring instruments refined to facilitate the acquisition of data;
- use measurement instruments - use different measurement instruments depending on the property to be measured. Utilise various instruments to measure length, area, volume, speed, energy, force, and others;
- analyse scientific data - collect and analyse scientific data resulting from research. Interpret these data according to certain standards and viewpoints in order to comment on it;
- execute analytical mathematical calculations - apply mathematical methods and make use of calculation technologies in order to perform analyses and devise solutions to specific problems;
- operate open source software - operate Open Source software, knowing the main Open Source models, licensing schemes, and the coding practices commonly adopted in the production of Open Source software;

Transversal Competencies[7]:

- interact professionally in research and professional environments - show consideration to others as well as collegiality. Listen, give and receive feedback and respond perceptively to others, also involving staff supervision and leadership in a professional setting;
- apply research ethics and scientific integrity principles in research activities - Apply fundamental ethical principles and legislation to scientific research, including issues of research integrity. Perform, review, or report research avoiding misconducts such as fabrication, falsification, and plagiarism;
- communicate with a non-scientific audience - communicate about scientific findings to a non-scientific audience, including the general public. Tailor the communication of scientific concepts, debates, findings to the audience, using a variety of methods for different target groups, including visual presentations;
- communicate mathematical information - use mathematical symbols, language and tools to present information, ideas and processes;
- conduct research across disciplines - work and use research findings and data across disciplinary and/or functional boundaries;
- develop professional network with researchers and scientists - develop alliances, contacts or partnerships, and exchange information with others. Foster integrated and open collaborations where different stakeholders co-create shared value research and innovations. Develop your personal profile or brand and make yourself visible and available in face-to-face and online networking environments;
- disseminate results to the scientific community - publicly disclose scientific results by any appropriate means, including conferences, workshops, colloquia and scientific publications;
- demonstrate disciplinary expertise - demonstrate deep knowledge and complex understanding of a specific research area, including responsible research, research ethics and scientific integrity principles, privacy and GDPR requirements, related to research activities within a specific discipline;
- perform scientific research - gain, correct or improve knowledge about phenomena by using scientific methods and techniques, based on empirical or measurable observations;
- evaluate research activities - review proposals, progress, impact and outcomes of peer researchers, including through open peer review;

[7] *Competențele transversale* reprezintă achizițiile valorice și atitudinale care depășesc un anumit domeniu/program de studii și se exprimă prin următorii descriptori: responsabilitate și autonomie, interacțiune socială, dezvoltare personală și profesională.

- increase the impact of science on policy and society - influence evidence-informed policy and decision making by providing scientific input to and maintaining professional relationships with policymakers and other stakeholders;
- manage findable accessible interoperable and reusable data - produce, describe, store, preserve and (re) use scientific data based on FAIR (Findable, Accessible, Interoperable, and Reusable) principles, making data as open as possible, and as closed as necessary;
- manage research data - produce and analyse scientific data originating from qualitative and quantitative research methods. Store and maintain the data in research databases. Support the re-use of scientific data and be familiar with open data management principles;
- manage personal professional development - take responsibility for lifelong learning and continuous professional development. Engage in learning to support and update professional competence. Identify priority areas for professional development based on reflection about own practice and through contact with peers and stakeholders. Pursue a cycle of self-improvement and develop credible career plans;
- manage intellectual property rights - deal with the private legal rights that protect the products of the intellect from unlawful infringement;
- manage open publications - be familiar with Open Publication strategies, with the use of information technology to support research, and with the development and management of CRIS (current research information systems) and institutional repositories. Provide licensing and copyright advice, use bibliometric indicators, and measure and report research impact;
- promote the participation of citizens in scientific and research activities - engage citizens in scientific and research activities and promote their contribution in terms of knowledge, time or resources invested;
- promote open innovation in research - apply techniques, models, methods and strategies which contribute to the promotion of steps towards innovation through collaboration with people and organizations outside the organisation;
- promote the transfer of knowledge - deploy broad awareness of processes of knowledge valorisation aimed to maximise the two–way flow of technology, intellectual property, expertise and capability between the research base and industry or the public sector;
- publish academic research - conduct academic research, in universities and research institutions, or on a personal account, publish it in books or academic journals with the aim of contributing to a field of expertise and achieving personal academic accreditation;

- draft scientific or academic papers and technical documentation - draft and edit scientific, academic or technical texts on different subjects;
- write scientific publications - present the hypothesis, findings, and conclusions of your scientific research in your field of expertise in a professional publication;
- write work-related reports - compose work-related reports that support effective relationship management and a high standard of documentation and record keeping. Write and present results and conclusions in a clear and intelligible way so they are comprehensible to a non-expert audience;
- synthesise information - critically read, interpret, and summarise new and complex information from diverse sources;
- apply for research funding - identify key relevant funding sources and prepare research grant application in order to obtain funds and grants. Write research proposals;
- speak different languages - master foreign languages to be able to communicate in one or more foreign languages;
- mentor individuals - mentor individuals by providing emotional support, sharing experiences and giving advice to the individual to help them in their personal development, as well as adapting the support to the specific needs of the individual and heeding their requests and expectations;

EXPECTED LEARNING OUTCOMES [8]

a) Knowledge - According to the European Qualifications Framework (EQF), the learning outcomes related to qualification level 7, corresponding to university master's studies, require highly specialized knowledge and their critical awareness, some of them being at the vanguard of the level of knowledge from a field of work or study, as a basis for original thinking and/or research:

- know the advanced notions in the field of Physics, which involves a critical understanding of theories and principles;
- know the working formulas for calculations with physical quantities using properly the principles and laws of physics;
- know the language specific to the field;
- know physical phenomena and interpret them by formulating hypotheses and operationalizing key concepts and the appropriate use of laboratory equipment;
- know the constructive and operating principles of the equipment for obtaining and characterizing materials and to explain how to use it;
- define essential concepts;

[8] *Rezultatele învățării (learning outcomes)* înseamnă enunțuri care se referă la ceea ce cunoaște, înțelege și este capabil să facă un cursant la terminarea unui proces de învățare și care sunt definite sub formă de cunoștințe, abilități, responsabilitate și autonomie.

- identify domain-specific terminology;
- interpret analytical results expressed in different units of measurement;
- justify the need for a given technique;
- compare types of results;
- demonstrate selected obtained results;
- report selected results;
- summarize selected results;
- identify specific analysis protocols;
- illustrate properties of substances or materials;
- define advanced physical concepts, theories, and methods;
- demonstrate and interpret concepts;
- match appropriate models to the situation;
- exemplify suitable analytical methods in concrete situations;
- identify optimal analytical alternatives to obtain relevant information in the field;
- understand laboratory-specific issues;
- be familiar with the main types of analyses and techniques used;
- apply the main types of analyses and techniques used;
- understand how certain types of analyses are used;
- identify automated analysis systems;
- develop algorithms for acquiring datasets required by a project through appropriately chosen instrumental measurements;
- evaluate options regarding the stages of an investigative process;
- compare results obtained using multiple techniques and methods;
- prepare reports;
- explain the operating principle of an instrument;
- understand the algorithm employed by a measuring instrument;
- be familiar with the analytical method used in analytical-control activities;
- identify the procedures underlying the methods employed;
- understand the concepts and phenomena underpinning specific methods and the instrumental methods of analysis and measurement specific to physics;
- explain and interpret experimental results obtained from a physics-specific case study;
- identify and set out scientific information and the legislative/regulatory framework specific to physics;
- draft and present a scientific/professional report in compliance with applicable legislation and current standards;
- understand quality-management requirements in the physics laboratory;
- understand the legislation in the field;

- understand procedures used in materials physics;
- design investigation methodologies;
- integrate all results obtained across analyses;
- propose investigation methods;
- identify an experiment that could provide additional data;
- devise a method for obtaining and characterizing a material;
- carry out a case study specific to materials physics;
- defend and debate results;
- identify errors;
- verify calculations and interpret them;
- compare erroneous results;
- exemplify the benefits of certain methods or techniques;
- argue effectively for an experimental methodology;
- interpret differing values;
- reorganize experiments if improved results can be achieved;
- answer questions within the studied disciplines;
- interpret results presented in diagrams/plots;
- cross-check results against the properties of materials or substances;
- elaborate concise answers in case studies;
- restate in their own words certain properties of materials;
- explain situations within the field of study;
- substantiate information with concrete examples;
- justify decisions taken in casework;
- interpret a case or situation in the field;
- report plausible conclusions;
- reconstruct events by associating multiple sources of information;
- verify results;
- compare formulas or results;
- substantiate results;
- explain situations;
- select, in an informed manner, a methodology using a minimal number of methods to achieve the best outcome;
- interpret a set of experimental data;
- verify the link between a result and a property of a material or substance;
- demonstrate the use of a technique;
- highlight the consequences of an action;
- identify common and distinct features within a series of samples;
- sketch conclusions following the experiments performed;

- exemplify theoretical concepts;
- describe thermal effects arising from reactions or processes;
- develop algorithmic approaches to solving numerical problems;
- select the most appropriate solution;
- identify the best solution for a concrete problem;
- apply occupational safety rules;
- apply safety and quality standards in specialized laboratories;
- propose a response plan for an incident or experiment;
- apply theory to real cases;
- make decisions based on theoretical knowledge;
- transpose the results of a synthesis or experiment into diagrams or illustrative schemes;
- identify strengths and weaknesses in a protocol;
- perform SWOT analyses after covering a concept;
- draw analogies between theory and real cases;
- argue conclusions;
- cross-check obtained data against the scientific literature;
- prepare reports on a predefined topic;
- verify the correctness of results;
- investigate methods for the analysis of materials;
- prioritize experiments;
- evaluate events in light of experimental results;
- assess the reproducibility of an experiment;
- make recommendations closely aligned with the theory learned;
- test hypotheses advanced in a case study;
- debate information obtained in a case;
- verify preliminary hypotheses through testing;
- perform self-assessment;
- provide feedback;
- appraise results obtained from a set of experimental data;
- adapt the working protocol to the specifics of the experiment;
- identify cost-effective alternatives;
- draft simplified working methodologies;
- lead research projects in the field;
- participate as a member of research teams;
- justify the time and materials used in a research study;
- produce field-specific deliverables;
- justify research costs;

- develop a project budget in compliance with relevant legislation;
- compile data to obtain clear conclusions;
- formulate viewpoints regarding an expert report;
- set clear activities within a research project;
- engage actively within the research team;
- test hypotheses grounded in legal norms;
- test hypotheses grounded in theoretical knowledge;
- conduct a literature review for a given case;
- corroborate theoretical data with practical data;
- distinguish among multiple analytical techniques;
- handle samples so as to minimize alteration of the evidence;
- know how to collect samples according to their specifics;
- know methods of personal protection in critical situations;
- use and understand the role of protective equipment;
- use domain-specific terminology;
- use discipline-appropriate language;
- justify why samples are treated for certain instrumental techniques;
- revise specific conclusions with justification;
- use techniques and methodologies that do not affect the integrity of evidence;
- translate documents from widely used international languages;
- relate results to international legislation in the field;
- write scholarly articles;
- disseminate results through participation in conferences and specialized symposia.

b) Skills - According to the European Qualifications Framework (EQF), the learning outcomes related to qualification level 7, corresponding to university master's studies, assume specialized skills for solving research and/or innovation problems, for the development of new knowledge and procedures and for the integration of knowledge from different fields:

- compare the theoretical results provided by the specialized literature with those of an experiment carried out within a professional project;
- deduce the working formulas for calculations with physical quantities, using appropriately the principles and laws of physics;
- describe physical systems using specific theories and tools (experimental and theoretical models, algorithms, schemes, etc.);
- apply the principles and laws of physics in solving theoretical or practical problems, under conditions of qualified assistance;

- use the computer and calculation programs for the numerical simulation of the physical processes.
- describe and explain the fundamental principles of physics, including those of: Relativity and Quantum Mechanics, Standard Model, Quantum fields and particles, Cosmology.
- use high-level mathematical skills to solve conceptual and quantitative problems in physics.
- describe critical experiments in the history of physics and explain how they led to revisions of our theoretical descriptions of nature.
- analyse physical systems and provide order-of-magnitude estimates of quantities. This includes a knowledge of basic physical constants and key equations.
- use the computer to control some experiments or processes and to acquire data;
- characterize the specific properties of some materials taking into account the field in which they are used;
- use experimental techniques for obtaining and characterizing materials through optical and spectroscopic methods;
- identify the most appropriate methods to develop new materials with well-defined properties.
- apply the full conceptual and methodological apparatus to solve complex problems under conditions of incomplete information;
- interpret results obtained in forensic analysis;
- articulate advanced chemical concepts;
- specify relevant experimental processes and procedures;
- critically analyze advanced methods of forensic analysis;
- implement advanced chemical analysis techniques;
- critically appraise a specialized article/report of high difficulty;
- design innovative research projects using advanced chemical methods;
- use advanced forensic analysis techniques in a coordinated/integrated manner;
- prepare professional/research reports specific to forensic chemistry;
- properly operate measuring instrumentation to carry out the investigations required for a concrete application;
- develop a work/activity plan for applying appropriate chemical analysis techniques;
- complete specific investigations by producing reports or conclusions in accordance with current regulations in forensic chemistry;
- deliver results with a high degree of confidence following forensic analyses;
- develop the most appropriate investigative method;
- integrate learned rules into concrete cases;

- apply the studied principles;
- construct algorithms for concrete cases;
- develop solutions in the event of accidents/incidents;
- employ techniques applicable to the resolution of casework;
- adapt the experimental plan to the specific situation;
- solve problems in specific situations;
- plan an experimental protocol for concrete cases;
- adapt the analysis to the specific situation;
- integrate results into a final report or a study;
- plan a case study;
- produce a synthesis (concise) report;
- lead a case study;
- improve specific experimental protocols in concrete cases;
- compute results in well-defined situations;
- handle chemical substances;
- operate physico-chemical analytical instrumentation;
- convert results into other units of measurement;
- outline experimental protocols;
- develop experimental protocols;
- develop new experimental protocols for different situations;
- apply (practice) knowledge in new situations;
- develop new protocols;
- lead work/project teams;
- initiate working protocols;
- select the best investigative techniques in new situations.

c) Responsibility and autonomy - According to the European Qualifications Framework (EQF), the learning outcomes related to qualification level 7, corresponding to university master's studies, involve the management and transformation of work or study situations that are complex, unpredictable and require new strategic approaches, by taking responsibility to contribute to professional knowledge and practices and/or to review the strategic performance of teams:

- assume responsibility for managing professional development;
- participate in some concrete physics experiments;
- to present scientific seminars and to popularize some notions of physics;
- to critically analyze a specialized report, scientific communication with a medium degree of difficulty in the field of physics;

- to be autonomous in the context of handling laboratory equipment, including in situations requiring an interdisciplinary approach;
- to autonomously use information sources and resources for communication and assisted professional training (Internet portals, specialized software applications, databases, online courses, etc.) both in Romanian and in a language of international circulation;
- to carry out research internships in various production/research units in order to become familiar with and operate modern equipment, obtain interesting results and prepare reports on the activity carried out.

3. Occupations that can be practiced on the labor market

- Physicist – code ESCO 2111.3
- Research Assistant in Physics – code COR 211103
- Research Assistant in Physics-Chemistry – code COR 211105
- Research Assistant in Technological Physics – code COR - 211107

4. Ensuring flexible learning paths within the study program

The flexibility of the study program is ensured through optional subjects, optional subjects and complementary subjects.

The disciplines of choice (optional) are proposed for semesters 1, 2, 3 and 4 and are grouped into optional packages, which complete the student's specialization path. The choice of the route is made by the student, before the start of each academic year.

The non-compulsory disciplines are proposed for semesters 1-4 by the Department of Physics or the Faculty of Physics, which manages the study program, but they can also be chosen from the packages offered by other faculties of UVT.

In accordance with the provisions of the Regulation on the development of education plans for the study programs at the University of West Timisoara, so that students can benefit from credits for volunteering activities based on the provisions of the National Education Law no. 1/2011, with subsequent amendments and additions (article 203, paragraph (9)), the Volunteering discipline is available every semester in the curricula of all bachelor's and master's degree programs, with optional subject status, with a number of 2 ECTS credits.

5. Professional activity and student assessment

The rights, obligations and conditions of the professional activity of students at the West University of Timisoara are regulated by the Code of Student Rights and Obligations and the Regulation on the professional activity of students from the bachelor's and master's study cycles of WUT, approved by the WUT Senate.

The form and assessment/examination methods for each subject in the curriculum are established by the subject sheets.

6. Final studies exam

In accordance with the Regulation on the organization and conduct of the final exams for bachelor's and master's university studies at the West University of Timisoara, approved by the WUT Senate, the final exam for master's university studies in any master's university study program organized at WUT it consists of a sample of elaboration and support of the dissertation work, for which 10 credits are awarded.

The topic and the bibliography corresponding to the final exam tests are published on each faculty's own website and/or on the WUT website before the beginning of each academic year.

Enrolment in the graduation exam is conditional on the student choosing the theme of the graduation thesis within 60 days at most from the beginning of the academic year of the final year of study.

The submission of the final version of the thesis on the e-learning platform is done at least 5 working days before the date scheduled for the start of the exam.

Each thesis will be accompanied, at the time of submission, by the Similarity Report resulting from the verification of the originality of the thesis through a specialized software, on the WUT e-learning platform.

According to the structure of the academic year, at WUT the exams for completing university studies can be organized in 3 sessions, usually in the months of July, September and February.

7. Preparation for the teaching profession (if applicable)

Students who wish to opt for a teaching career in pre-university education must complete (in addition to this study program) and complete the Psychopedagogical Training Program in order to certify the skills for the teaching profession and obtain the Certificate of Completion of this program. In the West University of Timisoara, this program is organized through the Department for the Training of Teaching Staff (DPPD) and can be followed in parallel with university studies or as a postgraduate. For more information, visit the link: https://dppd.uvt.ro.

LIST OF DISCIPLINES STUDIED, GROUPED BY YEARS AND SEMESTER OF STUDY

Study year I

Academic year 2025-2026

Nr. crt.	Discipline	C1	C2	Discipline Code	Semester I					Semester II				
					Number of hours/week				Number of credits	Number of hours/week				Number of credits
					C	S	L	P		C	S	L	P	
1.	Complements of Theoretical Physics	DF	DOB	ARMP 1101	2	1	-	-	7	-	-	-	-	-
2.	Complements of Solid State Physics	DF	DOB	ARMP 1102	2	1	-	-	7	-	-	-	-	-
3.	Complements of Atom and Molecule Physics	DF	DOB	ARMP 1103	2	1	-	-	7	-	-	-	-	-
4.	Magnetic materials	DS	DOP	ARMP 1104	2	1	-	-	7	-	-	-	-	-
	Symmetries in physics			ARMP 1105										
	Complements of biophysics with applications in medicine			ARMP 1106										
5.	Research ethics	DC	DOB	ARMP 1107	1	1	-	-	2	-	-	-	-	-
6.	Crystal growth methods	DS	DOP	ARMP 1201	-	-	-	-	-	2	1	-	-	6
	Gravitation and cosmology			ARMP 1202										
7.	Applications of Quantum Mechanics in Technology	DS	DOB	ARMP 1203	-	-	-	-	-	2	-	1	-	6
8.	Transport phenomena	DS	DOP	ARMP 1204	-	-	-	-	-	2	2	-	-	7
	Quantum fields			ARMP 1205										
9.	Standard model	DS	DOB	ARMP 1206	-	-	-	-	-	2	2	-	-	7
10	Specialization practice	DS	DOB	ARMP 1207	-	-	-	-	-	-	-	-	112[9]	4
Total					9	5		-	30	8	6		-	30
Total teaching hours per week					14					14				

[9] Total number of practice hours per semester.

Noncompulsory Disciplines														
Nr. crt.	Disciplina	C1	C2	Discipline Code	Semester I					Semester II				
					Number of hours/ week				Number of credits	Number of hours/ week				Number of credits
					C	S	L	P		C	S	L	P	
1.	Design of optical devices	DS	DFA	ARMP1108	2	-	2	-	4	-	-	-	-	
2.	Study of complex devices with ANSYS	DS	DFA	ARMP1109	2	-	2	-	4	-	-	-	-	
3.	Introduction to Econophysics: from Statistical Physics to Risk Management	DC	DFA	ARMP 1208	-	-	-	-	-	1	1	-	-	4
4.	Electron paramagnetic resonance and its role in science and industry	DS	DFA	ARMP 1209	-	-	-	-	-	1	1	-	-	2
5.	Volunteering activity 1	DC	DFA	ARMP 1110	60 hours[10]				2	-	-	-	-	-
6.	Volunteering activity 2	DC	DFA	ARMP 1210	-	-	-	-	-	60 hours[11]				2

[10] Total number of volunteer hours per semester.
[11] Total number of volunteer hours per semester.

Study year II

Academic year 2026-2027

Nr. crt.	Discipline	C1	C2	Discipline Code	Semester I					Semester II				
					Number of hours/ week				Number of credits	Number of hours/ week				Number of credits
					C	S	L	P		C	S	L	P	
1.	Advanced methods in Optical Spectroscopy	DS	DOB	ARMP 2301	2	-	2	-	8	-	-	-	-	-
2.	Solar energy conversion	DS	DOB	ARMP 2302	2	2	-	-	8	-	-	-	-	-
3.	Rheological characterization of materials	DS	DOP	ARMP 2303	2	1	-	-	7	-	-	-	-	-
	Advanced methods in computational physics			ARMP 2304										
4.	Synthesis and characterization of nano/micromaterials	DS	DOP	ARMP 2305	2	1	-	-	7	-	-	-	-	-
	Fields in interaction			ARMP 2306										
5	Microwaves and applications	DS	DOB	ARMP 2401	-	-	-	-	-	2	-	1	-	7
6.	Defects in crystal	DS	DOP	ARMP 2402	-	-	-	-	-	2	-	2	-	8
	Stellar astrophysics			ARMP 2403										
7.	X-ray characterization of materials	DS	DOP	ARMP 2404	-	-	-	-	-	2	1	-	-	7
	Statistical methods for data analyzing			ARMP 2405	-	-	-	-	-					
8	Relativistic Fluid Dynamics	DS	DOP	ARMP 2406	-	-	-	-	-	2	2	-	-	6
	Dielectrics			ARMP 2407										
9.	Elaboration of dissertation	DS	DOB	ARMP 2408	-	-	-	-	-	-	1	-	44[12]	2
Total					8	6		-	30	8	6			30
Total teaching hours per week					14					14+1				

[12] Total number of hours per semester.

Noncompulsory Disciplines														
Nr. crt.	Discipline	C1	C2	Discipline Code	Semester I					Semester II				
					Number of hours/ week				Number of credits	Number of hours/ week				Number of credits
					C	S	L	P		C	S	L	P	
1.	Volunteering activity 3	DC	DFA	ARMP 2307	-	60 hours[13]			2	-	-	-	-	-
2.	Volunteering activity 4	DC	DFA	ARMP 2409	-	-	-	-	-	-	60 hours[14]			2
3.	Effective Models in Quantum Chromodynamics	DS	DFA	ARMP 2410	-	-	-	-	-	2	2	-	-	6
4.	Numerical Relativity	DS	DFA	ARMP 2308	2	2	-	-	-	-	-	-	-	6

Legend

C1	content criterion
C2	mandatory criterion
DF	fundamental disciplines
DS	specialization disciplines
DC	complementary disciplines
DOB	compulsory (imposed) disciplines
DOP	optional disciplines (of your choice)
DFA	noncompulsory disciplines
CP	professional competency
CT	transversal competence
C	course-type didactic activity
S	seminar-type didactic activity
L	didactic activity of practical laboratory type
P	didactic activity of the internship type

Discipline code: <faculty><department><no. discipline>

[13] Total number of volunteer hours per semester.
[14] Total number of volunteer hours per semester.

GENERAL ASSESSMENT I
(by content criterion)

No.	Discipline type	Total number of hours							
		First year		Second year		The entire study program			% of the total
		Curs	S/L/P	Curs	S/L/P	Curs	S/L/P	**Total**	
1.	Fundamental	84	42	-	-	84	42	126	15.7%
2.	Specialisation	140	210	208	212	348	422	770	81%
3.	Complementary	14	14	-	-	14	14	28	3.3%
TOTAL		**238**	**266**	**208**	**212**	**446**	**478**	**924**	100%

GENERAL ASSESSMENT II
(according to the mandatory criterion)

No.	Discipline type	Total number of hours							
		First year		Second year		The entire study program			% of the total
		Curs	S/L/P	Curs	S/L/P	Curs	S/L/P	**Total**	
1.	Compulsory	154	210	80	124	234	334	5688	56%
2.	Optional	84	56	128	88	212	144	356	44%
TOTAL		**238**	**266**	**208**	**212**	**446**	**478**	**924**	100%
Raport total ore de seminar/laborator/practică / ore de curs						1.07			

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