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INFORMATION PACKAGE

/ECTS/

SCIENTIFIC FIELD: **1. PEDAGOGICAL SCIENCES**

PROFESSIONAL FIELD: **1.3. DIDACTICS OF EDUCATION IN...**

DOCTORAL DEGREE PROGRAMME: **METHODOLOGY OF PHYSICS EDUCATION**

EDUCATIONAL AND QUALIFICATION DEGREE:: **DOCTOR**

NATIONAL QUALIFICATIONS FRAMEWORK LEVEL: **8**

PROFESSIONAL QUALIFICATION: **A RESEARCHER**

DURATION: **3 / three / or 4 /four/ YEARS**

FORM OF TRAINING: **FULL-TIME / INDEPENDENT / PART-TIME**

THE PLAN WAS INTRODUCED BY: **2023 YEAR**

QUALIFICATION CHARACTERIZATION

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PROFESSIONAL FIELD:	**1.3. DIDACTICS OF EDUCATION IN...**
DOCTORAL DEGREE PROGRAMME:	**METHODOLOGY OF PHYSICS EDUCATION**
EDUCATIONAL AND QUALIFICATION DEGREE::	**DOCTOR**
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FORM OF TRAINING:	**FULL-TIME / INDEPENDENT / PART-TIME**

The doctoral program in Methodology of Physics Education, within the professional field 1.3. Didactics of Education in..., provides the opportunity to obtain the third level of higher education – the educational and scientific degree "Doctor" (PhD).

This doctoral program offers opportunities for conducting scientific research, teaching, and managerial-organizational activities in the field of pedagogical sciences.

Brief Annotation:

The aim of the program is to provide doctoral students with solid theoretical knowledge and practical-applied training for conducting independent research in the field of physics and specialized pedagogical technologies and practices relevant to the methodology of physics education.

Graduates who obtain the educational and scientific degree "Doctor" (PhD) can pursue academic, managerial, and expert careers within the educational system, research institutes, media, non-governmental organizations, and other related fields.

Competencies of the Graduates:

- Possess scientific competencies in the fields of research methodology, didactics, and the tools of pedagogical and specialized physics research;
- Are professionally prepared to successfully conduct regional, national, and international scientific research;

- Are qualified to independently carry out teaching and expert activities in the fields of education, school policy, and administration.

Curriculum:

Doctoral training is carried out according to an individual study plan approved by the Faculty Council and developed in accordance with the topic of the doctoral dissertation. Assessment is conducted through examinations using a six-point grading system.

The individual study plan includes several courses from a sample list and/or other courses proposed and approved by the academic advisor, the Department Council of the Department of Mathematics and Physics, and the Faculty Council of the Faculty of Natural Sciences and Mathematics (FNSM).

There are two compulsory courses for all doctoral students at the university: Project Preparation and Management, English Language.

Graduation Requirements:

Successful completion of the exams included in the individual study plan;

Defense of the doctoral dissertation.

CURRICULUM STRUCTURE

OF THE DOCTORAL PROGRAM
„METHODOLOGY OF PHYSICS EDUCATION"

№	ACTIVITIES	Form of preparation and implementation			Form of recognition
		Credits ECTS	HORARIUM	Lectures, seminars laboratory exercises, independent preparation, consultations, participation, other	exam, ongoing assessment, interview, certificate, report, protocol, certification, other
I.	**EDUCATIONAL ACTIVITY**				
1.	Compulsory course in the thematic area of the dissertation	14.0	420	30 L / 390 i.w.	I-IV/ Exam
2.	Methodology and Methods of Pedagogical Research	7.0	210	45 L, 45 S, 120 i.w.	I-IV/ Exam
3.	Project preparation and management	3.0	90	45 L, 45 i.w.	I-IV/ Exam
4.	English language	4.0	120	30 L, 30 S, 60 i.w.	I/ Exam
5.	Elective course	7.0	210	30 L, 30 S, 150 i.w.	V-VI/ Exam
	TOTAL:	**35.0**	**1050**		
II.	**SCIENTIFIC–RESEARCH ACTIVITY**				
1.	Defining the Research Problem: Development and defense of a research concept.	12.0	360	Individual work	Report, Minutes of the meeting
2.	Discussion of the Doctoral Dissertation Project – Stage One: Review and referencing of relevant literature. Presentation of research tools and methodology.	16.0	480	Consultations, Individual work	Report, Minutes of the meeting
3.	Development of the Dissertation Project – Stage Two: Implementation of the scientific research related to the dissertation.	12.0	360	Consultations, Individual work	Report, Minutes of the meeting
4.	Discussion and Analysis of Research Results: Evaluation of the outcomes from the doctoral research activities.	12.0	360	Consultations, Individual work	Evaluation interview
5.	Research Activities: Preparation and publication of a scientific article, study, and/or research communication. Participation in research projects.	15.0	450	Consultations, Individual work on manuscript preparation	Report and Certificates
6.	Participation in Scientific Forums: Attendance at national or international academic conferences.	10.0	300	Consultations, Individual work	Report and Certificates
7.	Introduction to Dissertation Defense Procedures: Preparation for the public defense.	30.0	900	Consultations, Individual work	Report
8.	Completion of the Doctoral Dissertation: Pre-defense discussion and finalization of the dissertation.	30.0	900	Consultations, Individual work	Report, Minutes of the meeting
	TOTAL:	**137.0**	**4110**		
III.	**PEDAGOGICAL ACTIVITY**				
1.	Conducting seminars, practical or laboratory classes, student consultations, observations and classroom shadowing, grading written	6.0	180	Conducting Educational Classes	Protocol, Approval by

	assignments, preparing reviews of diploma theses, etc.				Department Head
	TOTAL:	**6.0**	**180**		
IV.	**OTHERS**				
1.	Participation in department meetings; involvement in the work of departmental, faculty, and university committees; and other academic activities.	2.0	60	Participation	Protocol, Approval by Department Head
	TOTAL:	**2.0**	**60**		
	TOTAL (for the entire duration of the education):	**180**	**5400**		
	ELECTIVE COURSES				
1.	Current Issues in the Didactics of Physics	7.0	210		
2.	Modern Educational Technologies	7.0	210		
3.	Project-Based Learning	7.0	210		
4.	Information Technologies in Pedagogical Research	7.0	210		
5.	Quantitative Methods in Pedagogical Research	7.0	210		
6.	History of Physics	7.0	210		
	Elective courses are offered after the formulation of the topic for the scientific-pedagogical research. They are included in the individual work plan of the doctoral student and approved by the academic unit. The doctoral student selects one elective course.				

* The courses "English Language" and "Project Preparation and Management" are included in the curriculum of all doctoral students at South-West University "Neofit Rilski" as compulsory subjects, in accordance with a decision of the Academic Council.

DESCRIPTIONS OF THE COURSES

COMPULSORY COURSES

METHODOLOGY AND METHODS OF PEDAGOGICAL RESEARCH

Annotation:

The course is designed for doctoral students enrolled in full-time, part-time, and independent study programs. Its study is motivated by the need to acquire a system of fundamental knowledge regarding research methodology and the development of original scientific works and publications.

The aim of the program is, based on international standards, to equip participants with a comprehensive knowledge system of scientific research and to motivate them to prepare and conduct their own research activities.

Objectives:

- To acquire basic competencies in research methodology — theoretical and/or empirical;
- To present the typology, structure, and design of scientific research;
- To develop fundamental skills for selecting and applying quantitative and qualitative research methods;
- To foster motivation for preparing and presenting original scientific work — reports, articles, dissertations, etc.

PROJECT PREPARATION AND MANAGEMENT

Annotation:

The course in the discipline "Project Preparation and Management" introduces doctoral students to the main aspects of project development, which are the basis for the organization and management of projects when applying for European Union programs. The goal of the course "Project Preparation and Management" is for doctoral students to gain in-depth knowledge of the effective development of projects, the management process in their creation and implementation, as well as the preparation of a project budget.

In order to ensure quality training for doctoral students and achieve the set goals, teaching in the discipline "Project Preparation and Management" flexibly combines different methods and forms of training: lectures on key topics, case studies and independent work. The forms of control are also consistent with the nature of the discipline - conducting control checks in the form of discussing case studies during classroom sessions and preparing a project proposal.

Course content:

The set of thematic areas allows doctoral students to acquire knowledge about the main categories and concepts in preparing a project, its implementation and control. By studying them, they become familiar with and form a certain level of practical ideas for applying forms, techniques and methodologies in building a project proposal, as well as knowledge about their areas of application. Including basic analysis tools such as SWOT, STEP and PEST.

Teaching and assessment:

Training in the course is carried out in the form of lectures. It ends with the presentation and defense of a project proposal. The priority in the training is the practical and independent work of doctoral students. Knowledge, skills and competence are assessed during classroom work, with the results achieved from the assigned tasks being of great importance. The development of a project

proposal builds responsibility for the tasks set in doctoral students, self-discipline, systematicity in preliminary preparation, builds habits for optimizing time, develops logical thinking, skills for selecting and analyzing information acquired from various information sources.

Current control is carried out by checking the acquired knowledge by solving cases on the taught material.

The assessment criteria include: quality and depth of the written work; ability to present and successfully defend the formulated conclusions and proposed solutions; demonstration of knowledge, skills and competence; use of a creative approach in solving cases; ability to work independently in extracurricular activities.

ENGLISH LANGUAGE

Annotation:

According to Decision No. 21 of 04.09.2013 of the Academic Council, the English language course is mandatory for all doctoral students in the first year of their studies, who are studying in various doctoral programs in all faculties of the South-West University "Neofit Rilski".

The course is intensive and involves training within 6 hours per day. It is held (usually every year in the first month after the end of the summer semester) and its duration may vary depending on the formation of groups by language proficiency levels. The level of proficiency is determined by a preliminary entrance test, on the basis of which the participants are divided into levels - beginners, intermediate and advanced, corresponding to levels A1, A2 - B1 and B2 - C1 of the Common European Framework of Reference for Languages.

The English course for doctoral students necessarily contains the following modules: practical grammar, vocabulary, written exercises, reading and listening comprehension and conversation. Depending on the specific needs of students from different faculties and specialties, specialized vocabulary for the field is also introduced, as well as exercises in specialized and general translation. For the purposes of training, approved teaching aids from the field of university didactics are used, as well as materials developed by the teachers to meet the specialized needs of doctoral students.

Content of the course:

The course contributes to the development of speaking and listening skills, as well as the acquisition of basic principles of constructing an academic text in English, as well as the skills of preparing presentations, autobiographies, abstracts and articles in English. The main directions and activities are carried out through training in integrative modules, which are set out in the main methodological guide, mainly the teaching systems Headway (Oxford), Straightforward (Macmillan), General English Course (Elementary level) and Academic English (Elementary level). Following the teaching system, doctoral students become familiar with and deepen their knowledge of grammar, vocabulary, functional language.

Teaching and assessment technology:

The training in the subject "English Language" is carried out in the form of seminars and is conducted in the traditionally established manner with the use of multimedia products and interactive materials.

The final exams for each level are tailored to the goals and expected results of the training and are based on the achievements of the doctoral students in practically applying the knowledge and skills acquired during the course. All exams consist of a written and oral part, each of which has a weight of 50% in forming the final grade.

Beginners: The written part of the exam is a lexical and grammatical test, a reading comprehension text and questions to it, as well as an essay with a volume of 150 words, which is on topics from the daily life of the doctoral students, as well as their academic experience and achievements.

The oral part of the exam is conducted in the form of an interview, in which the examiners ask questions related to the topics covered in the textbook used during the course. Doctoral students also have a few minutes to tell their biography with a focus on education, scientific interests and achievements.

Intermediate: The written part of the exam is a lexical and grammatical test, a reading comprehension text and questions to it, as well as an essay or autobiography/abstract for an article with a volume of 200 - 220 words, or a short summary of a short article, which are on topics from the professional everyday life of the doctoral students and their academic experience and achievements.

The oral part of the exam is conducted in the form of an interview, in which the examiners ask questions related to the topics covered in the textbook used during the course and questions that relate to the specific scientific field in which the doctoral students are trained. A mandatory part of the oral part of the exam is a presentation of the doctoral students with a focus on education, scientific interests and achievements.

Advanced: The written part of the exam consists of 2 parts:

- a commentary on given statistical data or facts related to a certain social or scientific problem or a summary of a short article;
- an academic essay with a scientific problem with a volume of 250 - 300 words.

The oral part of the exam is conducted in the form of an interview, in which the examiners ask questions related to the topics affecting the scientific interests and future dissertation work of the doctoral students.

COMPULSORY COURSE IN THE THEMATIC AREA OF THE DISSERTATION

MODERN EDUCATIONAL TECHNOLOGIES IN PHYSICS EDUCATION

Annotation:

The course "Modern Educational Technologies in Physics Education" is included as a mandatory discipline according to the thematic focus of the dissertation in the overall curriculum of the doctoral program "Methodology of Physics Education."

The course has a total workload of 420 hours, including 30 hours of lectures. The independent study time for doctoral students is 390 hours.

Ongoing assessment of doctoral students' academic achievements is conducted throughout the semester during independent study hours.

The course concludes with a written exam covering the curriculum content.

The aim of the course "Modern Educational Technologies in Physics Education" is for doctoral students to acquire fundamental knowledge in the theoretical study and the specified main methodological directions and trends for the use of modern educational technologies in physics education at the secondary school level.

The lecture content covers theoretical approaches, methods, techniques, and procedures for using modern educational technologies and their potential application in the physics teaching process. These technologies are currently innovative within the educational system and aim to enhance the effectiveness of physics education at the secondary school level.

Expected outcomes: Upon completion of the course, doctoral students will acquire knowledge of modern educational technologies and develop practical skills and competencies in physics teaching.

COMPETENCY-BASED APPROACH AND INNOVATIONS IN EDUCATION

Annotation:

The course "Competency-Based Approach and Innovations in Education" emphasizes the importance of the competency-based approach in educational theory and practice, as well as the significance of innovation processes within the field of education. The focus is on processes related to the improvement of the pedagogical environment and the enhancement of the effectiveness and productivity of existing educational structures.

The course highlights the role and essence of the competency-based approach in teaching, types of competencies, main methodological approaches for developing key competencies, and the cultivation of an innovation culture. During the course, doctoral students have the opportunity to acquire knowledge and develop skills and competencies for appropriate actions and behaviors in the specific context of innovation in contemporary education.

The focus is on new ideas implemented in specific pedagogical settings and their technological dimensions, including new approaches, forms, methods, didactic, and educational tools.

The course aims to stimulate creativity among young researchers and to foster their professional and personal readiness to adopt, understand, and support innovations in the field of education.

ELECTIVE COURSES

CURRENT ISSUES IN THE DIDACTICS OF PHYSICS

Annotation:

The course is aimed at enhancing the knowledge and competencies of doctoral students in the field of physics didactics. It addresses a range of current issues related to: the selection and development of physics curriculum content; planning, organization, and control of the educational process in physics; improvement and modernization of the learning environment; professional skills and research activities of the teacher; innovations in physics and astronomy education based on contemporary pedagogical concepts, approaches, and theories; assessment and evaluation of students' knowledge and skills, among others.

The emphasis is placed on fostering student interest in learning activities and creating suitable conditions for the development of their potential.

MODERN EDUCATIONAL TECHNOLOGIES

Annotation:

The current stage of educational development is characterized by a trend towards raising educational standards and improving the quality of pedagogical content and technologies used. Traditional teaching technology is distinguished by a strongly reproductive nature, which hinders the stimulation of cognitive interests and creativity among children and adolescents.

In the presence of diverse channels of informational influence in electronic-based learning environments, the modern teacher needs to move beyond the role of merely transmitting knowledge and effectively address new challenges related to students' acquisition of a broad range of intellectual skills and the methodology of inquiry-based learning.

This lecture course responds to this need. It focuses on the analysis of modern interactive technologies used in the educational process. The development of Bulgarian schools, as well as progress in various aspects of their work, can only be achieved through a well-designed innovation process associated with the establishment of new, highly effective, learner-centered pedagogical

ideas, comprehensive concepts, and technologies.

The diversity of modern educational technologies is impressive and provides a foundation for rich creative organization and variability in the teacher's didactic activities.

PROJECT-BASED LEARNING

Annotation:

The course "Project-Based Learning" covers issues related to the procedural and technological improvement of educational activities. Participants have the opportunity to become acquainted with a new interpretation of the project method and its application in the context of modern schools.

The course offers students a specific model for applying project-based learning activities, grounded in the ideas of interdisciplinarity and the synthesis of humanities and natural sciences, for thoughtful reflection and creative interpretation.

Content-wise, the course addresses topics such as: the historical development of ideas related to the use of project activities in education; contemporary characteristics of project-based learning; the project method within the traditional classroom system; specifics of project activities at different educational levels; a synergetic model of project-based learning; effectiveness of project-based activities; and assessment and diagnostic tools for identifying qualitative changes in students' personalities as a result of their engagement in project activities.

The course also aims to stimulate the creative efforts of participants in exploring the synergetic interaction between traditional values in pedagogical theory and practice and innovative ideas in the contemporary educational space.

INFORMATION TECHNOLOGIES IN PEDAGOGICAL RESEARCH

Annotation:

The course "Information Technologies in Pedagogical Research" aims to familiarize doctoral students with the application of information technologies at all stages of conducting pedagogical research (preparation, implementation, data processing, analysis, and presentation of results).

The course seeks to provide doctoral students with knowledge of the essential requirements and steps involved in conducting pedagogical research, as well as various software solutions that support the entire process—from developing research instruments to visualizing the obtained results.

Main objectives:

Doctoral students will:

Become acquainted with the basic concepts in pedagogical research.

Learn about the planning and preparation of pedagogical research.

Gain practical experience with various software tools for creating forms, questionnaires, surveys, and tests.

Understand basic statistical terminology and the software products used for data processing.

Master the processing and visualization of results obtained within pedagogical research.

Expected outcomes:

Familiarity with the core concepts related to the instrumentation of pedagogical research.

Ability to follow the complete cycle of conducting pedagogical research—from its design and preparation to the visualization and analysis of results.

Proficiency in applying statistical functions and interpreting the obtained results.

QUANTITATIVE METHODS IN PEDAGOGICAL RESEARCH

Annotation:

The course "Quantitative Methods in Pedagogical Research" consists of 210 academic hours distributed across different forms of academic workload:

- Lectures and exercises covering the main topics – 60 hours;
- Out-of-class workload – 150 hours (independent preparation by doctoral students for participation in the course, reading additional literature on topics indicated by the instructor, deepening knowledge of the material presented in lectures).

Doctoral students are expected to have proficiency in English and basic knowledge of information technology and computer science.

Course Objectives:

- To familiarize doctoral students with fundamental statistical procedures and their application in modern pedagogy;
- To introduce basic models used in pedagogical research;
- To enhance doctoral students' proficiency in modern information technologies.

Upon successful completion of the course, doctoral students should:

- Know the basic statistical procedures and their applications in pedagogical research;
- Apply fundamental statistical procedures and interpret results from pedagogical research.

HISTORY OF PHYSICS

Annotation:

The course "History of Physics" is offered as an elective in the curriculum of the doctoral program "Methodology of Physics Education." It is studied by doctoral students enrolled in the educational and scientific degree of "Doctor."

The course has a total workload of 60 hours, including 30 hours of lectures and 30 hours of seminar exercises. The out-of-class workload for doctoral students is 150 hours.

The course concludes with a written exam covering the curriculum content. The "History of Physics" course is connected with all other physics courses and related subjects.

Objectives and Expected Outcomes:

The aim of the course is for doctoral students to acquire fundamental knowledge in the history of physics and to develop competencies for applying this knowledge in various contexts and situations.

The lecture content is designed as an essential component of the overall preparation of doctoral students in the program. Without providing an exhaustive historical overview of physics, the course presents the struggle of ideas that led to the development and progress of the science, highlights key discoveries, turning points, contributions of some of the greatest representatives, and more.

The goal is that doctoral students, having gained a fuller understanding of the historical development of physics, will comprehend its place within the broader context of knowledge and cultural development, as well as its crucial role in the progress of humanity.

Understanding science not only as a product but also as a process will help shape a comprehensive natural scientific worldview and foster a personal scientific outlook among doctoral students.

Expected results: Upon completion of the course, doctoral students will have acquired fundamental knowledge of the history of physics and developed competencies for applying this knowledge in different situations and contexts.