ABSTRACT

INTERACTIVE TRAINING SYSTEM «PRINCIPLES OF ALTERNATIVE ENERGY SOURCES»: diploma work / Almohamad Mohamad. – Gomel: ГГТУ им. П.О. Сухого, 2026. – Diploma work: 122 pages, 25 figures, 9 tables, 15 sources, 4 appendices.

Keywords: interactive training system, alternative energy sources, JavaFX, Java, JDBC, Microsoft SQL Server, bilingual educational content, lesson sequencing, quizzes, progress tracking, PDF certificate, bcrypt authentication, OpenPDF.

The object of development is an interactive desktop training system for studying the principles of alternative energy sources. The software presents structured bilingual learning materials, supports sequential access to lessons, uses diagrams and practical screenshots, checks knowledge through topic and mixed tests, records learning progress, and generates a PDF certificate after successful completion of the final examination.

The aim of the work is to develop a complete software product that supports classroom and individual study of alternative energy sources: presenting educational content in English and Russian, verifying knowledge through automated assessment, storing users, questions, attempts, progress, and certificates in Microsoft SQL Server, and demonstrating a layered JavaFX desktop architecture.

The stages of the work include: analytical review of educational software and similar solutions; formulation of software requirements; design of architecture, domain model, database structure, interfaces, and main algorithms; implementation of authentication, lesson viewing, quiz modes, progress tracking, administrator functions, and PDF certificate export; testing and validation of the developed application; economic justification; occupational safety analysis; and resource and energy conservation assessment.

The diploma student confirms that the diploma work was completed independently. The material presented objectively reflects the state of the developed object. The explanatory note was checked using the "Anti-Plagiarism" system (https://gstu.antiplagiat.ru). The percentage of text originality is [98,9]%. All theoretical and methodological provisions and concepts borrowed from literary and other sources are accompanied by references to the sources indicated in the list of used sources.