

REVIEW

For Syllabus of " PHY 3282 «Application of artificial intelligence for computational tasks in physics» Shalenov E.O.

Lecturer: PhD, Associated Professor Shalenov Erik"

Educational program 8D05301 – «Applied and Engineering Physics»

This syllabus contains all the essential elements that enable students to acquire both theoretical knowledge and practical skills within the framework of *Application of Artificial Intelligence for Computational Tasks in Physics*.

The program clearly formulates the course goals and objectives, provides a detailed description of the discipline, and specifies clear and measurable learning outcomes.

The calendar and thematic plan is logically and consistently structured, covering all lectures and practical sessions for one semester (15 weeks), including a comprehensive list of recommended literature, assignments, and deadlines for their completion.

The presentation of the material follows modern pedagogical design principles, ensuring that the syllabus structure fully aligns with the requirements of the educational program 8D05301.

The course content meets international standards for higher education in physics and engineering physics. The thematic content reflects current trends in artificial intelligence, computational physics, and interdisciplinary approaches, equipping students with the necessary knowledge to apply AI techniques in physics-related computational tasks.

Particular attention should be given to the practical orientation of the course. Laboratory exercises and practical assignments are fully aligned with lecture topics, allowing students not only to consolidate theoretical knowledge but also to develop professional skills in programming, data analysis, and computational modeling. These activities also foster critical thinking, problem-solving abilities, and preparation for future research projects.

The syllabus contains a strong research component, supporting the development of independent research skills. The course encourages students to utilize modern analytical tools and computational methods, which can form a foundation for thesis or dissertation work. The interdisciplinary nature of the course also promotes integration of knowledge across physics, artificial intelligence, and computational sciences.

The selected literature is appropriate and includes up-to-date textbooks, monographs, and scientific articles. The inclusion of English-language sources further supports the development of academic English and independent study skills.

Furthermore, the syllabus clearly defines the grading system, evaluation criteria, and policies regarding academic discipline and ethics. This transparency ensures students understand course expectations and promotes a fair and structured learning environment.

Overall, the syllabus is professionally developed, reflects modern educational requirements for teaching physics and artificial intelligence applications, and contributes significantly to the training of highly qualified specialists in applied and engineering physics.

Reviewer:

Chouaib Doukkali University, El Jadida, Morocco

Review by Dr. Nur Nabihah Yusof:

The syllabus for PHY 3282, *Application of Artificial Intelligence for Computational Tasks in Physics*, could be attractive course by applying theoretical principles with practical computational work. Coordinating lectures with student's laboratory sessions really helps students directly apply AI techniques to physics problems.

However, to strengthen this syllabus, it suggested to design weekly teaching plan. It great to specifying the programming languages and tools students will use. For instance, Python with libraries such as NumPy, SciPy, TensorFlow, and Pandas can be applied to analysing material properties, for instance Raman spectra that describes material's structure. Explicitly naming these tools would give students a clearer sense of the technical skills expected.

Additionally, including more detailed assessment rubrics would improve transparency. Criteria for programming tasks, lab reports, and project work such as accuracy, clarity, analysis quality, and use of AI methods would guide students in meeting expectations. The research component could also be made clearer with examples given during the hands-on.

The literature list is appropriate but could be strengthened with recent works (2020–2024) on machine learning in physics, physics-informed neural networks, and AI-driven materials discovery to ensure students stay updated with current trends. Overall, the syllabus is strong and modern, and adding these specific details would enhance clarity, improve student preparedness, and further enrich the learning experience.



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