Academic course description

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| BACHELOR ‘S PROGRAMME3rd YEAR OF STUDY, 2nd SEMESTER |

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| **Course title** | **PHYSICS AND THE ADVANCEMENT OF KNOWLEDGE** |
| Course code |  |
| Course type | full attendance |
| Course level | 1st cycle (bachelor’s degree) |
| Year of study, semester | 3rd year of study, 2nd semester |
| Number of ECTS credits | 5 |
| Number of hours per week | 4 (2 lecture hours + 2 seminar hours) |
| Name of lecture holder | PROF.DR. ALEXANDRU STANCU |
| Name of seminar holder |  |
| Prerequisites | Advanced level of English  |
| A | **general and course-specific competences** |
|  | **General competences:*** Ability to understand the various theoretical and practical aspects of physics development so that it can lead interdisciplinary projects
* Continuous accumulation of new knowledge in the history of physics and related fields for continuing vocational training
* Conducting teamwork using interpersonal communication skills to achieve the objectives
* Efficient use of information and communication resources and assisted training, both in Romanian and in an international language

**Course-specific competences**:* Understand how some experiments led to great discoveries in physics and the role of great physicists involved
* Understand how evolution of society and civilization influenced the development of physics
* Understanding the importance of the contribution of mathematics and laboratory techniques to the development of physics
* Understanding the role of great thinkers in developing the important concepts of physics and their role in the philosophy of science
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| B | **Learning outcomes** |
|  | After graduating from this discipline, students will be able to have an overview of the development of the fundamental ideas of physics and in particular to:* know the context of the development of scientific knowledge of antiquity
* argue the importance of scientific knowledge in the Middle Ages relative to the development of experimental physics methodology as a prerequisite for the emergence of scientific progress in Newtonian physics
* Know the importance of Newton's scientific work in consecrating physics as fundamental science, and its impact on the progress of society at that time
* argues the necessity to change the concepts of classical physics by the emergence of new concepts of energy quantification and relativity in microparticle physics
* know the evolution of Romanian physics with institutions and schools, as well as the contribution of Romanian physicists to physics research
* know the transdisciplinary historical aspects of physics related fields (mathematics, astronomy, chemistry, biology, technology, etc.) that have contributed to its progress as science and vice versa.
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| C | **Lecture content** |
|  | * Science in antiquity and early medieval times
* Renaissance. The beginning of modern science. Nicolaus Copernicus, Galileo Galilei, Giordano Bruno, Isaac Newton. The Conflict of Science and Religion.
* Pseudosciences (alchemy, astrology, homeopathy, etc.)
* Industrial Revolutions
* Science at the end of the nineteenth and early twentieth centuries
* The beginnings of Romanian physics: Dragomir Hurmuzescu, Ştefan Procopiu, Horia Hulubei
* Scientific method.
* Science in the Contemporary Age. Contemporary pseudo-scientific hypotheses.
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| D | **Recommended reading for lectures** |
|  | 1. Max von Laue, Istoria fizicii, Editura Științifică, București, 1965
2. E. Hutten, Ideile fundamentale ale fizicii, Editura Academiei, București, 1979
3. V. Novacu, Istoria fizicii, Editura Didactică şi Pedagogică, Bucuresti,1966
4. Max Born, Fizica în concepția generației mele, Editura Științifică București,1969
5. G. Gamow, Treizeci de ani care au zguduit fizica - Istoria teoriei cuantice, Editura Științifică, București, 1969
6. R. Taton R.(coord.), Istoria generală a științei (4 vol.), Editura Științifică, București, 1977
7. H. S. Williams and E. H. Williams, A history of science. New York,: Harper, 1904.
8. THE CAMBRIDGE HISTORY OF SCIENCE

 General editors David C. Lindberg and Ronald L. Numbersvolume 2: Medieval Science Edited by David C. Lindberg and Michael H. Shankvolume 3: Early Modern Science Edited by Katharine Park and Lorraine Dastonvolume 4: Eighteenth-Century Science Edited by Roy Portervolume 5: The Modern Physical and Mathematical Sciences Edited by Mary Jo Nyevolume 6: The Modern Biological and Earth Sciences Edited by Peter Bowler and John Pickstone |
| E | **Seminar / laboratory content** |
|  | - |
| F | **Recommended reading for seminars** |
|  | - |
| G | **Education style** |
| learning and teaching methods | LectureDiscussion |
| assessment methods | Continuous, formative and summative |
| Language of instruction | English |