Academic course description

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

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| **Course title** | **Lasers and Spectroscopy** |
| 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 | Silviu GURLUI |
| Name of seminar holder | Bogdanel MUNTEANU |
| Prerequisites | Advanced level of English  |
| A | **General and course-specific competences** |
|  | **General competences:*** Achievement of professional tasks efficiently and responsibly, in compliance with the field-specific deontology legislation, with qualified assistance.
* Application of efficient work techniques in a multi-disciplinary team, on various hierarchical levels.
* Effective use of information sources and communication resources and assisted professional training, both in Romanian and in a foreign language.

**Course-specific competences**:* Description of physical systems, using specific theories and tools (experimental and theoretical models, algorithms, schemes, etc.)
* Make of necessary connections to use physical phenomena, using basic knowledge from close domains (Chemistry, Biology, etc.)
* Solving of Physics problems in given conditions, using numerical and statistical methods.
* Comparison of the results given by numerical models or simulations of physical phenomena with data provided by literature and/ or experimental measurements.
* Identification of Physics and Informatics methods, techniques and tools; Design of Physics experiments using specific laboratory methods and equipment.
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| B | **Learning outcomes** |
|  | * Upon successful completion of this discipline, students will be able to: understand, describe correctly, analyze in depth the main physicochemical phenomena that occur at the interaction of electromagnetic radiation with the substance and the resulting applications.
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| C | **Lecture content** |
|  | * Atomics and molecular systems. Fundamentals
* Atomic and molecular spectroscopy
* Lasers. Fundamentals
* Laser matter interaction
* Multiphoton Spectroscopy
* Laser spectroscopy. Applications
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| D | **Recommended reading for lectures** |
|  | 1. M. A. Eliasevici, "Atomic and Molecular Spectroscopy", Romanian Academy Publishing House, Bucharest, 1966;2. I. Iova, "Spectroscopy and Lasers", Univ. of Bucharest, 1984;3. M. Strat, "Spectroscopy and lasers", "Al. I. Cuza" University of Iasi, 1988;4. M. Strat, "Introduction to Condensed Media Spectroscopy", Ed. Tehnica, Bucharest, 1985;5. M. Strat, "Structural Analysis by Physical Methods", Romanian Academy Publishing House, 1985;6. G. Singurel, "Laser Physics", "Al. I. Cuza" University of Iasi, 1995;7. G. Singurel, "Spectroscopy. Practical Problems ", Al. I. Cuza" University of Iasi, 1996;8. M. Strat "Spectroscopy and lasers. Fundamentals. Theory and Experiment. Ed. "Al. I. Cuza" University of Iasi, ISBN: 973-8243-17-3 / 2001;9. S. Stratulat, S. Gurlui, Medical applications of linearly polarized light, Vis / IR spectrum, Ed. Tehnopress, Iaşi, 2003;10. S. Gurlui, M. Delibas, Optica. Exercises and Problems, Ed. Tehnopress, Iaşi, 2005 |
| E | **Seminar / laboratory content** |
|  | * Lasers. Applications
* Applications of laser spectroscopy: laser ablation, optical atmosphere, optical instruments.
* Qualitative and semi-quantitative analysis.
* Absorption, emission and fluorescence spectroscopy
* Infrared spectroscopy
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| F | **Recommended reading for seminars** |
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| G | **Education style** |
| learning and teaching methods | Exposure, questions, dialogue with students, solutions of problems, techniques |
| assessment methods | Written exam + oralColloquium Written experiment + oral |
| Language of instruction | English |