BACHELOR 'S PROGRAMME
3rd YEAR OF STUDY, 2nd SEMESTER

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.

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.

C — LECTURE CONTENT

- Atomics and molecular systems. Fundamentals
- Atomic and molecular spectroscopy
- Lasers. Fundamentals
- Laser matter interaction
- Multiphoton Spectroscopy
- Laser spectroscopy. Applications

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
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 + oral Colloquium Written experiment + oral
LANGUAGE OF INSTRUCTION	English