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

COURSE TITLE	PHYSICS OF STARS
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	4
NUMBER OF HOURS PER WEEK	4 (2 lecture hours + 2 seminar hours)
NAME OF LECTURE HOLDER	PROF. PH. D. MARINA-AURA DARIESCU
NAME OF SEMINAR HOLDER	PROF. PH. D. MARINA-AURA DARIESCU
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:

- → Derivation of working formulas for calculations with physical quantities using appropriate principles and laws of Physics.
- → Description of physical systems, using specific theories and tools (theoretical models, algorithms, schemes, etc.)
- → Application of the principles and laws of Physics in solving theoretical or practical problems, under qualified assistance conditions.
- → Comparison of the results given by numerical models or simulations of physical phenomena with data provided by literature and/ or experimental measurements.
- → Critical assesment of the results obtained by employing a physical model, including the degree of uncertainty of the obtained experimental results.
- → Presentation of scientific and popularization seminars on topics such as Elementary Particles Physics, Quantum Mechanics, Field Theory.
- → Elaboration of reports and presentations, the construction of logical and coherent arguments, the support of these arguments in front of an informed audience, on subjects of General Physics.
- → Responsible performing independent work tasks and interdisciplinary approach of topics.

B — LEARNING OUTCOMES

- Ability to use theoretical physics methods in various fields;
- application of knowledge to practical situations;
- Ability in extracting information from a large variety of sources.
- Use of specific software for analyzing and processing experimental data.

C — LECTURE CONTENT

- Observing stars
- Stars Parameters: Radii, Masses and Luminosities
- Stars and planets as black bodies.
- Stellar Magnitudes
- Stellar Types and Classification: Hertzsprung-Russell (HR) Diagram. The Main Sequence
- The Red Giants and White Dwarfs. Variable Stars.
- Harvard and Morgan-Keenan Classification Schemes.
- Mass-Luminosity Relationship for Main Sequence Stars
- Stellar Atmospheres
- The Stellar Interior, Hydrostatic Equilibrium, Central Pressure and Temperature
- Stellar Models: Protostar Formation, Solar Energy Requirements, The Nuclear Fusion
- Main-Sequence Stellar Evolution: masses of stars and life cycles evolution
- Stellar end-points, Supernovae and remnants of Stars
- Neutron Stars and Magnetars

D — RECOMMENDED READING FOR LECTURES

1. B. W. Carroll, D. A. Ostlie, An Introduction to Modern Astrophysics, Cambridge Univ Press, 2017
2. M. A. Dariescu, C. Dariescu, L. M. Cosovanu, C. I. Stelea,Topici de astronomie, astrofizică și cosmologie pentru începători, Ed. Ars Longa, Iasi, 2015.

	3. E. Toma, Introducere in astrofizica, Ed. Tehnica, Bucuresti, 1980. 4. A.Unsold, B. Baschek, W.D. Brewer, The New Cosmos: An Introduction to Astronomy and Astrophysics, Springer, 2001. 5. Morag Casey, Courses on Stellar Physics. 6. The CLEA Project
E	SEMINAR / LABORATORY CONTENT
	• Applications to each topic presented at the course. • Use of virtual observatory. The CLEA Project.
F	RECOMMENDED READING FOR SEMINARS
	B. W. Carroll, D. A. Ostlie, An Introduction to Modern Astrophysics, Cambridge Univ Press, 2017 M. A. Dariescu, C. Dariescu, L. M. Cosovanu, C. I. Stelea,Topici de astronomie, astrofizică și cosmologie pentru începători, Ed. Ars Longa, Iasi, 2015. E. Toma, Introducere in astrofizica, Ed. Tehnica, Bucuresti, 1980. A.Unsold, B. Baschek, W.D. Brewer, The New Cosmos: An Introduction to Astronomy and Astrophysics, Springer, 2001. Morag Casey, Courses on Stellar Physics. The CLEA Project
G	EDUCATION STYLE
LEARNING AND TEACHING METHODS	Exposition. Debate. Problematization. Directed discovery. Co-operative problem solving. Debate. Problematization. Directed discovery.
ASSESSMENT METHODS	Written exam Participation in seminar activities.
LANGUAGE OF INSTRUCTION	English