COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Sciences			
ACADEMIC UNIT	Physics Department			
LEVEL OF STUDIES	Graduate			
COURSE CODE	**M124**	**SEMESTER**	**2**	
COURSE TITLE	Astrophysics			
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*			**WEEKLY TEACHING HOURS**	**CREDITS**
			4	7
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).				
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Special background			
PREREQUISITE COURSES:				
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek			
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes			
COURSE WEBSITE (URL)				

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

This course provides an advanced understanding of the physical processes that govern solar and space plasmas, with a focus on understanding the structure and dynamics of the solar atmosphere. In the framework of the course, students are required to conduct two advanced projects that involve in-depth physics, advanced data analysis, and literature study.

Upon successful completion of this course students should be able to:

- **understand the physical processes that take place in the quiet Sun and in solar active regions.**
- **understand the physical mechanisms leading to solar energetic eruptions.**

- **use state-of-the-art tools to model physical processes and compare them with observations.**
- **present their own work to peers and research scientists.**
- **apply their knowledge in solar and space astrophysics to new problems.**

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Search for, analysis and synthesis of data and information, with the use of the necessary technology.
- Working independently.
- Production of free, creative and inductive thinking.

(3) SYLLABUS

Introduction. Diagnostics of solar and space plasmas. One-dimensional models of the solar atmosphere. Interaction between magnetic fields and solar/space plasmas. Magnetic reconnection. Magnetic helicity. Wave phenomena (including shock waves) in the solar atmosphere and the interplanetary medium. Fine structure of the solar atmosphere: quiet Sun and active regions. The heliosphere. Flares. Coronal mass ejections. Particle acceleration. Coronal mass ejections and energetic particles in the interplanetary space.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face teaching.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	The Moodle e-learning platform is used for the delivery of lecture notes and exercises to the students.

TEACHING METHODS

The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS

Activity	*Semester workload*	
Lectures	27	
Exercises	9	
Study & analysis of bibliography	43	
Non-directed study	44	
Essay writing	49	
Examination	3	
Course total	***175***	

STUDENT PERFORMANCE	Homework.

EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Research projects. Written examination at the end of semester.

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- "Physics of the Solar Corona", M. J. Aschwanden, Springer, ISBN: 978-3-540-30765-5.
- "Magnetohydrodynamics of the Sun", E. Priest, Cambridge University Press, ISBN: 978-0-521-85471-9.
- "Solar Astrophysics", P. V. Foukal, Wiley, ISBN: 978-3-527-41174-0.