COURSE OUTLINE

1. GENERAL

SCHOOL	NATURAL SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	MAT_OR462	**SEMESTER OF STUDIES**	8th
COURSE TITLE	ATMOSPHERIC PHYSICS II - METEOROLOGY II		

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 credit*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures and Seminars	4	6
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*	Elective course
PREREQUISITE COURSES:	Recommended prerequisite knowledge: ATMOSPHERIC PHYSICS I - METEOROLOGY I
TEACHING AND ASSESSMENT LANGUAGE:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No
COURSE WEBPAGE (URL)	http://www.physics.upatras.gr/index.php?page=spoudesCourseAnalytic&courseId=151&lang=gr

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*

At the end of the course students will be able to

1. Recognize the basic atmospheric parameters affecting the propagation of solar radiation
2. Apply the principles of solar radiation transfer in the atmosphere and explain state-of-art problems
3. Understand the scientific principles of the basic instrumentation in atmospheric sciences.

General Abilities

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	*Others…*
Production of new research ideas	

- Search, analyze and synthesize data and information, using the necessary technologies.
- Autonomous work.
- Promote free, creative and inductive thinking.

3. COURSE CONTENT

1. Introduction: Solar radiation and the composition of Earth's atmosphere.
2. Theory of propagation of solar radiation: Basic concepts, black body, absorption-scattering-emission, radiation transfer equation.
3. Radiative transfer in the atmosphere: Molecular absorption and scattering, Rayleigh and Mie scattering, optical properties of airborne particles and clouds, multiple scattering phenomena.
4. Photochemistry in the atmosphere: Basic concepts, photochemistry of stratospheric and tropospheric ozone, photolysis rates of basic gases.
5. Theory of radiation measurements: Thermal devices, photoreceptors, spectrophotometers, calibration, spectral and angular response of instruments.
6. Basic principles of meteorological measurements: temperature, humidity, wind, pressure, humidity, upper atmosphere measurements and vertical distribution of gases.

4. TEACHING AND LEARNING METHODS - ASSESSMENT

TEACHING METHOD *Face-to-face, Distance learning, etc.*	Lectures (face to face)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT in teaching, laboratory education, communication with students*	Use of ITC in lectures, communication via *eClass* platform.
TEACHING ORGANIZATION *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*	
STUDENT ASSESSEMNT *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.*	**Assessment Language:** Greek **Assessment Language for Erasmus students: ---** **Assessment methods:** Written Final Course Examination (100%) including : ✓ Theory Problem solving ✓ Short Response Questions Minimum passing grade: 5 Maximum passing grade: 10

Activity	***Semester workload***
Lectures	42
Seminars	8
Non-guided study	87
Final examination	3
Total number of hours for the Course (25 hours of work-load per ECTS credit)	***150***

5. RECOMMENDED LITERATURE

(*in Greek*)

- Καζαντζίδης Ανδρέας, *Υπεριώδης Ηλιακή Ακτινοβολία*, Πανεπιστημιακές Σημειώσεις, 2017
- Καζαντζίδης Ανδρέας – Αργυρίου Αθανάσιος, Εργαστηριακές ασκήσεις στη Φυσική Ατμόσφαιρας ΙΙ, Πανεπιστημιακές Σημειώσεις, 2017
- Βαρώτσος Κώστας και Kondratyev Kirill. *Φυσικοχημεία Περιβάλλοντος. Τόμος Ι: Ακτινοβολία - Θερμοκήπιο - Κλιματική Αλλαγή*. 2η έκδοση, Εκδόσεις Τραυλός, 2000.
- Μελάς Δημήτριος. *Ατμοσφαιρική Τεχνολογία*. (e-book). Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών. Αποθετήριο "Κάλλιπος", 2016.