

COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Science		
ACADEMIC UNIT	Physics		
LEVEL OF STUDIES	Undergraduate (postgraduate course offered to undergraduate students)		
COURSE CODE	10EK311	SEMESTER	8
COURSE TITLE	Synoptic Meteorology		
INDEPENDENT TEACHING ACTIVITIES <i>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</i>	WEEKLY TEACHING HOURS	CREDITS	
	4	6	
	(2 hours theory +2 hours laboratory)		
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Specialised		
PREREQUISITE COURSES:	No (suggested : Atmospheric Dynamics (compulsory specialization course)		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	https://eclass.uoa.gr/courses/PHYS342/		

(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

The course offers the student the necessary knowledge for recognizing, analysis and understanding of weather charts, the study of the vertical structure of weather systems in the troposphere, the diagnosis and prognosis of weather phenomena. The students should have the basic background of knowledge being provided by the undergraduate course of Atmospheric Dynamics offered by the curriculum.

With the completion of the course the student is able to:

- Describe the synoptic scale atmospheric circulation with height in the troposphere with the aid of weather charts.
- Recognise the midlatitude weather systems and predict the associated weather phenomena
- Interpret the genesis, evolution and motion of weather systems
- Take advantage of all data and information derived from the chart analysis, radiosondes and satellites to compose the current weather and provide forecast for the following hours or days.
- Organize the forecast considering current weather

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

Adapting to new situations

Decision-making

Working independently

Team work

Working in an international environment

Working in an interdisciplinary environment

Production of new research ideas

Project planning and management

Respect for difference and multiculturalism

Respect for the natural environment

Showing social, professional and ethical responsibility and sensitivity to gender issues

Criticism and self-criticism

Production of free, creative and inductive thinking

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Others...

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The course aims at the following general competences:

- Search for, analysis and synthesis of data and information, with the use of the necessary technology.
- Working independently.
- Analytical and synthetic thinking.
- Critical thinking.
- Decision making

(3) SYLLABUS

- Vertical structure of atmosphere. Isobaric analysis. Surface charts and charts with height.
- Air masses. Fronts. Depressions and anticyclones. Tropical cyclones.
- 850 και 750 hPa chart. Temperature advection.
- 500 hPa chart. Vorticity and vorticity advection. Vertical motion. Thickness.
- 300 hPa chart. Jet stream. Rossby waves. Divergence/convergence.
- Structure and motion of synoptic scale systems. Cyclogenesis and anticyclogenesis.
- Characteristic weather types in Greece related with extreme events.

Laboratory:

- Surface charts
- 850 και 700 hPa chart.
- 500 hPa chart.
- 300 hPa chart.
- Satellite data associated with the analysis of weather charts.
- Thermodynamic structure of atmosphere. Tephigrams.
- Combined analysis of weather charts (case studies).
- Verification of forecasts (case studies).

(4) TEACHING and LEARNING METHODS - EVALUATION

<p>DELIVERY <i>Face-to-face, Distance learning, etc.</i></p>	Face-to-face	
<p>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>Yes</p> <p>Electronic communication with the students using ICT. Computer-aided lectures, eclass platform, interactive teaching, exercises with the aid of meteorological charts downloaded from data bases available in internet</p>	
<p>TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i></p> <p><i>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.</i></p> <p><i>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</i></p>	<p>Activity</p>	<p>Semester workload</p>
	Lectures	26
	Laboratory	26
	Individual Study	48
	Preparation for the laboratory/test	50
	Course Total	150
<p>STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i></p> <p><i>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</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<ul style="list-style-type: none"> • Written test of 20 min duration in the beginning of each laboratory exercise related with the material of the previous exercise • The grade of the laboratory part derives from the average of the first 8 exercises independently if each one is pass or not. • Final written exams in Greek • The students are not able to take the final exams if they have not taken passing average laboratory grade. <p>The final grade derives as an average of the laboratory and the final written exam</p>	

(5) ATTACHED BIBLIOGRAPHY

- *Suggested bibliography:*

- Meteorology Today, Ahrens C.D-Henson R.
- Synoptic -Dynamic Meteorology in Midlatitudes, H. Bluestein (Volume I and II)
- Synoptic Meteorology, A. Lehtonen
- Midlatitude Synoptic Meteorology, G. Lackman

- *Related academic journals (Indicative list):*

- Journal of Atmospheric Sciences
- Quarterly Journal of Royal Meteorological Society
- Monthly Weather Review
- Meteorology and Atmospheric Physics
- Natural Hazards