COURSE OUTLINE

(1) GENERAL

SCHOOL	NATURAL SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHYSICS		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**101**	**SEMESTER**	**8**
COURSE TITLE	STATISTICAL PHYSICS 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 credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	4
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, specialised general knowledge, skills development
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	http://ecourse.uoi.gr/course/view.php?id=1532

(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 objective of this course is to present to the students the basic principles of Statistical Physics – a science that finds applications in a variety of physical systems from the smallest to the largest – and to teach them the methods that it uses for every system. More analytically, at the end of this course, every student will be able to:

1. Recall the basic principles of Statistical Physics and how this relates the microscopic structure of the system to its macroscopic properties.
2. Choose the appropriate statistical ensemble (micro-canonical, canonical and grand canonical) according to the constraints that apply to the given system.
3. Apply the appropriate ensemble to the given system and derive results for its basic properties and physical parameters.
4. Compare the behaviour of the system with the experimental data and draw conclusions for the validity of the method that was employed.

5. Recognize the similarities in systems of different scale (conductivity electrons or neutron stars) and generalise that knowledge and experience to other physical systems.

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
Decision-making
Working independently
Criticism and self-criticism
Production of free, creative and inductive thinking

(3) SYLLABUS

Applications of statistical mechanics. Photon gas. Insulating and conductive solids. Atomic and molecular gases. Equilibrium of chemical interactions. Equilibrium of phases and phase transitions of first and second kind. The role of interactions. Critical Exponents. Applications in astrophysics.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Use of the course web page on http://ecourse.uoi.gr to post notes and exercise sheets Use of electronic mail to communicate with 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	32
Students' Presentations	20
Homeworks	20
Independent Study	25
Exams	3
Course total	***100***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure*	Oral presentations by the students during the semester on untaught material

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.*	Problem solving (every second week) and submission for assessment End-of-semester written exams during which the students are asked to solve problems related to the material taught at the course

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. "Statistical Physics", F. Mandl, G. Pnevmatikos Publications, 2000, Athens.
2. "Statistical Mechanics", C. Vayonakis, University of Ioannina Publications, 2008.
3. "Introduction to the Quantum Theory of Many degrees of Freedom", E. Manessis, University of Ioannina Publications, 1996.
4. "Statistical Physics and Thermodynamics", E.N. Oikonomou, University of Crete Publications, 2002.
5. "Statistical Physics", I.D. Vergados and E.S. Triantafyllopoulos, Symeon Publications, 1992, Athens.