ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Α .Δ Ι .Π .
ΑΡΧΗ ΔΙΑΣΦΑΛΙΣΗΣ & ΠΙΣΤΟΠΟΙΗΣΗΣ
ΤΗΣ ΠΟΙΟΤΗΤΑΣ ΣΤΗΝ ΑΝΩΤΑΤΗ
ΕΚΠΑΙΔΕΥΣΗ

HELLENIC REPUBLIC
H .Q .A .
HELLENIC QUALITY ASSURANCE
AND ACCREDITATION AGENCY

ΤΕΧΝΟΛΟΓΙΚΟ ΕΚΠΑΙΔΕΥΤΙΚΟ ΙΔΡΥΜΑ ΑΝΑΤΟΛΙΚΗΣ ΜΑΚΕΔΟΝΙΑΣ ΚΑΙ ΘΡΑΚΗΣ
ΜΟΝΑΔΑ ΔΙΑΣΦΑΛΙΣΗΣ ΤΗΣ ΠΟΙΟΤΗΤΑΣ ΤΕΙ ΑΜΘ

Quality Assurance in Higher Education
Course Data Collection Form

ΤΕΧΝΟΛΟΓΙΚΟ ΕΚΠΑΙΔΕΥΤΙΚΟ ΙΔΡΥΜΑ
ΑΝΑΤΟΛΙΚΗΣ ΜΑΚΕΔΟΝΙΑΣ & ΘΡΑΚΗΣ
ΑΓΙΟΣ ΛΟΥΚΑΣ,
65404 ΚΑΒΑΛΑ

EASTERN MACEDONIA AND THRACE
INSTITUTE OF TECHNOLOGY
AGIOS LOUKAS
65404 KAVALA

COURSE OUTLINE

1. GENERAL

SCHOOL	School of Technological Applications		
ACADEMIC UNIT	Department of Electrical Engineering		
DEGREE LEVEL	Undergraduate		
COURSE CODE	AN4	**SEMESTER**	1st
COURSE TITLE	APPLIED THERMODYNAMICS		

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**
Lectures and Exercises	3	4,5
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General Knowledge
Required passed courses:	-
TEACHING AND EXAMS LANGUAGE:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS:	No
COURSE WEBPAGE (URL)	http://eclass.teikav.edu.gr/ED189/

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*

Target and objective of the course is to teach students the basic concepts of applied thermodynamics and, mainly, understand the concept of heat as energy, the principles of thermodynamics, the circular modifications, the thermodynamics cycles as well as the conversion of heat into other energy types, with emphasis in its ability to utilize it for the production of electrical energy with the objective of environmental protection.

Upon successful completion of the course, students should be able to:

- Identify the thermodynamic alterations and calculate the participating.
- Solve simple and complex mathematic problems from the taught units.
- Convert the results from his/her calculations to the appropriate units either for the National or the International System of Units.
- Assemble a thermodynamic cycle and calculate its performance,
- Identify known thermodynamic cycle and calculate from the diagram all its parameters.
- Understand the concepts of heating or cooling machines and separate them.

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
……
Others…
…….

- Research, analysis and synthesis of data and information with the usage of the necessary technology
- Autonomous work
- Teamwork
- Work in a scientific environment
- Production of new research ideas
- Respect to natural environment

3. COURSE CONTENT

1. Thermodynamic system.
2. Ideal gas: kinetic theory, ideal gas equation, gas laws.
3. First thermodynamic law. Internal energy. Enthalpy.
4. Applications of the 1st thermodynamic law in changes of ideal gases.
5. Second thermodynamic law. Entropy.
6. Two phases thermodynamics. Evaporation.
7. Real Gases. Thermal capacity.
8. Principles of differential thermal analysis and calorimetry.
9. Thermal machines. Thermal cycles.
10. Carnot cycle. Performance rate of thermal and cooling cycle.
11. Rankine cycle and improvement interventions.
12. Hygrometry - applications (conditioning, cooling towers).
13. Air cycles. Otto cycle, Diesel, mixed cycle. Brayton cycle, Stirling, Ericsson. Brayton-Rankine combined cycle.
14. Exergy, analysis of exergy.

4. TEACHING AND LEARNING METHODS - ASSESSMENT

TEACHING METHOD *Face-to-face, Distance learning, etc.*	Room Lecture
UTILISATIONS OF INFORMATION AND COMMUNICATION TECNOLOGIES *Use of ICT in teaching, laboratory education, communication with students*	Syllabus organization in PPT slides. Learning process support through e-class electronic Contact via email.
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*	

Acivity	***Semester workload***
Lectures	33
Writing of small courseworks	6
Self-contained coursework	73
Course Summary (25 workload per credit)	***112***

STUDENT ASSESSMENT *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.*	Writing of small courseworks (10%) Final written examination (90%) which includes solving problems of different sections of the course (allowed to use notes).

5. RECCOMENDED READING

- Suggested bibliography:
- Related academic journals:

- Kappos Th. John, "Applied Thermodynamics I: Theory and Exercises", publications Klidarithmos EPE, 1st edition 1996, ISBN: 960-209-293-9
- Yung Hugh D., "University Physics" publications Papazisi AEBE, 1st edition 1994, ISBN: 978-960-02-1067-5
- Yunus A. Gengel, Michael Boles, "Thermodynamics: An Engineering Approach", McGraw – Hill, New York, 2002, ISBN: 0-07-238332-1