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 ENGINEERING		
ACADEMIC UNIT	ELECTRICAL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**STN3**	**SEMESTER**	**6ο**
COURSE TITLE	RENWABLE ENERGY SOURSES		

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	3	
LABORATORY EXERCISES	3	
		6,5
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*	*Specialised general knowledge* *Skills development*
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO
COURSE WEBSITE (URL)	http://eclass.teikav.edu.gr/ED118/

(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 aims to introduce students to the concept of Renewable Energy. Acquire skills on assessment conversion sizes RES in electricity and thermal energy. Conversion of solar, wind, hydraulic, geothermal and biomass energy into electricity and acquire skills on technologies A / C and P / B. In particular it will be deepened to:
- • Introduction to Renewable Energy Sources (RES).
- •Solar power. Converting solar energy into electricity.
- • Photovoltaic phenomenon. Characteristics Photovoltaic (P / B) component.
- • Performance P / V components.
- • Technologies P / V systems.
- •Wind power. Wind potential.
- • Kinetic energy of wind.
- • Curves duration, speed.
- Conversion of wind energy into electricity.
- • Wind Analysis (A / C).

- •Wind farms
- •Hydropower.
- • Principle hydroelectric system.
- • Small hydro projects.
- Features • Hydroelectric power plant turbine, performance.
- • Geothermal energy, geothermal features. Exploiting geothermal energy.
- • Uses geothermal energy.
- • Shallow Geothermal.
- • Biomass, formation, origin, recovery.
- • Methods of converting biomass, biomass conversion technologies into energy.
- • Wave energy, characteristics, utilization.

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…*
	…….

- *Understand concepts*
- *Designing RES system*
- *Work on energy source section*
- *Teamwork in the field per team*
- *Respect for the environment through energy process from RES*

(3) SYLLABUS

1.Energeia flashback, Basic concepts, energy issue, power plants, energy mix, energy, design.
2. Renewable Energy, basic concepts, advantages, disadvantages RES, RES development Brief
3. RES and Environment, National targets RES contribution of RES in the Energy Balance, biofuels, cogeneration
4. Hydropower, history, advantages hydropower Authority hydraulic conversion into electricity.
5. Hydraulic stations, split into small (SHP) and large, main parts, operation principle.
6. Turbines, description, function, types, hydrological analysis Identification, selection turbine, power, energy produced turbine.
7. Biomass, basic concepts, creation, origin, biomass cycle Advantages Disadvantages Biomass utilization.
8. Methods of converting biomass into energy. Thermochemical, biochemical, methods, direct combustion, produced products.
9. Electricity - Cogeneration Biomass technology power plants from biomass.
10. Geothermal throwback, advantages, basic concepts, applications.
11. Geothermal fields, formation, readability exploitation.
12. Electricity from geothermal energy and use for other purposes.
13. Shallow geothermal energy, principle of operation, exploitation of shallow geothermal systems, pumps heat.
14. The wave energy, basic concepts, systems.
15. Wind energy, wind, characteristics
16. Wind Energy Conversion Systems

17. turbines, wind farms, planning, evaluation
18. Solar energy
19. Solar energy conversion systems
20. The photovoltaic effect, P / V systems, features, design

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	In classroom
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lectures using Power Point presentations. Website of the course in e-class with supporting and auxiliary material which is updated at regular intervals. Software simulation Application. E-mail contact.
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	39
Project	39
Seminars	20
Self study	64
Course total (25 hours / ECTS)	***135***

STUDENT PERFORMANCE 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.*	Theory: Final short-answer questions writing examination concerning RES, problem solving, written work

(5) ATTACHED BIBLIOGRAPHY

Μ. Φυτίκας "Γεωθερμία", Εκδόσεις ΤΖΙΟΛΑ, 2004.
Δ. Παπαντώνης, "Μικρά Υδροηλεκτρικά Έργα" Εκδόσεις ΣΥΜΕΩΝ 2001.
Γ. Παπαϊωάνου "Ήπιες Μορφές Ενέργειας", Εκδόσεις ΙΩΝ 2009.
B. Sorensen, "Renewable Energy Conversion, Transmission, and Storage",Academic Press 2008.
B.Godfrey "Renewable Energy" Amazon, 2007.