Title:	**ENERGY AND ENVIRONMENT**		
Code number:		**Type:**	Compulsory Optional
Level:	Undergraduate		
Year:	3d	**Semester:**	E
ECTS Units:	3	**Teaching Units:**	4
Lecturer(s):	Dias Haralambopoulos		
Content outline and weekly schedule:	1. Introduction to the energy system, basic concepts, terms, units. Energy for heat, electricity production, transport. Energy resources and depletion of conventional fuels. 2. Thermodynamics. Basic concepts, laws and applications. 3. Analysis of energy systems, basic components, operation and significance. Cogeneration of heat and power. Environmental pressures. 4. Coal. Origin, extraction, transport, processing, uses and environmental pressures 5. Oil. Origin, extraction, transport, processing technologies, uses and environmental pressures. 6. Natural gas. Origin, extraction, transport, processing technologies, uses and environmental pressures. 7. Nuclear fuels. Origin, types, extraction, processing technologies, uses and environmental pressures and risks. 8. Electricity production. (a) Production of heat for power production. Technologies and estimation of environmental pressures. 9. Electricity production. (b) Production of mechanical energy and conversion to electricity. Technologies involved and estimation of conversion efficiencies. 10. Emissions cleaning technologies and technologies for carbon capture and storage. 11. Energy conservation, energy auditing programmes. 12. New energy technologies. The hydrogen system. Fuel cells. 13. Planning and siting of power systems (plants, transfer lines, distribution networks). Environmental impact assessment.		
Learning Outcomes:	The student will acquire a working knowledge of the modern energy system and infrastructure, the available conventional resources, the appropriate technologies for energy conversion and the environmental and health issues involved. She will be able to understand, evaluate and take part in the design of the energy system necessary and to organize and manage the environmental impact assessment.		
Prerequisites:	---		
Recommended Reading:	**Lecture notes:**	Handouts by D.Haralambopoulos (pp. 120, in Greek) .	
	Basic textbooks:	• Culp, A.W.J., Principles of Energy Conversion, McGraw-Hill, 1985.	
	Additional References:	• Boyle, G., Everett, B., Ramage, J., Energy Systems and Sustainability, Power for a sustainable future, Oxford University Press, 2003.	

		• Boyle, G., Renewable Energy, Power for a sustainable future, Oxford University Press, 1996. • Cassedy, E.S., Grossman, P.Z., Introduction to Energy, Resources, technology and society, Cambridge University Press, 1990. • Ramage, J., Energy a Guidebook, Oxford University Press, 1997. • R.Hinrichs, (1996), «Energy. Its use and the environment», Saunders College Publishing. • E.Cassedy and P.Grossman, (1990), «Introduction to Energy», Resources, Technology and Society, Cambridge University Press. • Smil Vaclav, Energy in Nature and Society, General Energetics of Complex Systems, The MIT Press, 2008. • Κουμούτσου Ν. και Μαρίνου-Κουρή Δ.Σ., (1986), «Χρήση και Εξοικονόμηση Ενέργειας», Αθήνα. • Κουμούτσου Ν. και Λυγερού Β., (1986), «Μεταφορά Μάζας», Αθήνα.
	Internet links:	www.doe.gov Dept of Energy, USA. www.ca.sandia.gov Sandia Laboratory. www.leeds.ac.uk/fuel/fuel.html Dept of Fuel and Energy – University of Leeds, UK. www.epri.com/ Electric power research institute. www.eren.doe.gov EREN – DOE. www.epa.gov/ US Environmental Protection Agency. europa.eu.int/en/comm/dg17/dg17home.htm European Commission, Energy. www.iea.org International Energy Agency. www.ises.org/ International Solar Energy Society. www.ases.org/ American solar energy society. www.bp.com/bpstats/ BP-AMOCO. www.eia.doe.gov Energy Information Agency. www.undp.org/seed United Nations.
Learning Activities and Teaching Methods:	**Lectures (hours/week):**	3
	Practicals-Tutorials (hours/week):	---
	Other learning activities:	Visit to PPC power plant in Lesvos.
Assessment/Grading:	Assignments, Intermediate and Final Test	
Instruction Language:	Greek	
Mode of delivery:	Lectures	