Title:	Environmental Physics: Radiation		
Code number:		**Type:**	Optional Compulsory
Level:	Undergraduate		
Year:	3	**Semester:**	6
ECTS Units:	4	**Teaching Units:**	3
Lecturer(s):	Christos Matsoukas		
Content outline and weekly schedule:	1. Electrical and magnetic fields, electromagnetic wave 2. E/M field, radiometric quantities, solid angle 3. Photon, gas emission spectra, black body 4. Bohr atom, X rays, Rayleigh and Mie scattering 5. Light absorption, solar radiation, erythemal action of UV 6. Infrared, planetary radiation budget, greenhouse effect 7. Radiowaves, exposure and biological impacts 8. Radioactive radiation, half time, isotopes 9. Radioactive dose, radon, nuclear reactions 10. Radioactivity effects on health 11. Laser, population inversion, harmful effects 12. Sound, intensity levels, loudness 13. Sound measurements, exposure effects		
Learning Outcomes:	Radiation is involved in many aspects of environmental degradation: 1. Greenhouse effect and climate change (infrared) 2. Ozone layer thinning (ultraviolet) 3. Radioactive pollution (particle radiation and γ) 4. Communications and electrosmog (microwaves, radiowaves) This course aims to study the areas above (among others) and to highlight physics as a tool to solve environmental problems		
Prerequisites:	Climatology-Meteorology Mathematics		
Recommended Reading:	**Lecture notes:**	"Environmental Physics", C.P. Halvadakis, C. Matsoukas, 94 pages	

	Basic textbooks:	J. L. Hunt, W. G Graham, "Radiation in the environment (2nd edition)", free web book
	Additional References	• E. T. Chanlett, (1979), "*Environmental Protection*", Second Edition, McGraw-Hill Book Company, New York. • M. Eisenbud, (1973), "*Environmental Radioactivity*", Second Edition, Academic Press, New York. • N. Mason, P. Hughes, (2001), "I*ntroduction to environmental physics : planet earth, life and climate*", Taylor & Francis, London, New York • G. M. Masters, (1991), "*Introduction to Environmental Engineering and Science*", Prentice-Hall, Inc., Englewood Cliffs, New Jersey. • J. L. Monteith, & M.H. Unsworth, (1990), "*Principles of Environmental Physics*", Second Edition, Routledge, Chapman and Hall, Inc., New York. • K. F. Papastefanou, (1992), "Radiation physics and isotope applications", 2nd ed., Zitis Editions, Thessaloniki • C. Proukakis, (1987), "Nuclear Accidents: Hazards and Health Protection", Scientific Publications G. K. Parisianos, Athens • I. N. Sahalos, (1990), "*Microwaves*", Aivazis-Zouboulis Editions, Thessaloniki • R. A. Serway, (1992), "*Physics for Scientists & Engineers with Modern Physics*", Third Edition, Updated Version, Saunders Golden Sunburst Series, Saunders College Publishing, Haarcourt Brace College Publishers, San Francisco. • C. Smith, (2001), "*Environmental physics*", Routledge, London
	Internet links:	http://moodle.aegean.gr/
Learning Activities and Teaching	**Lectures (hours/week):**	3

Methods:		
	Practicals-Tutorials (hours/week):	
	Other learning activities:	
Assessment/Grading:	Final exam (70%) and 6 homework problem sets (30%)	
Instruction Language:	Greek	
Mode of delivery:	Face to face	