New Course Announcement for Spring 2013
AME 583: Effects of Radiation on Health

This course is offered by the Department of Aerospace & Mechanical Engineering at USC, and is available on USC's Distance Education Network (DEN). The course lectures are webcast by DEN. Local students of course have the choice of taking it in the classroom setting if they wish. See http://gapp.usc.edu/howdenworks

Recommended Preparation: Physics 153, or equivalent
Semester: Spring 2013
Time: Tuesdays 6:40-9:20 pm
Instructor: Dr. Javad Rahimian, Kaiser Permanente

Class Number: 28960R (On Campus)
29061D (Distance Education)

Introduction and Purposes

The course will start with fundamental nuclear physics as a basis and build on applications relevant to human health. Besides the development of an understanding of the biological effects of radiation, course will emphasize problem solving and application to situations in a variety of health physics specialty areas. Students will experience the utilization of the basic concepts and principles to address a range of practical problems dealing with, for example, measurement, biological effects, radiation protection, nuclear accidents.

The course is suitable for Health Physicists, Dosimetrists, Radiation Therapists, Diagnostic Radiation Technologists, and Nuclear Engineers.

Course Requirements and Grades

- ***Required text***: "Introduction to Health Physics" (4th Edition)
  by Herman Cember and Thomas E. Johnson, 2008,
  ISBN-13: 978-0071054614

- ***Recommended References***:

1. "Basic Health Physics: Problems and Solutions" by Joseph John Bevelacqua
2. "Radiation Protection and Dosimetry: An Introduction to Health Physics" by Michael G. Stabin
3. "Radiation Protection: A Guide for Scientists, Regulators and Physicians," by Jacob Shapiro

- ***Grading breakdown:***

Homework:	20%
Mid-Term Exam	30%
Final Exam	50%
TOTAL	100%

For further information, contact Prof S.S. Sadhal sadhal@usc.edu

Breakdown of Course Material (AME 583)

Lecture No.	Lecture Dates	Topic(s)	Textbook Chapter(s)
1, 2 Week 1	Jan 15, 17	Review of atomic and nuclear structure.	1, 2
3, 4, 5 Week 2-3	Jan 22, 24, 29	Nuclear reactions and transformations. Kinetics of transformation. Natural and human-created radiation.	3, 4
6, 7 Week 3-4	Jan 31, Feb 5	Types of radiation: alpha, beta and neutron radiation, photonic radiation (gamma- and X-rays). Interaction of radiation with matter.	5
8, 9, 10 Week 4-5	Feb 7, 12, 14	Measurement of absorbed dose, dosimetry. Internal and external exposure. Radiation quantities and units.	6, 7
11, 12 Week 6	Feb 19, 21	Dose response characteristics, stochastic and deterministic effects of radiation.	7
Week 7	Feb 26	***Mid-Term Examination***	
13, 14, 15 Week 7-8	Feb 28, Mar 5, 7	Radiation protection principles, shielding. US and international regulatory guidelines. Ecological safety.	8
16, 17 Week 9	Mar 12, 14	Radiation measurement and instrumentation. Particle counters, neutron measurements. Calibration.	9
	Mar 18-22	***SPRING BREAK***	
18, 19, 20 Week 10-11	Mar 26, 28, Apr 2	External radiation safety	10
21, 22 Week 10-11	Apr 4, 9	Internal radiation, control, radioactive waste management, accidents.	11
23, 24 Week 12-13	Apr 11, 16	Radiation from reactors, fission yield and products, yield-specific radiation.	12
25, 26 Week 13-14	Apr 17, 22	Radiation safety standards and regulations, individual monitoring, environmental sampling techniques and monitoring.	13
27, 28, 29 Week 14-15	Apr 24, 29, May 1	Application of ALARA (As Low As Reasonably Achievable), emergency response training, decommissioning and decontamination	References
	As per published schedule	***Final Examination***	