ENU 6659: Nuclear Medicine Instrumentation and Procedures

Spring 2006

Time/place Tues./Thurs. period 5,6 (11:45 -1:40), 227 NSC

Instructor
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Open office hours: 2-5 T,Th, F (or by appointment)

Text *Emission Tomography: The Fundamentals of PET and SPECT*, Wernick and Aarsvold (eds.), Elsevier Academic Press, 2004

Grading

60% Homework	A = 91 -- 100
15% Midterm	B+ = 88 – 90, B = 81 – 87
25% Final	C+ = 78 – 80, C = 71 – 77
	D = 61 – 70

Description This course covers the fundamental theory and practical application of single photon emission computed tomography (SPECT) and positron emission tomography (PET). Included are the basic imaging physics and instrumentation design relevant to these nuclear medicine imaging modalities. Also included are the theory and practical application of image reconstruction and image processing methods, kinetic modeling, and objective assessment of image quality. Radiation safety and regulations pertaining to nuclear medicine are also covered.

Objectives Develop and in-depth understanding of the theory and practical application of SPECT and PET imaging systems and procedures. Know the relevant radiation safety and regulatory issues in nuclear medicine.

Prerequisites ENU 5615 or equivalent. Non-medical physics graduate students should consult the instructor regarding individual background needs.

Attendance Policy On time class attendance is mandatory. Chronic tardiness or absence will negatively impact the final grade. There is zero tolerance for cell phone disruptions.

Make-up/Late Policy There will be no make-up of exams. Unless otherwise specified, homework is due at the beginning of class on the due date. Late homework will be penalized commensurate with the degree of lateness.

Students with Disabilities Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

Academic Honesty All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a

student at the University of Florida and to be honest in all work submitted and exams taken in this class and all others.

UF Counseling Services

Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

- University Counseling Center, 301 Peabody Hall, 392-1575, Personal and Career Counseling.
- SHCC mental Health, Student Health Care Center, 392-1171, Personal and Counseling.
- Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling.
- Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

Software Use

All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Course Schedule

Week	Topics	Chaps.
1	Introduction to emission tomography, clinical application	1-3
2	Basic physics of radioisotope imaging	4
3	Radiopharmaceutical production and quality control	4
4	SPECT: fundamentals	7
5	SPECT: collimator design	8
6	SPECT: corrections for physical factors	22
7	SPECT: system performance evaluation	NEMA-NU 1
	MIDTERM	
8	PET: fundamentals	10
9	PET/CT systems	11
10	PET: system performance evaluation	NEMA-NU 2
11	PET: kinetic modeling	23
12	Scintillators and photodetectors	13,14
13	Basic imaging theory/statistics	6
14	Image reconstruction methods in SPECT/PET	20,21
15	Computer analysis in nuclear cardiology, Radiation safety and regulations	24
	FINAL	