

Spring 2020

**Nuclear Medicine Instrumentation and Procedures**

ENU 6659; Section 09A5; 3 Credits

**CLASS MEETING INFO**

11:15a-12:30p; T,Th  
C2-33, Communicore

**INSTRUCTOR**

David Gilland; gilland@ufl.edu; 265-0293  
Office Hours: email for appointment

**TEACHING ASSISTANTS**

N/A

**DESCRIPTION**

Theory, evaluation, applications of detecting and imaging systems in nuclear medicine including collimators, scintillation probes, cameras, data-processing devices; uses of radionuclides in medicine for radiopharmaceutical preparation.

**PRE-REQUISITES/CO-REQUISITES**

BME6535 or permission from instructor

**OBJECTIVES**

- Develop an in-depth understanding of the theory and practical application of SPECT and PET imaging systems and procedures.
- Develop skills to apply theoretical analysis in practice using software tools.
- Know the relevant radiation safety and regulatory issues in nuclear medicine.

**MATERIALS AND SUPPLY FEES – N/A**

**REQUIRED TEXTBOOKS & SOFTWARE**

- A. Title: *Physics in Nuclear Medicine*  
Author: Cherry, Sorenson and Phelps  
Publication date and edition: 2012, 4<sup>th</sup> edition  
ISBN number: 978-1-4160-5198-5
- B. Matlab (available at apps.ufl.edu)
- C. Students are expected to subscribe to SNMMI Smartbrief email newsletter.

## RECOMMENDED MATERIALS -- N/A

### COURSE SCHEDULE

<b>Week</b>	<b>Topic</b>	<b>Reading</b>
1	Nuclear medicine overview, clinical applications	Ch. 1
2	Basic physics of NM, modes of radioactive decay	Ch. 2,3
3	Radioactivity time decay, nuclear counting statistics	Ch. 4,9
4	Radionuclide production, dose calibrator, radiation safety	Ch. 5, 12D, 23
5	Gamma camera design and performance	Ch. 13,14
6	Gamma camera design and performance (cont.)	
7	Radiation detectors in NM, pulse height spectroscopy	Ch. 7B, 7C, 10
8	Gamma camera quality assurance	NEMA-NU1
9	Physical factors affecting image quality, SPECT	Ch. 15,16,17
10	SPECT attenuation correction, quality assurance	NEMA-NU1
11	Student presentations	
12	PET scanner design, performance, correction methods	Ch. 18
13	PET quality assurance, hybrid imaging	NEMA-NU2, Ch. 19
14	Student presentations	NEMA-NU2

### ATTENDANCE POLICY; CLASS EXPECTATIONS; MAKE-UP POLICY

- On time class attendance and participation in class discussions are expected.
- Material will be presented during class that will not be available electronically but will be necessary for homework assignments and exams. Therefore, note taking is highly encouraged. If a class is missed, arrangements should be made to get the notes from a classmate.
- Requirements for class attendance and make-up exams, assignments, and other work are consistent with university policies that can be found at:  
<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>
- Excused absences must be consistent with university policies in the Graduate Catalog and require appropriate documentation:  
<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance>

### EVALUATION OF GRADES

- 40% Homework/presentations
- 15% Quiz 1
- 20% Quiz 2
- 25% Quiz 3

### GRADING POLICY

<b>Percent</b>	<b>Grade</b>
93-100	A
90-92.99	A-
87-89.99	B+
83-86.99	B
80-82.99	B-
77-79.99	C+

73-76 .99	C
70-72.99	C-
67-69.99	D+
63-66.99	D
60-62.99	D-
59 & below	E

More information on UF grading policy may be found at:

<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades>

### **STUDENTS REQUIRING ACCOMMODATIONS**

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565; <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

### **EVALUATIONS**

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

### **UNIVERSITY HONESTY POLICY**

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

### **SOFTWARE USE**

All faculty, staff, and students 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.

## **STUDENT PRIVACY**

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see:

<http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>

## **CAMPUS RESOURCES**

### **Health and Wellness**

#### **U Matter, We Care**

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

#### **Counseling and Wellness Center**

352-392-1575; <http://www.counseling.ufl.edu/cwc>

#### **Sexual Assault Recovery Services (SARS)**

352-392-1161; Student Health Care Center

#### **University Police Department**

352-392-1111 (or 911 for emergencies); <http://www.police.ufl.edu/>

### **Academic Resources**

#### **E-learning Technical Support**

352-392-4357 (select option 2); [learning-support@ufl.edu](mailto:learning-support@ufl.edu); <https://lss.at.ufl.edu/help.shtml>

#### **Career Resource Center**

Career assistance and counseling.

352-392-1601; Reitz Union; <https://www.crc.ufl.edu/>

#### **Library Support**

Various ways to receive assistance with respect to using the libraries or finding resources.

<http://cms.uflib.ufl.edu/ask>

#### **Teaching Center**

General study skills and tutoring.

352-392-2010 or 352-392-6420; Broward Hall; <https://teachingcenter.ufl.edu/>

**Writing Studio**

Help brainstorming, formatting, and writing papers.

352-846-1138; 302 Tigert Hall; <https://writing.ufl.edu/writing-studio/>

**Student Complaints Campus**

[https://www.dso.ufl.edu/documents/UF\\_Complaints\\_policy.pdf](https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf)

**On-Line Students Complaints**

<http://www.distance.ufl.edu/student-complaint-process>