NEW YORK CITY COLLEGE OF TECHNOLOGY
THE CITY UNIVERSITY OF NEW YORK

Department of Radiologic Technology & Medical Imaging

RAD 4826
Advanced Medical Imaging II
Course Syllabus

Spring 2016
Prof. Subhendra Sarkar, PhD (Chemical Physics), RT(R,MR,CT,N), CNMT, DABMP
Room P- 513
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Class: Monday 6:00 – 8:30 pm
Office hours: Mon, Tues 5:00 – 6:00 pm

Revised: February 2016
COURSE: RAD 4826 Advance Imaging II

INSTRUCTOR: Prof. S. Sarkar, PhD, RT, CNMT, DABMP  OFFICE: Rm P513

E-MAIL: ssarkar@citytech.cuny.edu  PH:(718) 260-5360

OFFICE HOURS: Mon, Tues  5:00 to 6:00 pm

COURSE DESCRIPTION
A continuation of Advanced Imaging I. Students explore advanced diagnostic imaging and therapeutic procedures. The focus includes specialized modalities such as mammography, nuclear imaging, Positron Emission Tomography (PET), bone densitometry (DEXA), Interventional, Cardiac Catheterization, Fusion Imaging, Sonography, and Radiation Therapy.

PREREQUISITE: RAD 4726

COURSE OBJECTIVES:

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<th>Instructional Objectives: For the successful completion of this course, students should:</th>
<th>Assessment: Instructional Activity, Evaluation Methods and Criteria</th>
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<tr>
<td>Demonstrate skills in relating to knowledge about Mammography procedure, history and accreditations.</td>
<td>Reading, in-class exercises, group discussions and online blog posts.</td>
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<tr>
<td>Understand practice parameters for Mammography, Ultrasound and DEXA procedures in clinical setting</td>
<td>Reading, in-class exercises, group discussions and article summary presentations.</td>
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<td>Understand basic and latest PET/CT techniques in clinical practice and evaluate its relation with other imaging modalities.</td>
<td>Reading, in-class exercises, group discussions and article summary presentations and online blog posts.</td>
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<td>Analyze and discuss Interventional, Cardiac Catheterization, and Radiation Therapy and be familiar with scope, future growth and limitations.</td>
<td>Reading, in-class exercises, group discussions and article summary presentations.</td>
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<td>Characterize the impact of the expanding clinical use of exciting new technology known as positron emission tomography/computed tomography (PET/CT) and SPECT/CT to study metabolism.</td>
<td>Assigned reading material from the Text books and handouts. Ability to browse through and gather relevant imaging methods and results from review articles in radiology journals.</td>
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TEXTBOOK and Medical Journals:
REQUIRED:
- Introductory and review articles from medical journals as posted in blackboard.

COURSE REQUIREMENTS AND ASSESSMENT
Students who enroll in this class must:
1. Actively participate in all lecture sessions
2. Complete all required reading/viewing and in-class activities
3. Submit and present 2 article summaries
4. Submit and present a research paper on one of the Advanced Modality topics
5. Participate in midterm and final exams

COURSE GRADING
In-class participation (valid Q & A contributions) 15%
Summaries of text chapters and assigned articles 25%
Midterm exam 30%
Final exam 30%

Teaching/Learning Methods
- Lectures from text and introductory imaging articles
- Blackboard group/blog discussion
- Reading journal articles on state of the art and promising new imaging methods
- Subject-related article summaries submitted periodically
- In-class Q&A
- Midterm and final exams

Article Summaries
Each student will submit summaries on text materials or course-related journal articles from time to time to demonstrate grasp of the topics. Summary length should be approximately one page.

Reading Materials
The medical imaging field is constantly advancing in every modality. Subject-related introductory or review journal articles that present state of the art or promising new imaging techniques will be used to supplement texts. Instructor will help students navigate through those articles and point out portions relevant to students’ learning.
ATTENDANCE POLICY

No more than 2 absences will be allowed in this course. Each additional absence (excused or unexcused) will lower your course grade by one letter grade. This means that if your average is A and you were absent three times, the highest grade you can achieve is A-. And if you were absent 4 times, the highest grade you can achieve is B+. This may be altered only with prior permission or additional testing by the instructor.

LATENESS

Arrival 15 minutes after the scheduled start of class time will be counted as a lateness. Two late arrivals to class will be counted as one absence and may affect the final course grade.

CLASSROOM CONDUCT

✓ No cellular phone interruptions during class (Turn off before class).
✓ No talking during instructor's lectures or when another student is speaking.
✓ Food and drinks are not allowed in the classroom at any time
✓ Note: Unless specifically allowed, students should not exchange lecture notes or help each other arrive at answers during examinations.

NYCCT POLICY ON ACADEMIC INTEGRITY

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.
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<th>Week</th>
<th>Topic</th>
<th>Activity</th>
<th>Assignments</th>
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<tr>
<td>1</td>
<td>Mammography then and now</td>
<td>Lecture and Discussion on the historical background of breast cancer and technical evolution of mammographic technique, essentials of the &quot;Imaging Chain&quot;</td>
<td>Powerpoint in blackboard, Summary paragraph or as per instruction</td>
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<tr>
<td>2</td>
<td>Alternate Methods and Techniques in Mammography</td>
<td>Lecture and Discussion, digital Mammography versus traditional film Mammography.</td>
<td>Powerpoint in blackboard, Read Linda Lee Ch 1-3</td>
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<td>2/15 No Classes</td>
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<td>3</td>
<td>Sonography Principles and Instrumentation</td>
<td>Physical principles of ultrasound, ultrasound scanners, tissue properties, artifacts. Discussion of biological safety and risks.</td>
<td>Read Tempkin Ch. 1. Powerpoint and Basic Physics documents in blackboard.</td>
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<td>4</td>
<td>Scope of Practice and Practice Standards</td>
<td>Lecture and Discussion on application and clinical utility of ultrasound as relates to abdomen, pelvis and other organs including vascular assessment. Examples of normal anatomy and select pathology as visualized on sonograms. Scope of practice and other important issues for sonographers and radiology personnel.</td>
<td>Browse through a few images from chapters 6, 9, 20 and 22: Tempkin Select articles as provided in class.</td>
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<td>5</td>
<td>Principles of DEXA</td>
<td>The principles introduction &amp; overview of DEXA used in BMD, Radiation Protection of patients and staff. Daily QA testing for DEXA operators.</td>
<td>Read Linda Lee Ch 6 Write a blog post</td>
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<td>6</td>
<td>Interventional and Cadiac Catheterization</td>
<td>Slide/Review on Interventional and Cardiac Catheterization: indications, methods, typical results for catheterization and Digital Subtraction Angiographic procedures. <strong>Blackboard group discussions</strong></td>
<td>Summarize DEXA in a paragraph and also Interventional applications in another paragraph: class materials will be available on blackboard</td>
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<td>7</td>
<td>Review of materials covered</td>
<td>Review before midterm examination based on in-class contributions from students</td>
<td>Prepare notes from class materials for use in open book/open note midterm</td>
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<td>8</td>
<td>Midterm Exam</td>
<td>OPEN BOOK, OPEN NOTE</td>
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<td>Date</td>
<td>Topic</td>
<td>Presentation/Activities</td>
<td>Reading Material</td>
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| 9/4   | Basic CT/PET Imaging                                                 | Blackboard slide presentation on Content Specification for Basic CT and PET for Dual Modality Imaging  
A. Instrumentation / Quality Control  
B. Diagnostic Procedures  
C. Recent clinical developments PET/CT  
**Blackboard Group discussions** | Read Christian Waterstram-Rich chap 9                                                  |
| 10/4  | Understand the technical aspects and issues of PET/CT for use in radiation therapy planning | Lecture and Discussion Data acquisition and processing techniques for imaging treatment, including SPECT and PET  
**In-class Group discussions** | Read Christian Waterstram-Rich chap 10  
In-class presentation of article summary |
| 11/4  | Imaging Applications in Radiation Therapy I | Blackboard slide presentation on:  
A. Imaging applications in Therapy  
B. Conformal therapy / Brachytherapy autonomy and informed consent.  
**Blackboard blog posting & group discussion** | Read Christian Waterstram-Rich chap 12                                                  |
| 4/22 to 4/30 | Spring Recess | | |
| 12/5  | Imaging Applications in Radiation Therapy II | Blackboard slide presentation on Imaging applications in Radiation Therapy  
A. Quality Management & Safety  
B. Treatment Planning  
**Blackboard blog posting & group discussion.** | Read Christian Waterstram-Rich chap 16                                                  |
| 13/5  | The Clinical Role of Fusion Imaging Using PET, CT, and MR Imaging | Lecture and Discussion on the issues of The Clinical Role of Fusion Imaging Using PET, CT, and MR Imaging.  
**In-class Group discussions** | To summarize various articles on current technology                                      |
| 14/5  | Review of materials for Final Exam | Discussions on all the modalities covered during the course: based on in-class contributions from students | Prepare notes from class materials for use in open book/open note Final Exam |
| 15/5  | Final Exam | **OPEN BOOK, OPEN NOTE** | |
Bibliography


