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Textbook: The Essential Physics of Medical Imaging , Second edition  
Authors: Bushberg JT, Seibert JA, Leidholdt EM and Boone JM:

Publisher: Lippincott, Williams and Wilkins,  
Baltimore, Philadelphia, Hong Kong …2002

Frequent class notes from the additional reading material and various other sources.

Objective: The objective of this course is to familiarize the student with imaging methods in medicine, particularly in diagnostic radiology as it is found at UMC’s Radiology Department:

- Projection Radiography  
- Computed Tomography (CT)  
- Nuclear Medicine (SPECT)  
- Emission Tomography (PET)  
- Multi-Modality-Imaging (FUSION)  
- Ultra Sound Imaging (US)  
- Magnetic Resonance Imaging (MRI)  
- Selected topics such as Color displays

- The human visual process  
- Generation of Brems-strahlung  
- Interaction of x-rays with matter  
- Projection imaging process  
- Reconstruction from projections  
- Three-dimensional imaging  
- X-ray detectors and their performance  
- Signal, noise and information  
- Elements of digital imaging

A particular highlight are demonstrations in the UMC Radiology Department and the chance for "hands-on" experience in terms of a special project.
Preferred Class time: Tuesday and Thursday, 8 to 9:15 AM  
Class-Room Physics Department Room 220.

Course Grading

- Homework (30%)
- Exams (70%)

Both Homework and Exams will be take-home types. There will be no in-class exams. The final exam is due on the day when the Final Exam for PHYS-440/540 is scheduled.

Students requiring accommodation in testing or note taking must notify instructor and must deliver a Disability Resource Center faculty letter within the first few days of the course.

Additional Reading Material:


Below is a map for UMC on Campbell Ave, and for my office at the Radiology Research Lab, Building 211, on the Ring-Road surrounding UMC.

It is basically the Map, found in the U-of-A phone directory after the blue pages.
PHYS 2 (PH 202L), advanced medical surgical nursing (NURS 211), Financial Accounting (ACT 210), Basic Health Concepts Nursing Practice (NURS 130).

Introduction to Physics (PHYS 111N), Med Surg (NS 660), General Biology II (BIO 102).

Processing of Metallic Materials (MSE 440/540), University of North Carolina State University. Working distance: 440-540 mm. Warranty: 1 year. Customers also viewed these products.

BoNew 3.5X Surgical Binocular Loupes Optical Glass+5W LED Headlight with Filter Clip-on Type + Aluminum Box (Black).

4.0 out of 5 stars 63.


PHYS 440 is a 3-credit lecture course on electricity and magnetism, designed for science majors at the junior or senior level. Prerequisites: PHYS 350, MATH 327, and MATH 331; or equivalents. Corequisites: none. Required Texts.


Chapter 3: Optics: Basic Physics. Chapter 4: Light Sources, Detectors, and Irradiation Guidelines. Chapter 5: Tissue Optical Properties. The breast tissue optical properties have been measured with integrating sphere technique in the visible and NIR spectral ranges (Peters et al. 1990) and summarized in Table 5.5.
