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COLLEGE OF GRADUATE STUDIES

University of Toledo

Existing Graduate Course Modification Form

Contact Person: E. Ishmael Parsai

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Present

College: Medicine

Dept/Academic Unit: Radiation Oncology

Course Alpha/Numeric: MPHY 6020

Course title: Radiation Physics II

Credit hours: Fixed 3 or Variable: ____ to ____

Cross Listings:

MPHY-8020

Prerequisites(s) (if more than 50 characters, please place it in Catalog Description)

None

Co-requisites(s) (if more than 50 characters, please place it in Catalog Description)

None

Catalog Description (*only if changed*) 75 words max:

This course is a continuation of Radiation Physics I and includes the radioactive decay principles, basics of nuclear medicine imaging including SPECT and PET, basic concepts of NMR and MR imaging, and the principles of ultrasound including Doppler ultrasound.

Proposed

College:

Dept/Academic Unit:

Course Alpha/Numeric:

Course title: Survey of Diagnostic Medical Imaging II

Credit hours: Fixed 3 or Variable: ____ to ____

Cross Listings:

Prerequisites(s) (if more than 50 characters, please place it in Catalog Description)

Co-requisites(s) (if more than 50 characters, please place it in Catalog Description)

Catalog Description (*only if changed*) 75 words max:

This course builds on the material taught in MPHY6010/8010, and discusses advanced concepts in medical imaging including functional MRI, SPECT, and PET imaging. Details of radioactivity & nuclear transformation, radionuclide production & radiopharmaceuticals, radiation detection and measurement and scintillation camera will be covered. advanced discussions on CT and US will also be presented.

Date Added: 4-28-14

Graduate Council Approved: 4-29-14

To Provost: 5-8-14

Has course content changed? Yes

If yes, give a brief topical outline of the revised course below (less than 1500 words)

This course was second course following the Radiation Physics I where it was not clear that it is a diagnostic survey course. Moreover we are restructuring our course curriculum to be more in line with CAMPEP and ABR requirements for national accreditation and to better prepare our students for board certification. The new course has specific title and content to reflect the course curriculum.

Proposed Effective Term: 2014 / 40 (Fall)

List any course(s) to be deleted: Date

Date

Attach new syllabus reflecting course modifications.
Attach additional documents if necessary.

Course Approval

Department Curriculum Authority		Date 4-1-2014
Department Chairperson		Date 4/1/2014
College Curriculum Authority or Chair	Kandace Williams Kandace Williams	Date 4-2-2014
College Dean		Date 4-3-14
Graduate Council		Date 4-29-2014
Dean of Graduate Studies		Date 4-29-2014
Office of the Provost		Date

For Administrative Use Only

Effective Date

CIP Code

Subsidy Taxonomy

Program Code

Instruction Level

Course Outline for Survey of Diagnostic Medical Imaging II:
MPHY6020/8020
Text book: Bushberg 2nd Edition

18. RADIOACTIVITY AND NUCLEAR TRANSFORMATION
    - 18.1. Radionuclide Decay Terms and Relationships
    - 18.2. Nuclear Transformation

19. RADIONUCLIDE PRODUCTION & RADIOPHARMACEUTICALS
    - 19.1. Radionuclide Production
    - 19.2. Radiopharmaceuticals
    - 19.3. Regulatory Issues

20. RADIATION DETECTION AND MEASUREMENT
    - 20.1. Types of Detectors
    - 20.2. Gas-Filled Detectors
    - 20.3. Scintillation Detectors
    - 20.4. Semiconductor Detectors
    - 20.5. Pulse Height Spectroscopy
    - 20.6. Nonimaging Detector Applications
    - 20.7. Counting Statistics

21. NUCLEAR IMAGING-THE SCINTILLATION CAMERA
    - 21.1. Planar Nuclear Imaging: The Anger Scintillation Camera
    - 21.2. Computers in Nuclear Imaging

    22. NUCLEAR IMAGING-EMISSION TOMOGRAPHY
    - 22.1. Single Photon Emission Computed Tomography (SPECT)
    - 22.2. Positron Emission Tomography (PET)

14. NUCLEAR MAGNETIC RESONANCE
    - 14.1. Magnetization Properties
    - 14.2. Generation and Detection of the MR Signal
    - 14.3. Pulse Sequences
    - 14.4. Spin-Echo
    - 14.5. Inversion Recovery
    - 14.6. Gradient Recalled Echo
    - 14.7. Signal from Flow
    - 14.8. Perfusion and Diffusion Contrast
    - 14.9. Magnetization Transfer Contrast

15. MAGNETIC RESONANCE IMAGING (MRI)
    - 15.1. Localization of the MR Signal
    - 15.2. k-space Data Acquisition and Image Reconstruction
    - 15.3. Three-Dimensioinal Fourier Transform Image Acquisition
    - 15.4. Image Characteristics
    - 15.5. Angiography and Magnetization Transfer Contrast
    - 15.6. Artifacts
    - 15.7. Instrumentation
    - 15.8. Safety and Bioeffects

16. ULTRASOUND
    - 16.1. Characteristics of Sound
    - 16.2. Interactions of Ultrasound with Matter
    - 16.3. Transducers
    - 16.4. Beam Properties
    - 16.5. Image Data Acquisition
    - 16.6. Image Quality and Artifacts
    - 16.7. Doppler Ultrasound
    - 16.8. System Performance and Quality Assurance
    - 16.9. Acoustic Power and Bioeffects