

Request for Undergraduate Course Addition

Prepare one paper copy with all signatures and forward to the University Curriculum Committee Chair. Additionally, immediately following attainment of the College Curriculum Chair signature, send one identical ELECTRONIC COPY sans signatures in PDF format with all supporting documentation converted to PDF format by email to the University Curriculum Committee chair for electronic distribution.

College: COHP Department/Division: Medical Imaging Alpha Designator / Number : MI 302 Graded: CR/NC:

Contact Person: Dr. Shelia Kyle, Vice President Phone: 304-526-1412
St. Mary's Center for Education

Dr. Rita Fisher 304-526-1259
Director – School of Medical Imaging

NEW COURSE DATA:

New Course Title: Principles of Radiation Physics

Alpha Designation/Number:

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Title Abbreviation:

P	R	I	N	C	I	P	L	E	S		O	F		R	A	D		P	H	Y	S	I	C
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(Limit of 25 characters and spaces.)

Course Description (Limit of 30 words): Introduces student to the nature and characteristic of radiation production and the fundamentals of photon interactions with matter. Course covers principles associated with radiography, nuclear medicine and radiation oncology.

Co-requisite(s): MI 302, MI 303, MI 304, MI 305, MI 306 First Term to be offered: Fall 2009

Prerequisite(s): CHM 203, PHY 101, PHY 101L, MTH 121 or higher, MI 209; Admission to the Medical Img Program Credit Hours: 3

Course(s) being deleted in place of this addition (*must submit course deletion form*): None

CHECKLIST/REQUIREMENTS:

1. After completing this two page form in its entirety, include a complete syllabus and route through the departments/committees below.
2. A complete syllabus can be from when this course was previously taught as a special topics course or by creating a new, intended syllabus to use with the course. The sample syllabus must at a minimum address the following areas:
 - a. COURSE OBJECTIVES
 - b. COURSE OUTLINE
 - c. SAMPLE TEXT(S) WITH AUTHOR(S) AND PUBLICATION DATE
 - d. INSTRUCTIONAL METHODS (Lecture, Lab, Internship, Practicum, etc...)
 - e. EVALUATION METHODS (Unit/Chapter, Midterm, Final, Projects, etc...)
3. If this course will replace a course that is required by another department, please send a memo to the affected department and include it with this packet, as well as, the response received from the affected department.
4. If this course will be similar in title or content to another department's courses, please send a memo to the affected department and include it with this packet, as well as, the response received from the affected department.
5. Send a copy of this completed form to the Marshall University Catalog Editor.

SIGNATURES: (If disapproved at any level, do not sign. Return to previous signer.)

Department Chair/Division Head _____	Date: _____
Registrar: _____	Date: _____
Librarian: _____	Date: _____
College Dean: _____	Date: _____
College Curriculum Chair _____	Date: _____
University Curriculum Committee Chair: _____	Date: _____
Faculty Senate Chair: _____	Date: _____
VP Academic Affairs/VP Health Services: _____	Date: _____

Request for Undergraduate Course Addition - Page 2
Additional Information Required for Undergraduate Course Addition

College: COHP

Department/Division: Medical Imaging

Alpha Designator/Number: MI 302

Provide complete information regarding the new course addition for each topic listed below. Before routing this form, a complete syllabus also must be attached addressing the items listed on the first page of this form.

1. Identify by name the faculty in your department/division who may teach this course.

Rita Fisher, PhD RT (R)(CT)(CV)(ARRT)

2. If your department/division requires additional faculty, equipment, or specialized materials, attach an estimation of money and time required to secure these items.

No additional funding required

3. If this course will be required by a department/division other than your own, identify by name.

N/A

4. If there are any agreements required to provide clinical experience, attach details and signed agreements.

No additional agreements will be needed for this class

5. If library resources are deemed inadequate, attach a plan to overcome this. The plan must include the cost as stated by the Dean of Libraries.

No additional Library Resources to be provided by Marshall University

6. EQUIPMENT/SUPPLIES NEEDED TO TEACH THIS COURSE (this does not refer to additional equipment/supplies that need to be purchased; simply what materials are needed in order to teach this course successfully.):

Computer, LCD Projector, Projector Screen, White Board, Markers, Handouts, CD Rom's

No additional equipment or supplies will need to be provided by Marshall University

7. ADDITIONAL GRADUATE REQUIREMENTS IF LISTED AS AN UNDERGRADUATE OR GRADUATE COURSE (please also submit to Graduate Council course addition for 5xx graduate component):

None

8. PROVIDE A COMPLETE BIBLIOGRAPHY INCLUDING ALL PUBLICATIONS RESEARCHED TO CREATE THIS COURSE AND WHAT PUBLICATIONS MAY BE BENEFICIAL TO STUDENTS TAKING THIS COURSE (separate page).

See attached sheet

BIBLIOGRAPHY:

Bushberg JT, et al. *The Essential Physics of Medical Imaging*. 2nd ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2002. ISBN 0683301187

Bushong S. *Radiologic Science for Technologists: Physics, Biology, and Protection*. 8th ed. St. Louis, Mo: Mosby; 2001. ISBN 0323013376

Bushong S. *Radiologic Science for Technologists - Workbook and Laboratory Manual*. 8th ed. St. Louis, Mo: Mosby; 2004. ISBN 0323025552

Dowsett DJ, Kenny PA, Johnston RE. *The Physics of Diagnostic Imaging*. New York: Chapman & Hall Medical; 1998. ISBN 0412401703

Frey GD, Sprawls P, eds. *The Expanding Role of Medical Physics in Diagnostic Imaging*. College Park, Md: AAPM Medical Physics Publishing; 1997. ISBN 1888340096

Graham D, Cloke P, Vosper M. *Principles of Radiological Physics*. 5th ed. New York: Churchill Livingstone; 2006. ISBN: 0443101043

Hendee WR, Ritenour ER. *Medical Imaging Physics*. 4th ed. Hoboken, NJ: Wiley-Liss; 2002. ISBN 0471382264

Huda W, Slone RM. *Review of Radiologic Physics*. Philadelphia, Pa: Lippincott Williams & Wilkins; 1995. ISBN 0683042300

Martin JE. *Physics for Radiation Protection*. New York, NY: Wiley InterScience; 2000. ISBN 0471353736

Wolbarst AB. *Physics of Radiology*. 2nd ed. Madison, Wis: Medical Physics Pub; 2005. ISBN 1930524226

COURSE SYLLABUS OUTLINE

Course Title and Number: MI 302 Principles of Radiation Physics

Semester and Year: Fall 2009

*Course with Special Designation: none

Text Information: Carlton and Adler. *Principles of Radiographic Imaging*, 4th ed. Thomson Learning

Computer Requirements: access to the internet

<http://www.sprawls.org/ppmi2/>

Instructor: Name: Dr. Rita Fisher
Office: Room 212
Office Hours: As arranged
Phone/email: 526-1259, rfisher@st-marys.org

Course Description: Content is designed to establish a basic knowledge of the characteristics of radiation, x-ray production and the fundamentals of photon interactions with matter. The student will be introduced to the concepts of radioactivity including half-life and radioactive decay. This course will provide basic knowledge of principles associated with diagnostic radiography, nuclear medicine imaging and radiation oncology.

Credits: 3

Prerequisites: CHM 203, PHY 101, PHY 101L, MTH 121, MI 209

Co-requisites:

Desired Learner Outcomes/Objectives: When finished with this course you should be able to:

1. Discuss atomic structure and nomenclature.
2. Describe basic physical principles.
3. Describe the electromagnetic spectrum including wavelength and frequency and how they are related to velocity
4. Explain the Wave-particle duality phenomena.
5. Describe charged and uncharged forms of particulate radiation.
6. Describe radioactivity and radioactive decay in terms of alpha, beta and gamma emission.
7. State the principles of x-ray production.
8. Compare the production of bremsstrahlung and characteristic radiations.
9. Describe the conditions necessary to produce x-radiation.
10. Describe the x-ray emission spectra.
11. Identify the factors affecting the x-ray emission spectra.
12. Discuss various photon interactions with matter in terms of description of the interaction, relation to atomic number, photon energy and part density, and their applications in diagnostic radiology.
13. Discuss relationships of wavelength and frequency to beam characteristics.
14. Discuss the clinical significance of the photoelectric and modified scattering interactions in diagnostic imaging.

Evaluation/Measurement/Assessment of Learner Outcomes:

1. 6 Exams: Exams will be administered to cover the content material found in the text, delivered in lecture and any additional materials. Exams will be multiple choice, true/false and short answer.
2. Class participation
3. Comprehensive final exam. Students who have achieved an A (93.1%) on the exams only may be exempt from the final exam. Written assignment grades **will not** be considered in exemption from the final exam.

Your demonstrated daily preparation, participation, and punctuality can raise or lower your final grade.

Grading Policy:

Exams: 100 points each	75% of grade
Final Exam	25% of grade

Grades will be determined by the following scale:

92.3-100	A
84.3-92.2	B
74.3-84.2	C
Below 74.3	F

Policy Statements:

1. **Attendance:** Regular attendance is expected. Students who miss more than two classes will receive a one letter drop in the final grade. You cannot pass the course with more than four absences. You must be present at the beginning of the class and stay until the end of class in order to be counted present. *The School of Medical Imaging follows Marshall University inclement weather policy. Refer to the Student Handbook.*
2. **Preparation, participation, punctuality.** All preparation material should be completed prior to its scheduled discussion in class. All class sessions will be conducted with the assumption that all appropriate readings and/or assignments have been completed. Doing the preparation work prior to class will allow you to identify specific topics with which you need the most help, and you can then raise the pertinent questions when the topic is scheduled for class time. Not all assigned information will be reviewed in class. Additionally, information that may not have been assigned may be reviewed in class. If you have a question about a particular subject, you have the responsibility of using class time to get your questions answered. This necessitates having attempted the work prior to class. Class time should be used to clarify issues; it is difficult to know what issues you need to have clarified if you have not prepared.
3. **Academic integrity:** Please refer to the Student Handbook. Students may not copy or utilize prior exams as study material unless provided by the instructor for review. Students who obtain copies of old exams from current or former students will be sanctioned.
4. **Make-up assignments: Late assignments will not be accepted.** Students who miss scheduled exams may make them up only in the event of a medical emergency or by prior arrangement with the instructor.
5. **Missed classes:** If you are absent, it is your responsibility to find out from a classmate what notes, handouts, assignments, or other course material you missed and to make arrangements with me to receive handouts.
6. **Office hours:** Instructors are available to meet individually by appointment.
7. **Learning Disabled Students:** consideration toward learning disabled students will be in accordance to SMI Student Handbook policies. Please make certain the instructor is made aware of any special needs.
8. **Computing policy at SMMC:**
 - a. Authorized users of SMMC or other clinical affiliates institutional networks are those individuals who have been granted a username and password. Unauthorized use of usernames or passwords is prohibited
 - b. Use of computer systems in the clinical setting is limited to authorized patient data entry. Unauthorized access or attempts to access privileged patient information is a HIPAA violation and may result in dismissal from the SMI.
 - c. Students are provided access to the Internet through computers located in the School of Nursing Library, the computer lab and the SMI office. **Internet access is limited to assigned research projects.** Students may not access personal e-mail accounts (such as Hotmail or Yahoo) from these computers. Non school related use of the internet is prohibited. Students may access the internet via computers located in the Mojo/vending area in the hospital.
 - d. Internet access at SMMC is monitored by Information Services. Any attempts to download material of an obscene nature may result in dismissal from the SMI.
 - e. Students have access to computers located in the computer lab next to the SMI classroom. Students may not store information of the hard drive of these computers.
 - f. Users must adhere to the ethical standards governing copyright, software licensing, and intellectual property.
 - g. Suspected violation of these guidelines constitutes unacceptable use of information resources, and may violate other institutional policies and/or state and federal law including HIPPA. Suspected or known violations should be reported to the appropriate supervisory authority. The SMI and/or law enforcement agencies will process violations.
 - h. Violations may result in revocation of computing resource privileges, academic dishonest proceedings, disciplinary action or legal action.
 - i. Violations are subject to the appeal or grievance process.
 - j. Students should refer to MCTC computer policy in the MU Student handbook

Proposed Course Schedule.

Dates and content are subject to change as the semester progresses. Changes will be announced in class as far in advance as possible.

Week	Topic	Reading Assignment/Exam
	Introduction	
	Physics Fundamentals	
	Exam One	
	Energy and Radiation	http://www.sprawls.org/ppmi2/ERAD/
	Structure of matter	http://www.sprawls.org/ppmi2/MATTER/
	Exam Two	
	Radioactive decay	
	Interactions of Radiation	http://www.sprawls.org/ppmi2/INTERACT/
	Exam Three	
	Production of X-rays	
	X-ray spectra	
	Exam Four	
	Radiation quantity and quality	
	Interaction of x and gamma rays in the body	
	Exam Five	
	Review	
	Final Exam	