New Course Request

1. School/Division: College of Health and Human Services
2. Academic Subject Code: 
3. Course Number: RADX-R270 (must be cleared with University Enrollment Services)
4. Instructor: Duncan
5. Course Title: Radiologic Physics
   Recommended Abbreviation (Optional): 
   (Limited to 32 Characters including spaces)
6. First time this course is to be offered (Semester/Year): Fall 2011
7. Credit Hours: Fixed at _3_ or Variable from ______ to _______
8. Is this course to be graded S-F (only)? Yes [ ] No [X]
9. Is variable title approval being requested? Yes [ ] No [X]
10. Course description (not to exceed 50 words for Bulletin publication): Radiologic Physics includes the fundamental principles of radiation physics, x-ray generating equipment and equipment quality control
   __________________________________________________________________________
   __________________________________________________________________________
11. Lecture Contact Hours: Fixed at _3_ or Variable from ______ to _______
12. Non-Lecture Contact Hours: Fixed at _______ or Variable from ______ to _______
13. Estimated enrollment: 20, of which ______ percent are expected to be graduate students.
14. Frequency of scheduling: ___once a year____ Will this course be required for majors? ___yes____
15. Justification for new course: critical to the program, integral portion of national curriculum.
16. Are the necessary reading materials currently available in the appropriate library? ___yes____
17. Please append a complete outline of the proposed course, and indicate instructor (if known), textbooks, and other materials.
18. If this course overlaps with existing courses, please explain with which courses it overlaps and whether this overlap is necessary, desirable, or unimportant
19. A copy of every new course proposal must be submitted to departments, schools, or divisions in which there may be overlap of the new course with existing courses or areas of strong concern, with instructions that they send comments directly to the originating Curriculum Committee. Please append a list of departments, schools, or divisions thus consulted.

Submitted by: 
Date: 2/11/11
Department Chairman/Division Director

Approved by: 
Date: 
Dean
Date: 
Chancellor/Vice-President
Date: 
University Enrollment Services

After School/Division approval, forward the last copy (without attachments) to University Enrollment Services for initial processing, and the remaining four copies and attachments to the Campus Chancellor or Vice-President.
COURSE DESCRIPTION:
Radiologic Physics includes the fundamental principles of radiation physics, x-ray generating equipment, and equipment quality control.

INSTRUCTOR:
Cheryl Duncan, M.S., R.T.(R)(QM)
duncanc@ipfw.edu
Office Phone: IPFW 481-6146

Campus Office: Neff B50C
Office Hours: By appointment

CLASS DAY AND TIME:

LEARNING OBJECTIVES:

Upon completion of this course, with 80% minimum standards, the student will be able to:

1. State the laws of electrostatics and magnetism.
2. Discuss the structure of a Bohr atom.
3. Describe the terms related to the physical concept of energy.
4. Explain the principles involved in electromagnetic mutual induction and self-induction.
5. Explain the operation of an electric capacitor, generator, and motor.
6. Given the appropriate data, solve mathematical problems relating to:
   a. effective current and voltage
   b. maximum current and voltage
   c. transformer law
   d. Ohm's Law
   e. power and power loss
   f. metric conversions
   g. greatest density

7. Describe the basic design of an x-ray circuit giving functions and electrical operation of each component.
8. Identify the basic components and functions of an x-ray tube.
9. Explain how x-rays are produced and interact with matter.
10. Describe the basic design of an image intensification system giving functions and operation of each component.
11. Select and perform the appropriate QC test in a given situation and evaluate the QC test results.
12. Evaluate the performance of different radiographic systems, determine the safe limits of the equipment operation, and determine when to report malfunctions to the proper authority.
13. Discuss QA methods and state the role of QA in radiology and throughout the hospital.
REQUIRED TEXT:

RECOMMENDED TEXT:

COURSE FORMAT:
The information for this course is presented using a variety of teaching strategies including:
1. Lectures
2. Group Discussions
3. Individual and Group Activities
4. E-Learning/Blackboard
5. Labs

Objectives for each unit and outlines of each chapter are available on Blackboard. Students tend to be most successful in this course when they have reviewed the outline and read the chapter prior to class discussion of the material.

METHOD OF EVALUATION:

1. Grading Scale:
   - A+ 99-100
   - B+ 92-93
   - C+ 85-86
   - A 95-98
   - B 88-91
   - C 81-84
   - A- 94
   - B- 87
   - C- 80

2. The grade for Radiologic Physics will be calculated as follows:
   - 50% based on Unit Opportunities
   - 25% based on Comprehensive Final Opportunity
   - 15% based on Unit Assignments
   - 10% based on Class Project

RADIOLOGIC PHYSICS
TENTATIVE SCHEDULE

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Chapter Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>Mathematics / Energy &amp; Matter</td>
<td>SELMAN 1-4 C&amp;A 1&amp;2</td>
</tr>
<tr>
<td>Class 2</td>
<td>Electrostatics</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Electrodynamics / Ohm’s Law</td>
<td>6</td>
</tr>
<tr>
<td>Class 3</td>
<td>Ohm’s Law</td>
<td></td>
</tr>
<tr>
<td>Class 4</td>
<td>OPPORTUNITY #1 Magnetism</td>
<td>SELMAN 7 C&amp;A p58-62</td>
</tr>
<tr>
<td>Class</td>
<td>Topic</td>
<td>Notes</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>5</td>
<td>Electromagnetism / Generators</td>
<td>8 &amp; 9 p62-71</td>
</tr>
<tr>
<td>6</td>
<td>Generators / Motors</td>
<td>p71-74</td>
</tr>
<tr>
<td>7</td>
<td>OPPORTUNITY #2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transformers / Rheostats</td>
<td>SELMAN C&amp;A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 p74-78</td>
</tr>
<tr>
<td>8</td>
<td>Rectification / Primary Circuit</td>
<td>11 &amp; 14 p79-85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&amp; Ch 5</td>
</tr>
<tr>
<td></td>
<td>NO CLASS ~ SPRING BREAK</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>AED / Secondary Circuit</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>OPPORTUNITY #3</td>
<td>BUSHONG</td>
</tr>
<tr>
<td></td>
<td>Digital Radiography</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SELMAN C&amp;A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 40</td>
</tr>
<tr>
<td>11</td>
<td>Image Intensification</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>OPPORTUNITY #4</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>QA PRESENTATIONS</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Quality Assurance</td>
<td>BUSHONG C&amp;A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>31 &amp; 32 33</td>
</tr>
<tr>
<td>15</td>
<td>Optional Final Review</td>
<td></td>
</tr>
<tr>
<td>Finals Week</td>
<td>Comprehensive Final Exam</td>
<td></td>
</tr>
</tbody>
</table>