CASPER COLLEGE COURSE SYLLABUS
RDTK 1925
Computed Tomography Physics and Instrumentation I

Semester/Year: Fall 2012

Lecture Hours: 3  Lab Hours: 0  Credit Hours: 3

Class Time: Class Meets on the following Saturdays 8/25,9/22,10/20,11/17,12/8
Days: Saturday listed under class times
Room: TBA

Instructor’s Name: Verona Rausch

Instructor's Contact Information: Office Phone: 234-6963  Email:
Home Phone:

Office Hours: Contact instructor for appointment

Course Description: Content is designed to impart an understanding of the physical principles and instrumentation involved in computed tomography. Physics topics covered include the characteristics of x-radiation, CT beam attenuation, linear attenuation coefficients, tissue characteristics and Hounsfield numbers application. Data acquisition and manipulation techniques, image reconstruction algorithms such as filtered back-projection will be explained. Radiation protection and ethical issues associated with CT will be discussed.

Statement of Prerequisites: RDTK 1610, RDTK 1640

Outcomes:
1. List the characteristics of x-radiation.
2. Explain the interaction of x-rays with matter.
3. Explain the configuration of the CT tube and its components.
4. Define the heat load capacity of the radiographic tube and explain what it means in both conventional and spiral CT scanning.
5. Be knowledgeable of the technical factors used in CT, ie; kVp, mA
6. Understand the warm up procedure
7. Gain a basic knowledge of the data acquisition systems
8. Understand image processing to include reconstruction and post processing.

Methodology: Lecture, exploration, research

Evaluation Criteria: Test, quiz, assignments
Grade Scale: Grade percentage scale: A = 92-100
B = 83- 91
C = 75- 82
F = 0- 74

Total course points= 825
Assignments:
1. Basic X-ray Review 50 pts.

Chapter Quizzes: Chapters 3-8 at 50 points each= 300 pts.
Module Quizzes: 3 module quizzes 50 points each= 150 pts.
Final Exam= 200 points

Required Text, Readings, and Materials:

Class Policies: Last Date to Change to Audit Status or to Withdraw with a W Grade: (college deadline or yours, if different) (Your attendance policy, exam, homework, assignment make-up policy, anything particular to your class)

Student Rights and Responsibilities: Please refer to the Casper College Student Conduct and Judicial Code for information concerning your rights and responsibilities as a Casper College Student.

Chain of Command: If you have any problems with this class, you should first contact the instructor to attempt to solve the problem. If you are not satisfied with the solution offered by the instructor, you should then take the matter through the appropriate chain of command starting with the Department Head/Program Director, the Dean, and lastly the Vice President for Academic Affairs.

Academic Dishonesty - Cheating & Plagiarism: Casper College demands intellectual honesty. Proven plagiarism or any form of dishonesty associated with the academic process can result in the offender failing the course in which the offense was committed or expulsion from school. See the Casper College Student Code of Conduct.

Official Means of Communication: Casper College faculty and staff will employ the student's assigned Casper College email account as a primary method of communication. Students are responsible to check their account regularly.

ADA Accommodations Policy: If you need academic accommodations because of a disability, please inform me as soon as possible. See me privately after class, or during my office hours. To request academic accommodations, students must first consult with the college’s Disability Services Counselor located in the Gateway Building, Room 344, (307) 268-2557, bheuer@caspercollege.edu. The Disability Services Counselor is responsible for reviewing documentation provided by students requesting accommodations, determining eligibility for accommodations, and helping students request and use appropriate accommodations.
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<tr>
<th>Date</th>
<th>Content</th>
<th>Required Reading</th>
<th>Assignment</th>
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<tbody>
<tr>
<td>Aug. 27-31</td>
<td>Digital Image Processing</td>
<td><strong>Required Reading:</strong> 1. Computed Tomography; Physical Principles, Clinical Applications, and Quality Control, Ch. 3 <strong>Reference Suggestion:</strong> 2. Computed Tomography For Technologists</td>
<td>1. Read Ch. 3 CT Physical Principles, Seeram. 2. Take quiz covering this material. <strong>50 points</strong></td>
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<td>Sept. 3-14</td>
<td>CT Module: Equipment and Instrumentation</td>
<td><strong>Equipment and Instrumentation</strong> Overview: Suggested that the student take detailed notes to be used while taking quiz covering this section.</td>
<td>1. Read Ch. 4 CT Physical Principles, Seeram. 2. Take quiz covering this material. <strong>50 Points</strong></td>
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<td>Sept. 17-22</td>
<td>Physical Principles of Computed Tomography</td>
<td><strong>Required Reading:</strong> 1. Computed Tomography; Physical Principles, Clinical Applications, and Quality Control, Ch. 5 <strong>Reference Suggestion:</strong> 2. Computed Tomography For Technologists</td>
<td>1. Read Ch. 5 CT Physical Principles, Seeram &amp; Ch. 2 CT for Technologists, Romans. 2. Answer questions 1-11 Chapter 2 in Text CT for Technologists, Romans. <strong>55 points</strong> 3. Take quiz covering material from both text. <strong>50 points</strong></td>
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<td>Sept. 24-28</td>
<td>Data Acquisition Concepts</td>
<td><strong>Required Reading:</strong> 1. Computed Tomography; Physical Principles, Clinical Applications, and Quality Control, Ch. 2</td>
<td>1. Watch module: Data Acquisition. 2. Take quiz covering this material. <strong>50 points</strong></td>
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<td>Oct. 1-12</td>
<td>CT Module: Data Acquisition</td>
<td><strong>Data Acquisition Module-Overview:</strong> Suggested that the student take detailed notes to be used while taking quiz covering this section.</td>
<td>1. Read Ch. 6 CT Physical Principles, Seeram &amp; Ch. 3 CT</td>
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<td>Date</td>
<td>Assignment</td>
<td>Required Reading</td>
<td>Final Exam</td>
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<td>Oct. 21</td>
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<td>Due: Oct. 21 Clinical Applications, and Quality Control, Ch. 6 2.Computed Tomography For Technologists, Ch. 3</td>
<td>for Technologists, Romans. 2. Answer questions 1-7 Chapter 3 in Text CT for Technologists, Romans. 35 points 3. Take quiz covering material from both text. 50 points</td>
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<td>Oct. 22- Nov. 2</td>
<td>CT Module: Image Processing and Reconstruction</td>
<td>Image Processing and Reconstruction Overview: Suggested that the student take detailed notes to be used while taking quiz covering this section.</td>
<td>1. Watch module: Image Processing and Reconstruction 2. Take quiz covering this material. 50 points</td>
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<td>Nov. 5-16</td>
<td>Basic Instrumentation</td>
<td>Required Reading: 1. Computed Tomography; Physical Principles, Clinical Applications, and Quality Control, Ch. 7 Reference Suggestion: 2. Computed Tomography For Technologists</td>
<td>1. Read Ch. 7 CT Physical Principles, Seeram 2. Take quiz covering material from this chapter. 50 points</td>
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<td>Nov. 19-30</td>
<td>Image Post Processing and Visualization Tools</td>
<td>Required Reading: 1. Computed Tomography; Physical Principles, Clinical Applications, and Quality Control, Ch. 8 2. Computed Tomography For Technologists, Ch. 8</td>
<td>1. Read Ch. 8 CT Physical Principles, Seeram &amp; Ch. 8 CT for Technologists, Romans. 2. Answer questions 1-7 Chapter 8 in Text CT for Technologists, Romans. 35 points 3. Take quiz covering material from both text. 50 points</td>
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<td>Final Exam</td>
<td>Comprehensive: Review all course material</td>
<td>Final Exam 200 points</td>
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<td>Dec. 3-7</td>
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<td>Final Exam 200 points</td>
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<td>Exam must be taken by Dec. 7</td>
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<td>Final Exam 200 points</td>
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