Semester/Year:  **Spring 2016**

Lecture Hours:  3  
Lab Hours:  
Credit Hours:  3

Class Time:  On-line/Saturdays  
Days:  Saturday:  
2/13, 3/5 & 4/23

Instructor’s Name:  Rick Johnson

Instructor's Contact Information:  
Office Phone:  268-2718  
Home Phone:  258-7046  
Email:  rjohnson@caspercollege.edu

**Course Description:** This course covers the anatomy and common pathology associated with computed tomography. The anatomical structures will be demonstrated in the axial, sagittal and coronal imaging planes. Scanning protocols, contrast administration, and contraindications for computed tomography of common pediatric procedures will be covered in depth to include exam protocol, radiation protection and dose considerations, special patient care issues and contrast media and injections. Pediatric exams will cover CT of the head, neck, spine, abdomen, chest, musculoskeletal systems and CT angiography. Special applications in CT will also be presented. Specialized CT procedures will include breast imaging, interventional CT studies, CT fluoroscopy, PET and CT fusion, cardiac scanning, CT angiography, CT guided biopsies, Virtual Colonoscopy, brain and transplant studies. Radiation Therapy simulation studies will also be discussed. Content provides detailed coverage of procedures for CT imaging. Procedures include, but are not limited to, indications for the procedure, patient education, preparation, orientation and positioning, patient history and assessment, contrast media usage, scout image, selectable scan parameters, filming and archiving of the images. CT procedures will be taught for differentiation of specific structures, patient symptomology and pathology. CT images studied will be reviewed for quality, anatomy and pathology. CT procedures vary from facility to facility and normally are dependent on the preferences of the radiologists.

Statement of Prerequisites:  HLTK 2200 Cross sectional Anatomy, RDTK 1920 CT Procedures I

**Goal:** Students will gain a working knowledge of anatomy, pathology, scanning protocols, and contrast administration for computed tomography exams of common pediatric exams and special applications in CT. An emphasis on the importance of patient care, education and communication will be discussed. Students will utilize this basis for exams in the clinical setting while maintaining ALARA principles in radiation protection.
Outcomes:

Exam Protocol in relation to the: Pediatric exams and special applications in CT.

1. List the CT scanner and scan room preparation steps necessary for CT procedures.
2. Name the indicated CT procedure for specific anatomical structures, patient symptoms or pathology.
3. Educate the patient on the general aspects of CT and the specifics of the CT procedure.
4. Name the patient preparation required for each procedure.
5. Determine if contrast media is indicated for a specific procedure and if indicated, name the type and specify the dosage and route of administration.
6. Determine from patient medical laboratory results, patient history and charted information if the use of contrast media is contraindicated and explain why.
7. Describe the conditions that require a patient to grant informed consent in writing for a CT procedure.
8. List the range, azimuth, anatomical landmarks, patient orientation and position and technical factors used to produce scout and scan images for a given procedure.
9. Provide correct information concerning the scan field of view (SFOV), display field of view (DFOV), mode, algorithm, gantry angle, technical factors, range, table incrementation and slice thickness (z-axis) selection for each procedure.
10. List accurate window width (WW) and window level (WL) selections for each procedure protocol.
11. Explain why different window width and levels are selected.
12. List the required imaging planes for each procedure.
13. Determine the correct matrix size selection for each procedure studied.
14. List the information that should be noted on each scout and scan image.
15. Name the routine filming format for each procedure studied.
16. Perform any non-routine procedure tasks associated with CT procedures.
17. Adapt routine scanning parameters for CT procedures of the neck to spiral mode and explain the differences.
18. Differentiate between scanning parameters for conventional vs. spiral procedures.
19. Explain current trends in CT image archiving.
20. List postprocedure patient instructions for each procedure.
21. Describe proper procedures for patient screening.

Anatomy in relation to Common pediatric exams and special applications in CT Imaging.

1. Name the anatomical structures located within the listed systems.
2. Describe the relationship of each anatomical structure to surrounding structures.
3. Describe the function of each anatomical structure.
4. Locate each anatomical structure on CT images in the transverse axial, coronal, sagittal and orthogonal (oblique) cross-sectional imaging planes.
5. Locate each anatomical structure on CT images in the transverse axial, coronal, sagittal and oblique imaging planes.

Pathology for Common pediatric exams and special applications in CT

1. Define common terms used in the study of pathology.
2. Name the common pathological conditions affecting any of the body systems studied in this course.
3. For each common pathological condition identified in the course:
   - Describe the disorder.
   - List the etiology.
   - Name the associated symptoms.
   - Name the common means of diagnosis.
   - List characteristic CT manifestations of the pathology.
4. Identify each of the pathological conditions studied on CT images.
5. Identify pathology resulting from trauma on CT images.
6. Identify pathology common only in pediatric patients.

Methodology: Lecture, discussion, hands on activities and case study reviews.

Evaluation Criteria: Exams, quizzes, case study

Grade Scale: Grade percentage scale:
A = 92-100
B = 83-91
C = 75-82
F = 0-74

Required Text, Readings, and Materials:
1. CT and MRI Pathology; A Pocket Atlas, Michael Grey
2. Computed Tomography; Physical Principles, Clinical Applications, and Quality Control, Euclid Seeram, Saunders, 3rd Ed
4. Mosby CT Registry Review

Attendance: It is very important that you attend these classes. If you miss a class day, your final grade will be deducted by 3% for each day missed. We will have 3 classes this semester on Saturdays and it is vital that you attend, circumstances can arise and will be handled on an individual basis.

Class Policies: Last Date to Change to Audit Status or to Withdraw with a W Grade April 14th, 2016:

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 Interim 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.
ADA Accommodations Policy: It is the policy of Casper College to provide appropriate accommodations to any student with a documented disability. If you have a need for accommodation in this course, please make an appointment to see me at your earliest convenience.

Course Content:

<table>
<thead>
<tr>
<th>Date</th>
<th>Content</th>
<th>Required Reading</th>
<th>Assignment</th>
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</thead>
<tbody>
<tr>
<td>Jan. 19-26</td>
<td>CT Pathology Part 1 Module/Quiz</td>
<td>View module and take quiz covering material presented. Be sure to take notes to use while taking quiz.</td>
<td>View the module and take the quiz. Be sure to take notes that can be used while taking the quiz. Module covers: Identifying pathologies on CT images Naming the cause of each pathology Understanding the signs and symptoms of common pathologies Identifying normal vs abnormal anatomy Defining common pathological processes Quiz= 50 Points</td>
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<tr>
<td>Jan. 27-Feb 2nd</td>
<td>CT Pathology Part 2 Module/Quiz</td>
<td>View module and take quiz covering material presented. Be sure to take notes to use while taking quiz.</td>
<td>View the module and take the quiz. Be sure to take notes that can be used while taking the quiz. Module covers: Identifying pathologies on CT images Naming the cause of each pathology Understanding the signs and symptoms of common pathologies Identifying normal vs abnormal anatomy Defining common pathological processes Quiz= 50 points</td>
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<td>Feb 3\textsuperscript{rd}-9\textsuperscript{th}</td>
<td>Pediatric Computed Tomography: Content Includes:</td>
<td>Required Reading: Computed Tomography, Seeram, Chapter 19.</td>
<td>Assignment: 1. \textbf{Read} Ch. 19 Computed Tomography, Seeram, Pediatric CT. 2. \textbf{Complete quiz} covering pediatric CT Quiz = 100 Points</td>
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<td>* Multi-detector CY vs Single</td>
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<td>* Pediatric Applications with Multi-detectors</td>
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<td>* Pediatric Patient Management</td>
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<td>* Pediatric Contrast Media</td>
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<td>* Radiation Protection/Dose</td>
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<td>* Pediatric Procedure Considerations: Indications, positioning, technical considerations, protocol.</td>
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<td>Pediatric CT of the head, neck, spine, abdomen, chest, musculoskeletal system, and pediatric CT angiography</td>
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<td><strong>Due in class Feb. 13\textsuperscript{th}</strong></td>
<td>Pediatric Case Study</td>
<td>In Class presentation covering a pediatric case study using the criteria outlined.</td>
<td>Pediatric Case study presented in class. Presentation must include the following: 1. CT images demonstrating the pathology 2. Detailed description of pathology 3. Etiology 4. Epidemiology 5. Signs and symptoms 6. Lab results that may appear out of normal limits due to this pathology 7. Image Characteristics: How it appears on the CT image as demonstrated by your images 8. Treatment 9. Prognosis 10. Special considerations for pediatric patients to include patient care and radiation dose reduction. <strong>100 Points</strong></td>
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<td>Feb. 10-16</td>
<td>Interventional CTIndications CT Guided Biopsies CT Fluoroscopy Image Principals</td>
<td>Required Reading: Computed Tomography for Technologists, Romans, Ch. 23 \textbf{Reference:}</td>
<td>Assignment: 1. \textbf{Read} Ch. 23 in Romans text. 2. Complete review questions 1-3 from Ch. 23</td>
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<td>Date</td>
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<td>Feb. 17-23</td>
<td>PET and CT Fusion</td>
<td>Computed Tomography, Seeram</td>
<td>1. Read Ch. 24 in Romans text. 2. Complete review questions 1-3 from Ch. 24</td>
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<td>FDG-PET Scanning Pitfalls</td>
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<td>Skeletal, head, neck, thorax, myocardium, thymus, breast, lung, GI,</td>
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<td>Urinary, reproductive, bone marrow, blood vessels</td>
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<td>Uptake Values</td>
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<td>Clinical Procedures for FDG-PET CT</td>
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<td>Feb. 24-</td>
<td>Module 10 CT Additional Applications</td>
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<td>1. Watch module 2. Take quiz covering module content</td>
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<td>March 13</td>
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<td>Mar 5th Class</td>
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<td>March 23-30</td>
<td>CT Specialty Imaging Applications:</td>
<td>Research</td>
<td>Research paper and in class presentation covering CT Specialty Imaging Applications. Students will write a minimum 3 page paper covering all aspects of one of the specialty imaging areas. The student will prepare a power point presentation covering their research.</td>
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<td>Due in class</td>
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<td>April 23</td>
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<td>March 31-</td>
<td>Patient Safety Module 5</td>
<td>Watch module take review quiz</td>
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<td>April 6</td>
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<td>April 7-13</td>
<td>X-Sectional Anatomy Head/Neck Module 7</td>
<td>Watch module take review quiz</td>
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<td>April 14-20</td>
<td>X-Sectional Anatomy Chest/Abd./Pelvis Module 8</td>
<td>Watch module take review quiz</td>
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| April 21-27 | On-going Mosby Review | Patient care and Safety:  
*Patient Preparation  
*Patient Assessment  
*Contrast Administration  
*Radiation Safety and Dosimetry | Take final comprehensive exam for Procedures  
**100 Points** |
| May 9-12 | ARRT Exam Review | Imaging Procedures:  
*Sectional Anatomy  
*Contrast Media  
*Imaging processes  
*Special Procedures |