

CASPERCOLLEGE COURSE SYLLABUS
RDTK 1925

Computed Tomography Physics and Instrumentation I

Semester/Year: **Fall 2015**

Lecture Hours: **3**

Lab Hours: **0**

Credit Hours: **3**

Class Time: **TBA**

Days: **Tentatively: Sept. 19,
Oct. 17 & Nov. 14**

Room: **208**

Instructor's Name: April Perez R.T. (R) (CT)

Instructor's Contact:

Cell Phone: 970-275-2063

Email:
aperez@caspercollege.edu

Office Hours: Email or text is the best way to get a hold of me.

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

Goal: Students will learn the physics portion of CT and the Instrumentation through a variety of modules and lectures. Students will learn through a set of lectures as well as online courses.

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

Evaluation Criteria: Test, quiz, assignments, attendance

Attendance: 3%

Assignments:

1. Basic X-ray Review 50 pts.
2. Data Acquisition Review Questions: 55 pts.
3. Image Reconstruction Review Questions: 35 pts.
4. Image Post Processing Review Questions: 35 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

Total course points= 825

Required Text, Readings, and Materials:

1. Computed Tomography; Physical Principles, Clinical Applications, and Quality Control, Euclid Seeram, Saunders, 3rded.
2. Computed Tomography For Technologists, Lois Romans, ISBN 978-0-7817-7751-3, Lippincott 2011

Class Policies:Last Date to Change to Audit Status or to Withdraw with a W Grade: TBD

Attendance is expected, unless of inclement weather or prior arrangements have been made thru me and with approval, all exams and quizzes have a specific due date, make-up policy must be within 3 days of exam deadline and I must be notified in writing to why it was not taken during the given time frame

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.

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. This is also, where you will find course evaluation links during course evaluation periods.

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. See me privately after class, or email. 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 accommodation, determining the eligibility for accommodations, and helping students request and use appropriate accommodations.

**Calendar or schedule indicating course content:
Syllabus is subject to change.**

Date	Content	Required Reading	Assignment
Aug.24 – Sept. 31 Assignment Due: Sept. 6	Basic X-ray Review: X-ray Characteristics, X-ray tube construction, Production of x-rays Radiation Interaction with Matter, Acquisition (Geometry), Physical Principles (Attenuation)	1.Computed Tomography; Physical Principles, Clinical Applications, and Quality Control, Chapter 1 2.Computed Tomography For Technologists, Chapter 1	Take the quiz covering this material. 50 points
Labor Day Sept 7 Sept. 1 – Sept. 8 Assignment Due: Sept. 13	Digital Image Processing	Required Reading: 1.Computed Tomography; Physical Principles, Clinical Applications, and Quality Control, Ch. 3 Reference Suggestion: 2.Computed Tomography For Technologists, Chapter 2	1.Read Ch. 3 CT Physical Principles, Seeram. 2.Take quiz covering this material. 50 points
Sept. 9 – Sept. 18 Assignment Due Sept. 27	CT Module: Equipment and Instrumentation	Equipment and Instrumentation Overview: Suggested that the student take detailed notes to be used while taking quiz covering this section.	1.Watch module: Equipment and Instrumentation. 2.Take quiz covering this material. 50 points
Sept. 19 – Sept. 30 Assignment Due: Oct. 7	Physical Principles of Computed Tomography	Required Reading: 1.Computed Tomography; Physical Principles, Clinical Applications, and Quality Control, Ch. 4 Reference Suggestion: 2.Computed Tomography For Technologists, Chapter 4	1.Read Ch. 4 CT Physical Principles, Seeram. 2.Take quiz covering this material. 50 Points
Oct. 1 – Oct. 11 Assignment Due: Oct. 18th	Data Acquisition Concepts	Required Reading: 1.Computed Tomography; Physical Principles, Clinical Applications, and Quality Control, Ch. 5 2.Computed Tomography For Technologists, Ch. 2	1.Read Ch. 5 CT Physical Principles, Seeram& Ch. 2 CT for Technologists, Romans. 2. Answer questions 1-11 Chapter 2 in Text CT for Technologists, Romans. 55 points 3.Take quiz covering material from both text. 50 points

Fall Break – Oct. 19-20 Oct. 12 – Oct. 23 Assignment Due: Oct. 30th	CT Module: Data Acquisition	Data Acquisition Module-Overview: Suggested that the student take detailed notes to be used while taking quiz covering this section.	1.Watch module: Data Acquisition. 2.Take quiz covering this material. 50 points
Oct. 24 – Nov. 6 Assignment Due: Nov. 13 th	Image Reconstruction	Required Reading: 1.Computed Tomography; Physical Principles, Clinical Applications, and Quality Control, Ch. 6 2.Computed Tomography For Technologists, Ch. 3	1.Read Ch. 6 CT Physical Principles, Seeram& Ch. 3 CT 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
Nov. 7 - 14 Assignment Due: Nov. 21	CT Module: Image Processing and Reconstruction	Image Processing and Reconstruction Overview: Suggested that the student take detailed notes to be used while taking quiz covering this section.	1.Watch module: Image Processing and Reconstruction 2.Take quiz covering this material. 50 points
Thanksgiving Break Nov. 15 - 22 Assignment Due: Nov. 29	Basic Instrumentation	Required Reading: 1.Computed Tomography; Physical Principles, Clinical Applications, and Quality Control, Ch. 7 Reference Suggestion: 2.Computed Tomography For Technologists, Chapter 5	1.Read Ch. 7 CT Physical Principles, Seeram 2.Take quiz covering material from this chapter. 50 points
Nov. 23- Dec. 4th Assignment Due: Dec. 13 th	Image Post Processing and Visualization Tools	Required Reading: 1.Computed Tomography; Physical Principles, Clinical Applications, and Quality Control, Ch. 8 2.Computed Tomography For Technologists, Ch. 8	1.Read Ch. 8 CT Physical Principles, Seeram& 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
Nov.	Study for the final		

Final Exam Dec. 5 – 18th Exam must be taken by Dec. 18th		Comprehensive: Review all course material	Final Exam 200 points
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