CASPER COLLEGE COURSE SYLLABUS

RDTK 2925 H1

MRI Principles II: Instrumentation and Imaging

Semester/Year: SP 2016

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

Class Time: On-line and listed  Days:  Room: TBA
Saturdays

Instructor’s Name: Misty Dibble

Instructor's Contact Information:
Office Phone: 259-6245  Email: E-mail instructor through Moodle

Office Hours: On-line via Moodle

Course Description:
This unit is designed to provide the student with a comprehensive overview of MR pulse sequences, image formation and image contrast. Pulse sequences include spin echo, fast spin echo, gradient echo, inversion recovery, echo planar, parallel imaging and spectroscopy. In addition, tissue characteristics, contrast agents and post processing techniques are covered. This course provides the student with knowledge of the parameters and imaging options used to create MR images. In addition, the content introduces quality assurance measures used in maintaining image quality.

Statement of Prerequisites: RDTK 1955 MRI Principles I
**Goal:** This course is required to understand MR pulse sequences, image formation and image contrast. The course provides information on selecting pulse sequences. This information enables the student to maximize MR image quality by understanding the basis of MR imaging. This course is necessary to educate the student on how to create high-quality diagnostic images that will be reviewed by the interpreting physician. A thorough knowledge base in the application of parameters, imaging options and quality assurance allows technologists to obtain the highest quality images possible, ensuring accurate diagnosis of the patient’s condition.

**Outcomes:**
Upon completing the course, the student will be able to:
1. Explain intrinsic parameters that affect image quality such as: MR tissue characteristics that include spin density, T1 and T2 relaxation.
2. Explain extrinsic parameters that affect image quality such as: TR, TE, TI, flip angle and lesser used parameters such as velocity encoding (VENC) and “b” value.
3. Apply the principles of pulse sequences and timing diagrams in MR.
4. Define the use of gradient and RF pulses in acquiring MR images.
5. Understand the concepts of image formation in MR.
6. Describe scan time and the associated parameters.
7. Select the appropriate pulse sequence for clinical application.
8. Describe image contrast appearance according to image weighting.
9. Describe the imaging parameters that determine image contrast.
10. Describe the imaging parameters that determine spatial resolution on MR images.
11. Describe the imaging parameters involved in MR image formation.
12. Apply MR imaging parameters in the clinical setting.
13. Describe many typical imaging options used to optimize image quality.
14. Understand parameters and imaging options to obtain diagnostic MR images with Minimal image artifacts.
15. Maintain high-quality MR images via routine quality assurance practices.

**Methodology:** Lecture, hands on learning, research
Evaluation Criteria: Exams, research, review

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

Required Text, Readings, and Materials:

3. Lippincott’s MRI Review, Wheeler

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

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.

Topic 1 Pulse Sequences:
January 19-26

Required Reading:

MRI in Practice, Ch. 5
Handbook of MRI Technique, Ch. 3

Answer questions 1-11 listed in the assignment section (60 Points)

DUE 1/26/16 Pulse Sequences Assignment

Topic 2 Module on Parameters/ Quiz

January 26-February 2
Take Q Quiz: DUE 2/2/16
Pulse Sequencing Quiz (100 points)

Topic 3 Flow Parameters

February 2-16

Required Reading

MRI in Practice, Ch. 6
Assignment:
Complete questions 1-10 listed in assignment section (50 Points)
Assignment: DUE 2/16 Flow Parameters Assignment

Topic 4

February 6 Required Class
Lecture on Chapter 5
Lecture on Chapter 6
Take Registry in Class - Participation Grade only
Topic 5 Artifacts and their Compensation:
February 16- March 1

1. Read
MRI in Practice, Ch. 7

2. Answer questions 1-12 listed in the assignment section pertaining to the chapter (60 points)

Assignment: Due March 1 Artifacts and Their Compensation

Topic 6 Module Image Quality/ Quiz
February 16-March 1

Quiz = 100 points
Quiz: DUE 3/1/16 MR Image Quality

Topic 7
March 1- 8

Registry Review

Review module and take quiz

DUE 3-8-15 Please note that 2 attempts have been given do the first attempt without notes!
This is to see what areas you need to work on as we start to review for the registry.

Topic 8
March 5th required class

Lecture Chapter 7

Lecture Review
Topic 9: Equipment and Instrumentation
March 8-22
Registry Review
Review module and take quiz
DUE 3-22-15 Please take note that you have been given two attempts. Take the first attempt without notes. This is to see where we are at and what needs to be reviewed

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Topic 10
Spring Break 3/12-3/20
All modules are open this will be a great time to review.

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Topic 11: Radiofrequency and Gradients
March 22-29
Registry Review
Review module and take quiz
DUE 3-29-15 Please take note that you have been given two attempts. Take the first attempt without notes. This is to see where we are at and what needs to be reviewed

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Topic 12: Image Production Parameters
March 30-April 7th
Registry Review
Review module and take quiz
DUE 4-7-15 Please take note that you have been given two attempts. Take the first attempt without notes. This is to see where you are at and what needs to be reviewed
April 7-17

Lippincott's MRI Review

Complete Review Questions on pages 59-145

Take Lippincott post-test review pg. 146

Topic 14

April 16

required class day

Review-- This class will be used to go over any area you feel needs reviewed it will be based on your individual needs.

Topic 15

April 18-May 6

ARRT Exam Review: 1 attempt per quiz.

Exams: 100 Points each
Exam One: Fundamentals, Equipment and Instrumentation, Radio-frequency
Exam Two: Image Production, Pulse Sequences, Image Quality
Exam Three: All Subject Material
Exam Four: All Subject Material

Topic 16 TBA

May

Registry test this will be your final in Class or Online and review

           Final in class May 9th Assignment