Code # NHP23 (2014) REV

**New/Special Course Proposal-Bulletin Change Transmittal Form**

**Undergraduate Curriculum Council** - Print 1 copy for signatures and save 1 electronic copy.

**Graduate Council** - Print 1 copy for signatures and send 1 electronic copy to [mmcginnis@astate.edu](mailto:mmcginnis@astate.edu)

|  |
| --- |
| **New Course or**  **Special Course (Check one box)**  *Please complete the following and attach a copy of the catalogue page(s) showing what changes are necessary.* |

|  |  |
| --- | --- |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date… **Department Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **COPE Chair (if applicable)** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date… **Department Chair:** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **General Education Committee Chair (If applicable)** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date… **College Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Undergraduate Curriculum Council Chair** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date… **College Dean** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Graduate Curriculum Committee Chair** |
|  | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Vice Chancellor for Academic Affairs** |

1. Proposed Course Prefix and Number (For variable credit courses, indicate variable range.)

RAD 4113

2. Course Title – if title is more than 30 characters (including spaces), provide short title to be used on transcripts. Title cannot have any symbols (e.g. slash, colon, semi-colon, apostrophe, dash, and parenthesis). Please indicate if this course will have variable titles (e.g. independent study, thesis, special topics).

Image Acquisition and Evaluation III

Short Title: IMGE ACQSTN and EVAL III

3. Will this course be lecture only, lab only, lecture and lab, activity, dissertation, experiential learning, independent study, internship, performance, practicum, recitation, seminar, special problems, special topics, studio problems, student exchange, occupational learning credit, or course for fee purpose only (e.g. an exam)? Please choose one.

Lecture only

4. What is the grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental)?

Standard letter

5. Is this course dual listed (undergraduate/graduate)?

No

6. Is this course cross listed? (If it is, all course entries must be identical including course descriptions. It is important to check the course description of an existing course when adding a new cross listed course.)

No

7. Brief course description (40 words or fewer) as it should appear in the bulletin.

Continues the study of image acquisition and evaluation begun in RAD 3213 with specific emphasis on digital image acquisition errors, image artifacts, pathology effects on image quality and technique chart development and use.

8. Indicate all prerequisites and if this course is restricted to a specific major, which major. (If a student does not have the prerequisites or does not have the appropriate major, the student will not be allowed to register).

a. Are there any prerequisites?

Formal admittance into the Radiologic Science Program, RAD 3213 Image Acquisition and Evaluation I.

b. Why?

The Medical Imaging and Radiations Sciences programs are lock step programs. Students complete the program in cohorts.

9. Course frequency(e.g. Fall, Spring, Summer). Not applicable to Graduate courses.

Spring

10. Contact Person (Name, Email Address, Phone Number)

Ray Winters

[rwinters@astate.edu](mailto:rwinters@astate.edu)

ext. 3329

11. Proposed Starting Term/Year

Spring 2016

12. Is this course in support of a new program? No

If yes, what program?

Enter text...

13. Does this course replace a course being deleted? Yes

If yes, what course?

RT 2122 and RT 3212.

Has this course number been used in the past? No

*Submit Course Deletion Proposal-Bulletin Change Transmittal Form.*

14. Does this course affect another program? No

If yes, provide contact information from the Dean, Department Head, and/or Program Director whose area this affects.

Enter text...

15. Justification should include:

a. Academic rationale and goals for the course (skills or level of knowledge students can be expected to attain)

In order to practice ALARA, the medical imaging professional must be able to understand causes of errors in image acquisition, identify sources of potential image artifacts, the effects of pathology on the interactions of x-rays with human tissues, and develop and use a technique chart. Additionally, calculations needed to safely alter exposure to optimize image acquisition are necessary.

Course Goals:

1. Explain the latent and manifest image processes for digital and screen-film radiography.
2. Identify the types, causes, and corrective actions for digital image histogram analysis errors.
3. Recognize the types of histogram errors on sub-optimal digital images.
4. Detail the types, causes, and corrective actions for image artifacts.
5. Recognize the types and causes of artifacts and determine the need for a repeat exposure.
6. Explain the consequences of repeat exposures.
7. Classify pathologies by the effect on the interactions of x-rays with affected tissues.
8. Explain exposure technique alterations needed for various types of pathologies.
9. Compare and contrast the types of technique charts.
10. Cite the essential components and development process for both fixed and variable kVp technique charts.
11. Calculate changes in exposure techniques to correct sub-optimal images.

b. How does the course fit with the mission established by the department for the curriculum? If course is mandated by an accrediting or certifying agency, include the directive.

This course is mandated by the current American Society of Radiologic Technologists Radiography Educational Curriculum stipulated by the Joint Review Committee on Education in Radiologic Technology. It is a foundational course which leads to preparing students for entry level practice of radiologic technology.

c. Student population served.

Students formally admitted to the Bachelor of Science in Radiologic Sciences program and successful completion of all previous RAD courses.

d. Rationale for the level of the course (lower, upper, or graduate).

This is an upper division class required upon entry to the professional curriculum. It will require synthesis of previous materials, the use of critical thinking skills and independent judgment to succeed in the class. Students are required to be admitted to the Radiologic Science Program before taking this class. Students must have completed all core classes of approximately 75 hours with a minimum of 2.5 GPA. They have completed the 3000-level foundation and are in the mastery level of this professional track.

16. Outline (The course outline should be topical by weeks and should be sufficient in detail to allow for judgment of the content of the course.)

Weeks 1-2: Latent and Manifest Image Processes

Weeks 3-4: Digital Image Acquisition Errors

Week 5: Review and Assessment

Weeks 6-7: Image Artifacts

Weeks 7-8: Effects of Pathology

Week 9: Review and Assessment

Weeks 10-11: Technique Charts

Weeks 12-13: Exposure Techniques Adjustments

Weeks14-15: Review and Comprehensive Assessment

17. Course requirements (e.g. research papers, projects, interviews, tests, etc.)

Pre-lecture preparation assignments, three formative exams, one comprehensive exam.

18. Special features (e.g. labs, exhibits, site visitations, etc.)

This course content will be enhanced and supplemented with internet resources, as well as image analysis and technique calculation practice activities. Required pre-lecture preparation assignments and assessments will also be included.

19. Department staffing and classroom/lab resources (Will this require additional faculty, supplies, etc.?)

No additional resources will be required.

20. What is the primary intended learning goal for students enrolled in this course?

Successcul students will understand and recognize image acquisition errors, artifacts, pathology effects and the use and development of ALARA-compliant technique charts.

21. Reading and writing requirements:

a. Name of book, author, edition, company and year

Radiologic Sciences for Technologists by Stuart Bushong, 10th edition, Elsevier, 2013 and Radiographic Imaging and Exposure by Terri Fauber, 4th edition, Elsevier, 2013.

b. Number of pages of reading required per week: 30

c. Number of pages of writing required over the course of the semester: 2

22. High-Impact Activities (Check all that apply)

Collaborative assignments

Research with a faculty member

Diversity/Global learning experience

Service learning or community learning

Study abroad

Internship

Capstone or senior culminating experience

Other Explain: Enter text...

23. Considering the indicated primary goal (in Box #20), provide up to three outcomes that you expect of students after completion of this course.

**Outcome #1:** (For example, what will students who meet this goal know or be able to do as a result of this course?)

The student will be able to recognize histogram analysis errors and identify the cause.

Learning Activity:(For example, what instructional processes do you plan to use to help students reach this outcome?)

Lectures, reading assignments, and internet research on histogram analysis errors and their causes.

Assessment Tool: (For example, what will students demonstrate, represent, or produce to provide evidence of their learning?)

Given sample images on written exams, students will identify the digital images that demonstrate histogram analysis errors and the cause with 80% accuracy.

*(Repeat if needed for additional outcomes 2 and 3)*

**Outcome #2:**

Students will be able to identify and analyze causes of image artifacts.

Learning Activity:

Lectures, reading assignments and internet research on image artifacts and their causes.

Assessment Tool:

Given sample images on written exams, students will identify artifacts on digital images and the cause with 80% accuracy.

**Outcome #3**:

Students will be able to construct and apply an ALARA-compliant exposure technique chart.

Learning Activity:

Development of two types of ALARA-compliant exposure technique charts for two different imaging systems.

Assessment Tool:

A rubric will be used to grade the submitted technique charts developed by the student. Techniques submitted by the student for the imaging systems must comply with ALARA, an essential ethical foundation of medical imaging with 95% accuracy.

24. Please indicate the extent to which this course addresses university-level student learning outcomes:

* 1. Global Awareness

Minimally  
Indirectly  
Directly

* 1. Thinking Critically

Minimally  
Indirectly  
Directly

* 1. Using Technology

Minimally  
Indirectly  
Directly

**From the most current electronic version of the bulletin, copy all bulletin pages that this proposal affects and paste it to the end of this proposal.**

**To copy from the bulletin:**

1. Minimize this form.
2. Go to <http://registrar.astate.edu/bulletin.htm> and choose either undergraduate or graduate.
3. This will take you to a list of the bulletins by year, please open the most current bulletin.
4. Find the page(s) you wish to copy, click on the “select” button and highlight the pages you want to copy.
5. Right-click on the highlighted area.
6. Click on “copy”.
7. Minimize the bulletin and maximize this page.
8. Right-click immediately below this area and choose “paste”.
9. For additions to the bulletin, please change font color and make the font size larger than the surrounding text. Make it noticeable.
10. For deletions, strike through the text, change the font color, and enlarge the font size. Make it noticeable.

This is a complete program overhaul. Please refer to the accompanying Program package. This information will replace information on pages 311-332 and 504-512 in the bulletin