Code # NHP13 (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 3123

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).

Radiation Physics and Imaging

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 and experiential learning

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.

Intrduction to the basic x-ray equipment and the production and use of ionizing radiation, basic radiation physics and its application, and components for radiologic imaging.

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

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.

Summer (10 weeks)

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

Ray Winters

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

ext. 3329

11. Proposed Starting Term/Year

Summer 2015

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

If yes, what program?

No

13. Does this course replace a course being deleted? Yes/No

If yes, what course?

Yes. It replaces RT 1222 and RT 1323 due to new curriculum being proposed in response to American Society of Radiologic Technologists Curriculum guide and JRCERT Accreditation standard.

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.

No

15. Justification should include:

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

An understanding of the physical production of radiation and the related equipment is essential for the professional radiologic practitioner. When functioning as a radiographer, interventions entail more than pushing a button or even correctly placing the patient. Once must fully comprehend the physical nature of image production, not only to produce a diagnostic image, but to adequately protect the patient from needless harmful radiation

Course Goals:

1. Explain the fundamental properties of radiation physics

2. Identify the properties of x-rays and describe the basic units of measurement

3. Describe radioactivity and radioactive decay in terms of alpha, beta and gamma emission

4. Cite the general theories of physics at the atomic and subatomic level

5. Understanding the basic electronics involved in daily radiographic practice

6. Appreciate the nature of electromagnetic radiation, noting its use in medicine.

7. Understand x-ray tube construction and components

8. Describe x-ray interactions with matter.

9. Note the differences and similarities in single phase and three phase power.

10. Describe the basic components of x-ray circuits.

11. List various automatic exposure controls.

12. Describe the line-focus principle and anode heel effect and its effect.

13. Understand beam restriction theory and devices.

14. Know the basics of film processing

15. Describe the various types of digital receptors

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 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

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.

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.)

Week 1: Principles of Radiation Physics

Week 2: Nature of radiation

Week 3: Production & properties of X-radiation

Week 4: X-ray emission spectra and factors that affect it

Week 5: Introduction to Imaging Equipment

Week 6: Imaging Receptors

Week 7: Accessory Imaging Equipment

Week 8: Processing of the image

Week 9: Equipment Quality Maintenance

Week 10: Review and Comprehensive Assessment

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

Three lecture exams, completion of homework and required videos, and a final

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

This will be a web-supported class. There will be supplemental reading and required pre-class videos. Positioning lab will reinforce concepts learned in the classroom.

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?

Students will have a working knowledge of the theoretical physical production of radiation and the equipment required to produce it..

21. Reading and writing requirements:

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

Radiologic Sciences for Technologists by Stuart Bushong, 10th edition, Elsevier, 2014

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 gain a foundational understanding of the physical production of radiation.

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

Students will be introduced to the physical production of radiation during lecture. The concepts and requirements related to how x-rays are produced will be reinforced in course readings. The physical requirements related to x-ray production will be hands-on in lab experiences.

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

Students will be tested specifically over all aspects x-ray production, scoring 80% or better.

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

**Outcome #2:**

The student will be able to demonstrate knowledge of the components of a modern x-ray tube and their role in the production of radation.

Learning Activity:

Students will use readings and research to support their physical understanding of lab equipment during hands-on reconstruction of that equipemnt.

Assessment Tool:

Students will be divided into groups of 4 and must assemble and disassemble the department x-ray tube model with 80% accuracy.

**Outcome #3**:

Learning Activity:

Assessment Tool:

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