Proposal Form For Addition And Revision Of Courses

1. Proposing College / School: College of Engineering
   Department: College of Engineering (ENGR)

2. Course Prefix and Number: ENGR 4710
   3. Effective Term: Fall 2013

4. Course Title: Advanced Reactor Plant Operations I
   Abbreviated Title (30 characters or less): ARPO I

5. Requested Action:
   - Renumber a Course
   - Add a Course
   - Revise a Course

6. Course Credit:

<table>
<thead>
<tr>
<th>Contact/Group Hours</th>
<th>Scheduled Type</th>
<th>Weekly or Per Term</th>
<th>Credit Hours</th>
<th>Anticipated Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lecture</td>
<td>Weekly 3</td>
<td>3</td>
<td>60</td>
</tr>
</tbody>
</table>

   Total Credit Hours: 3

7. Grading Type:
   - Regular (ABCDF)
   - Satisfactory/Unsatisfactory (S/U)
   - Audit

8. Prerequisites/Corequisites:
P/C ENGR 2700

9. Restrictions: List specific restriction in space above.

10. Course Description:
    Advanced safety topics and risk assessment within regulatory structure of the nuclear power industry.

11. May Count Either: N/A or N/A
    Program Type: Minor
    Program Title: Nuclear Power Generation Systems Minor
    Requirement or Elective?: Required

12. Affected Program(s):
    (Respond "N/A" if not included in any program; attach memorandum if more space is required)

13. Overlapping or Duplication of Other Units' Offerings:
    (If course is included in any other degree program, is used as an elective frequently by other unit(s), or is in an area similar to that covered by another college/school, attach correspondence with relevant unit)

   - Applicable
   - Not Applicable
14. Justification: One of six required courses for the engineering minor in Nuclear Power Generation Systems, ENGR 4710 is deleting the lab portion of the course and reducing the total hours to three (3). ENGR 4710 lab topics will be included in the ENGR 4721 comprehensive lab course, which will serve as the lab course for both ENGR 4710 and ENGR 4720. Total hours for the NPGS minor will be revised to 16 credit hours, to reflect this change (request submitted with this document).

(Include a concise, yet adequate rationale for the addition/revision of the course, citing accreditation, assessments (faculty, graduate, and/or external) where applicable)

15. Resources: ENGR 4710, 4720 and 4721 will be taught using existing resources.

(Indicate whether existing resources such as library materials, classroom/laboratory space, and faculty appointments are adequate to support the proposed addition/revision; if additional resources are required, indicate how such needs will be met; referencing the appropriate level of authorization -- i.e.: Dean -- where necessary; if no additional resources or shifting of resources will be necessary, respond "Not Applicable")

16. Student Learning Outcomes: This course teaches multidisciplinary nuclear engineering and risk analysis concepts to students in the college of engineering who are preparing for a career in the nuclear power generation industry through Auburn University's minor in Nuclear Power Generation Systems. Advanced safety topics are introduced within the regulatory structure of the nuclear power industry. These include radiation types, physical shielding, exposure controls, monitoring instruments, engineered safeguards, reactor accident planning, reliability engineering methods (e.g., FMEA, FTA, LOPA, PRA), preventive maintenance concepts and work package controls in the nuclear industry.

(State in measurable terms (reflective of course level) what students should be able to do when they have completed this course)

17. Course Content Outline: Lecture course content is unchanged.

The following topics are covered:
- Basic Nuclear Physics (radiation, decay & flux)
- Nuclear Radiation (interactions, radiation types, dose, biological effects)
- Radiation Measurement (RADIACS, TLD's, Badges, etc)
- Shielding & Exposure Controls
- Societal issues with radiation and nuclear power
- Organization of 'work' in nuclear power plants
- Corrective versus Preventive maintenance plans
- Preventive Maintenance Tools (lubrication analysis, thermography, and vibration analysis)
- Systems Safety Fundamentals - PHL, PHA, FTA, FMEA, LOPA, ETBA, CCFA
- Probabilistic Risk Assessment
- Human Factors engineering issues in the industry
- Occupational safety issues in nuclear power environments
- Emergency Preparedness Planning
- Risk assessment and abatement
- Possible field trips can include; simulators, power plant & industry

(Provide a comprehensive, week-by-week breakdown of course content, including assignment due dates)

18. Assignments / Projects: Examinations 200 Points
- Comprehensive Final Exam 200 Points
- Total Possible Points ~400 Points

(List all quizzes, projects, reports, activities and other components of the course grade -- including a brief description of each assignment that clarifies its contribution to the course's learning objectives)

19. Rubric and Grading Scale: See 18: A>=90%; B>=80%; C>=70%; D>=60%; F<60.
20. Justification for Graduate Credit: N/A

(Included below are standard statements regarding course policies. If necessary, a statement may be altered to reflect the academic policies of individual faculty members and/or the academic unit or department, provided that there is no conflict with the Tiger Cub, Faculty Handbook, or any existing university policy.)

POLICY STATEMENTS

Attendance: Although attendance is not required, students are expected to attend all classes, and will be held responsible for any content covered in the event of an absence.

Excused Absences: Students are granted excused absences from class for the following reasons: illness of the student or serious illness of a member of the student’s immediate family, the death of a member of the student’s immediate family, trips for student organizations sponsored by an academic unit, trips for university classes, trips for participation in intercollegiate athletic events, subpoenas for a court appearance, and religious holidays. Students who wish to have an excused absence from class for any other reason must contact the instructor in advance of the absence to request permission. The instructor will weigh the merits of the request, and render a decision. When feasible, the student must notify the instructor prior to the occurrence of any excused absences, but in no case shall such notification occur more than one week after the absence. Appropriate documentation for all excused absences is required. Please see the Tiger Cub for more information on excused absences.

Make-Up Policy: Arrangement to make up a missed major examination (e.g., hour exams, mid-term exams) due to properly authorized excused absences must be initiated by the student within one week of the end of the period of the excused absence(s). Except in unusual circumstances, such as the continued absence of the student or the advent of university holidays, a make-up exam will take place within two weeks of the date that the student initiates arrangements for it. Except in extraordinary circumstances, no make-up exams will be arranged during the last three days before the final exam period begins.

Academic Honesty Policy: All portions of the Auburn University student academic honesty code (Title XII) found in the Tiger Cub will apply to university courses. All academic honesty violations or alleged violations of the SGA Code of Laws will be reported to the Office of the Provost, which will then refer the case to the Academic Honesty Committee.

Disability Accommodations: Students who need special accommodations in class, as provided for by the Americans With Disabilities Act, should arrange for a confidential meeting with the instructor during office hours in the first week of classes (or as soon as possible if accommodations are needed immediately). The student must bring a copy of their Accommodation Letter and an Instructor Verification Form to the meeting. If the student does not have these forms, they should make an appointment with the Program for Students with Disabilities, 1288 Haley Center, 844-2096 (V/TT).
Approvals

Department Chair / Head

Date

College / School Curriculum Committee

Date

College / School Dean

Date

N/A

Date

Dean of the Graduate School (for Graduate Courses)

Date

Assoc. Provost for Undergraduate Studies (for Undergraduate Courses)

Date

Contact Person: Bill Goodwin
Telephone: 4-7599
E-Mail Address: bill.goodwin@auburn.edu
Fax: 4-4487
ENGR 4710 Advanced Reactor Plant Operations I: Radiological Health, Risk Assessment, Safety and Work Practices


2. Department: College of Engineering
Credit Hours: 3 hour total – 3 hour lecture
Designation: E

3. Corequisites: ENGR 2700 Introduction to Nuclear Power Operations, Systems and Careers
Website: Course materials are maintained on Canvas
Date Prepared: March 12, 2013 (by Jerry Davis)

4. Instructor(s): Jerry Davis
334-844-1424
davisga@auburn.edu

5. Course Time: Tuesday: 3:30 – 6:00 pm (Lecture) in Shelby Center

Textbooks and class materials:
Required: ENGR 4710 course package (University Bookstore or Engineering Reproduction)


6. Course Description: “Auburn Bulletin: Advanced Reactor Plant Operations I: Radiological Health, Risk Assessment, Safety and Work Practices.” 3 hour credit (Lecture (3)). Advanced safety topics are introduced within the regulatory structure of the nuclear power industry. These include radiation types, physical shielding, exposure controls, monitoring instruments, engineered safeguards, reactor accident planning, reliability engineering methods (e.g., FMEA, FTA, LOPA, PRA), preventive maintenance concepts and work package controls in the nuclear industry.

7. Course Objectives: This course introduces students in the nuclear power generation minor to advanced concepts associated with nuclear power plant operation. Students will gain a basic understanding of radiological issues associated with nuclear reactors, be able to identify and understand the structural organization of ‘work’ in such an environment, and be exposed to the basic risk analysis methodologies to assure safe and productive nuclear operations. Students will be able to describe their role as engineers in the topical content areas.

8. Course Requirements/Evaluation: Students will be evaluated based on the following:

<table>
<thead>
<tr>
<th>Examinations</th>
<th>200 points</th>
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<tbody>
<tr>
<td>Final Examination</td>
<td>200 points</td>
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<tr>
<td>400 points</td>
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</tbody>
</table>

Course grades will be assigned based upon points obtained in course (10 percent scale)

- >= 90% A
- >= 80% B
- >= 70% C
- >= 60% D

Student grades are posted continuously on Canvas throughout the term. Students can always calculate their current grade by applying the 10 percent scale to the current points graded for the term.

9. Class Policy Statements: Course attendance is recommended, but will not be evaluated as part of the course grade. The University academic honesty policies will be strictly enforced. Students will sign the attached honesty affirmation.

10. Disabilities: Any student with a disability needing special accommodation should notify the instructor and contact Tracy Donald, Director of the Program for Students with Disabilities, located in 1228 Haley Center, 334-844-2096.
11. **Topics and Schedule**: All lectures meet for 150 minutes.

The following topics are covered:

(a) Basic Nuclear Physics (radiation, decay & flux)
(b) Nuclear Radiation (interactions, radiation types, dose, biological effects)
(c) Radiation Measurement (RADIACS, TLD’s, Badges, etc)
(d) Shielding & Exposure Controls
(e) Societal issues with radiation and nuclear power
(f) Organization of ‘work’ in nuclear power plants
(g) Corrective versus Preventive maintenance plans
(h) Preventive Maintenance Tools (lubrication & Vibration analyses, thermography)
(i) Systems Safety Fundamentals (PHL, PHA, FTA, FMEA, LOPA, ETBA, CCFA)
(j) Probabilistic Risk Assessment
(k) Human Factors engineering issues in the industry
(l) Occupational safety issues in nuclear power environments
(m) Emergency Preparedness Planning
(n) Possible field trips include; simulators, power plants, and industry

12. **Contribution to Meeting the Professional Component**

This multidisciplinary course introduces students to health physics and exposure controls associated with working in the vicinity of nuclear power generation facilities. Additionally, students will be exposed to engineered safety controls and risk assessment associated with operating, servicing, and maintaining nuclear power generation equipment and systems.

**Relationship to Program Outcomes**

This course supports the following ABET outcomes:

(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(j) a knowledge of contemporary issues

**Special Accommodations**: Students needing special accommodation will be handled privately between the instructor and the student in accordance with Auburn University policies. Please contact the instructor as early in the course as possible.
Academic Honesty: All portions of the Auburn University student academic honesty code (Title X11) found in the Tiger Cub will apply to this class. All academic honesty violations or alleged violations of the SGA Code of Laws will be reported to the Office of the Provost, which will then refer the case to the Academic Honesty Committee.

Violations include, but are not limited to:

**Cheating on an examination.** This includes such things as copying from another’s paper, using unauthorized notes, calculators, etc., or giving or receiving unauthorized aid, such as trading examinations, whispering answers, passing notes, or using electronic devices to transmit or receive information. This includes cell phones, blue-tooth and/or wireless. Notes stored on a PDA, laptop/pen tablet, calculator or cell phones are also prohibited.

**Plagiarism.** This is using someone else’s work without giving credit. It is, for example, using ideas, phrases, papers, laboratory reports, computer programs, data - copied directly or paraphrased - that you did not arrive at on your own. Sources include published works such as book, movies, web sites, and unpublished works such as other students’ papers or material from a research service. In brief, representing someone else’s work as your own is academically dishonest. The risk of plagiarism can be avoided in written work by clearly indicating, either in footnotes or in the paper itself, the source of any major or unique idea or wording that you did not arrive at on your own. Sources must be given regardless of whether the material is quoted directly or paraphrased.

**Copying another student’s assignment and putting your name on it is plagiarism.**

**Copying an answer key from an instructors guide is plagiarism.**

**Copying work from a previous semester of the class is plagiarism.**

**Electronic submission of another person’s electronic original is plagiarism.**

**Unauthorized collaboration.** This is working with or receiving help from others on graded assignments without the specific approval of the instructor. *If in doubt, seek permission from the instructor before working with others.* Students are encouraged to learn from one another: Form study groups and discuss assignments, but each assignment must be individual work unless specifically stated and turned in as a group assignment.

You are encouraged to talk to one another about your assignments, however, all assignments must be done by the student(s) whose name is (are) on it!

**Multiple submission.** This means using the same work to fulfill the academic requirements in more than one course. *Prior permission of the instructors is essential.*

I have read and understand the college and university academic honesty policy.

_________________________  _______________________
Name                  Date