<table>
<thead>
<tr>
<th>COURSE #:</th>
<th>NERS 425; CREDITS: 4/Selective</th>
<th>COURSE TITLE: Applications of Radiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>TERMS OFFERED:</td>
<td>Winter</td>
<td>For each prerequisite below, “E” denotes Enforced and “A” denotes Advis</td>
</tr>
<tr>
<td>TEXTBOOKS/REQUIRED MATERIAL:</td>
<td>Handouts</td>
<td>PREREQUISITES: NERS 312 (A)</td>
</tr>
<tr>
<td>INSTRUCTOR(S):</td>
<td>Atzmon, Fleming, Hartman, Pozzi, F</td>
<td>COGNIZANT FACULTY: Micheal Atzmon</td>
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**CoE BULLETIN DESCRIPTION:**
Applications of radiation interaction with matter using various forms (neutrons, ions, electrons, photons) of radiation, including neutron activation analysis, nuclear reaction analysis, Rutherford backscattering analysis, x-ray diffraction, plasma-solid interactions and wave-solid interactions. Lectures and laboratory.

**COURSE TOPICS:**
Radiation Safety; Statistics and Error Propagation; X-ray diffraction; Langmuir Probes, AC and DC; Neutron activation analysis; Neutron source strength determination; Energy-angle correlation for D-T neutrons; Nuclear reaction analysis; Radon gas and thermoluminescent detectors.

**COURSE STRUCTURE/SCHEDULE**
Lecture: 1 per week @ 80 minutes; Laboratory: 1 per week @ 4 hours

**COURSE OBJECTIVE**
For each Course Objective links to the Program Educational Objectives are shown
1. Teach students advanced radiation measurements techniques [1,2]
2. Increase student’s knowledge of the applications of radiation [1,2,3]
3. Provide an opportunity for team work [3]
4. Provide an opportunity for the practice of written communications skills [3]

**COURSE OUTCOMES**
For each Course Outcome links to the Program/ABE Student Outcomes are shown [#,a-k]
1. Students demonstrate their knowledge of advanced radiation measurements techniques [5|ABET b]
2. Students will communicate in writing their insights into radiation applications [1,4,6,7|ABET a,c,d,g]

**ASSESSMENT TOOLS**
For each assessment tool to the Course Outcomes are identified
1. Each of the experiments provides the topic for a separate laboratory report, prepared by each student. One of the reports (nuclear reaction analysis) is prepared by groups consisting of 4-6 members. In addition to being graded on the technical content, students receive a grade on the presentation.
2. Course evaluations at the end of the course provide student self-assessment of selected outcomes.
3. Faculty self-assessment provides self-assessment data on all outcomes.

**Revision History:** September, 1998; May, 2005; October, 2005; June 2010