ISE 541: Occupational Safety Engineering
Spring 2016
Wednesdays: 3:00-5:45pm
331 Daniels Hall

Instructor: David B. Kaber, Ph.D. Phone: (919) 515-0312
Office: 472 Daniels Hall. Fax: (919) 515-5281
e-mail: dbkaber@ncsu.edu

Teaching Assistants: Maryam Zahabi & Phone: (919) 515-7210
Olivia Morejon Fax: (919) 515-5281
Office: 458 Daniels Hall. e-mail: mzahabi@ncsu.edu

Introduction:
In the modern workplace, everyone has the right to expect a safe and healthful
environment. Workers should not accept job-related accidents or illness as “status quo”.
An understanding of the fundamentals of workplace safety is imperative for those
involved in the design, engineering, and operation of industrial processes and equipment.
This includes knowledge of causes of accidents and methods of prevention and risk
management. Engineers should also be aware of types of process or equipment defects
and potential corporate liability. If accidents lead to injuries, the engineer should
understand how workers are compensated and returned to work. Knowledge of
Occupational Safety and Health Administration (OSHA) regulations is also critical to
promoting a safe and healthful workplace. Awareness of the key elements of safety
standards for general industry is necessary and can serve to prevent potential accidents
during process operations and new equipment use. Finally, detailed knowledge of various
types of workplace hazards, methods of measurement evaluation and control is useful to
the engineer in order to prevent specific types of worker injury as well as facility and
equipment losses.

Course (content) description:

Safety history and litigation; accident causation; safety organizations and agencies.
Approaches to occupational safety and risk management. Product defects and safety
program development; product liability; safety in the legal arena; consumer product
safety commission. Hazard communication standard. Workers’ compensation. OSHA and
OSHAct; safety standards and codes; OSHA record keeping. Workplace stress and safety;
Thermal stress; electrical hazards; industrial noise and vibration hazards; fall hazards and
protection; fire protection; emergency planning; ionizing radiation.

Prereq: Graduate standing

Course objectives:

To develop:
(1) a familiarity with safety and historical litigation;
(2) knowledge of the pillars of occupational safety and methods for application;
(3) an understanding of product safety programs and risk management;
(4) knowledge of hazard communication methods;
(5) an understanding of Workers’ Compensation systems;
(6) a familiarity with OSHA standards and codes and recordkeeping;
(7) knowledge of human behavior as related to safety;
(8) knowledge on industrial hazards and related safety standards; and
(9) familiarity with safety activities related to accidents.

Text:


Assignments:

Reading assignments:
The course schedule lists textbook chapter assignments for the various weeks of the term. You should read the assigned chapters before the class in which the material is to be covered. We may also assign supplemental reading materials throughout the course, such as scholarly writings on safety and applicable OSHA regulations. We will post any supplemental materials to the course website for your reference.

Homework:
There will be four homework assignments during the term including a library assignment, Workers’ Compensation (WC) benefit calculations, an accident record keeping exercise, and noise exposure calculations. We will provide detailed descriptions for each assignment. The library assignment will be worth 30 points and the record keeping exercise will be worth 45 points. The WC benefits and noise exposure calculations will be worth 25 points each. All homework assignments must be submitted according to the due dates in course schedule.

Exams:
There will be two exams as part of the course. Both will be closed book and closed notes. You will be permitted to use a one-page “cheat sheet” (double-sided, 8.5” x 11”) for formulas, etc. (The second exam will be held during the final exam period but will not be comprehensive in nature.)

Exams will be graded on a 100-point, standard scale. There will be no make-up for missed exams unless arranged for in advance with a medical or family excuse. Missed exams will be recorded as zeros in final grade calculations.
Grade determination:

Adding the points you earn on each assignment and dividing this number by the total number of points possible will determine final grades. Grades will be assigned based on a standard scale, including “+” and “-“ (i.e., an average between 97.5-100% will be assigned a grade of "A+", an average between 92.5% and 97.4% will be assigned a grade of “A”, an average of 89.5-92.4% will be assigned an “A-“, an average between 87.5-89.4% will be assigned a “B+”, etc.) Below is a summary of the assignments and their point values.

Below is a summary of the assignments, their point values and the percentage of your grade they account for.

<table>
<thead>
<tr>
<th>Assignment:</th>
<th>Points:</th>
<th>Approx. Percentage of Grade:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library assignment</td>
<td>30</td>
<td>9%</td>
</tr>
<tr>
<td>Record keeping exercise</td>
<td>45</td>
<td>14%</td>
</tr>
<tr>
<td>Two exams (100 points each)</td>
<td>200</td>
<td>61%</td>
</tr>
<tr>
<td>Worker’s compensation benefit</td>
<td>25</td>
<td>8%</td>
</tr>
<tr>
<td>calculations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise exposure calculations</td>
<td>25</td>
<td>8%</td>
</tr>
<tr>
<td>Totals</td>
<td>325</td>
<td>100%</td>
</tr>
</tbody>
</table>

Due Date Policy and Late Assignments:

All assignments are due at the beginning of each lecture on the specified due dates. Assignments should be submitted in hard-copy form to the instructor. Points will be deducted from late assignments equivalent to one-letter grade for each lecture session past the due date.

Academic Integrity Policy:

Students are expected to adhere to the guidelines for academic integrity, as found in the “Code of Student Conduct” at: http://policies.ncsu.edu/policy/pol-11-35-01

Disability Accommodation:

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with Disability Services office (https://dso.dasa.ncsu.edu), 515-7653. For more information on NC State's policy on accommodating students with disabilities, please see the “Academic Accommodations for Students with Disabilities Regulation (REG02.20.1)” at: http://policies.ncsu.edu/regulation/reg-02-20-01
On-line Class Evaluation:

Online class evaluations will be available for students to complete during the last two weeks of the spring term. You will receive an email message directing you to a website where you can login using your Unity ID and complete evaluations. All evaluations are confidential.

Evaluation website: [https://classeval.ncsu.edu/](https://classeval.ncsu.edu/)
Student help desk: classeval@ncsu.edu

Important Dates:

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>January 12</td>
<td>Last day to register – add course.</td>
</tr>
<tr>
<td>January 18</td>
<td>Holiday (Martin Luther King Jr. Day).</td>
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<tr>
<td>March 2</td>
<td>Last day to withdraw or drop course without grade.</td>
</tr>
<tr>
<td>March 7-11</td>
<td>Spring Break; no classes.</td>
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<tr>
<td>March 14</td>
<td>Class resume at 8:05am.</td>
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<tr>
<td>March 25</td>
<td>Spring Holidays; no classes.</td>
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<tr>
<td>March 28</td>
<td>Class resume at 8:05am.</td>
</tr>
<tr>
<td>April 19-25</td>
<td>“Last week” (No exams. No additional assignments (beyond those identified in syllabus).)</td>
</tr>
<tr>
<td>April 25</td>
<td>Last day of classes.</td>
</tr>
<tr>
<td>April 27-May 5</td>
<td>Final examinations.</td>
</tr>
<tr>
<td>May 7</td>
<td>Spring Commencement.</td>
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