This syllabus is intended to provide a guideline for the course. It describes the planned course content and schedule, learning objectives, class assignments, examinations, and grading. Listed course topics will be covered to the extent allowed by the schedule. The topics covered and course schedule may change as a result of student readiness and learning abilities, time conflicts and limitations, or other unforeseen circumstances.

Course Description:
Theoretical concepts and industry practices used to model, evaluate, and improve construction worker safety through the design of the project features, construction operations, and site safety program elements. Causes of construction site accidents, hazard recognition and comprehension, safety risk valuation and mitigation, and the true costs of injuries and fatalities. Prerequisites: Graduate standing or consent of instructor. 3 credits.

Course Objectives:
The objectives of this course are to: educate students on the theories and practices developed to understand and improve safety on construction projects, and enable students to design comprehensive safety programs to address and enhance safety on construction projects. The approach taken to the topic is from the viewpoint of a civil/construction engineer tasked with developing a safety program which spans from project planning and design through the end of construction. The course begins with descriptions of construction site injuries and fatalities and the typical causes of accidents. This is followed by study of the impacts of construction accidents, how to assess safety risk, and how to measure and predict safety performance. The majority of the course covers methods of controlling, eliminating, and reducing safety hazards through the design of the project, the construction process, and the site safety program elements. The hierarchy of controls is utilized both for the structure of the course and as the foundation for addressing safety on projects and designing an effective safety program.

Learning Objectives:
At the completion of the course, the students should be able to:

1. Describe the theories of accident causation in the construction industry and analyze construction worker injuries and fatalities with regard to the theories.
2. Calculate risk and evaluate the risk associated with construction site safety hazards.
3. Describe the hierarchy of controls and apply it to improve construction site safety.
4. Describe the concept of designing for safety as it is applied to construction site safety and evaluate the feasibility of implementing the concept in practice.
5. Describe common elements of safety programs on construction projects.
6. Design a comprehensive safety program for a project from planning and design through the end of construction.

Instructor:  Dr. John Gambatese  
Professor, School of Civil and Construction Engineering  
201b Kearney Hall  
Tel.: (541) 737-8913  
E-mail: john.gambatese@oregonstate.edu  
Office hours: Tuesdays/Thursdays, 10:00am-12:00pm, or by appointment

Teaching Assistants:  None.

Textbooks:
Primary references:
“Construction Safety,” 2nd Edition  
Author: Jimmie Hinze  
Publisher: Pearson Education, Inc.  

Journal papers and professional publications on construction safety (see Blackboard website for the course).

Additional references:
“Construction Safety Management and Engineering”  
Author: Darryl C. Hill (Editor)  
Publisher: American Society of Safety Engineers (ASSE)  
ISBN: 978-1-88-558146-4

“Safety Through Design”  
Authors: Wayne C. Christensen and Fred A. Manuele  
Publisher: National Safety Council (NSC)  
ISBN: 978-0-87-912204-1

“Construction Safety & Health,” 2nd Edition  
Author: David L. Goetsch  
Publisher: Pearson Education, Inc.  

Course Website:  
Course announcements, assignments, and other information will be posted on the course website on Blackboard. The website is accessible to students at:  
http://my.oregonstate.edu/. Access requires that students sign up for an ONID (Oregon Network Identification) account at:  
Assignments:
Assignments will be issued periodically during the course as noted in the course schedule below. The assignments are to be done individually, except when noted. Completed assignments are to be submitted at the beginning of class on or before the date due. No assignments will be accepted or graded after the due date without a valid excuse.

The assignments may best be done in several sittings, and it should not be expected that they can be successfully completed quickly the night before they are due. For assignments that are to be done individually, students may discuss the assignments with other classmates, but not copy solutions; the solutions must be written up independently. Solutions for the assignments must be presented in a neat, well organized, and professional manner.

Exams:
The course will include a midterm exam and a final exam. The exams will cover material presented in the lectures, assigned reading, and homework assignments. All exams will be closed book/closed notes, unless otherwise noted, and are to be done individually.

According to the OSU Final Examination Policy, re-scheduling a final exam may not be possible even for the most meritorious reasons, and approval is limited to the following reasons:

- Conflict with working hours on a job that has been held during the term, and for which working schedules cannot be readily adjusted. Example: driving a school bus.
- Religious reasons.
- Four finals in one day.
- Military obligations verified in writing. Example: military orders, pre-induction physical.
- Other exceptional hardship cases.

If you have a conflict with the final exam due to one of the reasons above, please contact Dr. Gambatese as soon as possible before the exam to make other arrangements for the day and time of the exam.

Grading:
Assignments: 25%
Group project: 15%
Midterm exam: 30%
Final exam: 30%

Grading of the assignments and exams will be based on various criteria. A portion of the grades will be based on the presentation, clarity, and organization of the solution. In
addition to a score based on whether a correct solution was obtained, scores will also be based on the following criteria:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Levels of Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Professional</td>
</tr>
<tr>
<td>1. Presentation</td>
<td>Course #, assignment #, date, and name on first page. Page numbers provided on each sheet. Pencil and engineering paper used on one side only. Stapled in upper left corner.</td>
</tr>
<tr>
<td>2. Organization</td>
<td>Problem organized as: given, find, sketch (if needed), and solution. Answers underlined or boxed.</td>
</tr>
<tr>
<td>3. Neatness</td>
<td>Writing is typed (or if written: dark, clear, printed, and legible), and presented with a professional appearance. Any attachments are equally professional.</td>
</tr>
<tr>
<td>4. Clarity and Logical Presentation of Solution</td>
<td>Solution presented in a logical, orderly fashion, including fundamental equations used and sufficient (but brief) text to explain procedures, assumptions, and answers. Solution is easy for someone else to follow. <strong>Calculations are shown.</strong></td>
</tr>
</tbody>
</table>

**Class Participation and Academic Integrity:**
Each student is expected to participate in the class. Participation includes coming to class on time, being prepared for class, participating in class discussions and in-class group assignments, and interacting in a courteous and professional manner in accordance with that prescribed by the University. The CCE Honor Code and Student Conduct Code on the class Blackboard website describe appropriate class conduct.

Students are expected to be honest and ethical in their academic work. Academic or Scholarly Dishonesty is defined as an act of deception in which a student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student’s own efforts or the efforts of another. It includes:

- **cheating** - use or attempted use of unauthorized materials, information or study aids, or an act of deceit by which a Student attempts to misrepresent mastery of academic effort or information. This includes but is not limited to unauthorized copying or collaboration on a test or assignment, using prohibited materials and texts, any misuse of an electronic device, or using any deceptive means to gain academic credit.

- **fabrication** - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.
• **assisting** - helping another commit an act of academic dishonesty. This includes but is not limited to paying or bribing someone to acquire a test or assignment, changing someone's grades or academic records, taking a test/doing an assignment for someone else by any means, including misuse of an electronic device. It is a violation of Oregon state law to create and offer to sell part or all of an educational assignment to another person (ORS 165.114).

• **tampering** - altering or interfering with evaluation instruments or documents.

• **plagiarism** - representing the words or ideas of another person or presenting someone else's words, ideas, artistry or data as one's own, or using one's own previously submitted work. Plagiarism includes but is not limited to copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project and then submitting it as one's own.

For more information about OSU’s policies and procedures related to academic integrity, see the following websites:

- [http://oregonstate.edu/studentconduct/academic-misconduct](http://oregonstate.edu/studentconduct/academic-misconduct)
- The section on Academic Regulations in the OSU Schedule of Classes, [http://catalog.oregonstate.edu/](http://catalog.oregonstate.edu/)

Academic Dishonesty cases are handled initially by the academic units, following the process outlined in the University's Academic Dishonesty Report Form, and will also be referred to SCCS for action under these rules. If academic dishonesty occurs, the instructor will follow the guidance given here: [http://arcweb.sos.state.or.us/pages/rules/oars_500/oar_576/576_015.html](http://arcweb.sos.state.or.us/pages/rules/oars_500/oar_576/576_015.html).

**Civil and Construction Engineering Calculator Policy:**
Calculators used on exams and quizzes must abide by the School of Civil and Construction Engineering (CCE) calculator policy. The CCE policy states that calculators used must be those that are approved by the NCEES for use on the Fundamentals of Engineering/Surveying (FE/FS) exam. As of November 2010, these include: Casio models fx-115, Hewlett Packard models HP 33 and HP 35, and Texas Instrument models TI-30X and TI-36X. All calculators of these lines, including these model numbers, are allowed. For example, allowed calculators include Casio fx-115 MS, Casio fx-115 EX, TI-30Xa SE, etc. The NCEES calculator policy may be found at: [http://ncees.org/exams/calculator-policy/](http://ncees.org/exams/calculator-policy/).

**Disabled Student Assistance:**
Accommodations are collaborative efforts between students, faculty, and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are
eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 541-737-4098. (E-mail: disability.services@oregonstate.edu; website: http://ssd.oregonstate.edu/)
Course Schedule:

<table>
<thead>
<tr>
<th>Class Meeting</th>
<th>Topic</th>
<th>References**</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Course Introduction; Injury and Fatality Case Studies</td>
<td></td>
<td>1a, 1b See assignments</td>
</tr>
<tr>
<td>2</td>
<td>Nature of Safety in Construction</td>
<td>Introduction and Chapter 3</td>
<td>2 Class mtg. #5</td>
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<tr>
<td>3</td>
<td>Accidents: Theories and Causes</td>
<td>Chapters 1 and 2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Accidents: Theories and Causes</td>
<td>Chapters 1 and 2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Hazard Recognition and Risk Assessment</td>
<td>Chapters 7</td>
<td>3 Class mtg. #8</td>
</tr>
<tr>
<td>6</td>
<td>Impacts of Injuries/Fatalities and Working Safely</td>
<td>Chapter 4</td>
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<tr>
<td>7</td>
<td>Measuring Safety Performance</td>
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<tr>
<td>8</td>
<td>Safety Regulations; Safety in Contracts; Insurance</td>
<td>Chapters 5 and 10</td>
<td>4 Class mtg. #13</td>
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<tr>
<td>9</td>
<td>Midterm Exam</td>
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<tr>
<td>10</td>
<td>Designing a Safety Program</td>
<td>Chapter 24</td>
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<tr>
<td>11</td>
<td>Prevention through Design</td>
<td>Chapter 23</td>
<td></td>
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<tr>
<td>12</td>
<td>Prevention through Design</td>
<td>Chapter 23</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Prevention through Design</td>
<td>Chapter 23</td>
<td>5 Class mtg. #17</td>
</tr>
<tr>
<td>14</td>
<td>Administrative Controls</td>
<td>Chapters 8, 9, and 11 – 13</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Administrative Controls</td>
<td>Chapters 8, 9, and 11 – 13</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Worker Involvement and Behavior</td>
<td>Chapters 14 – 22</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Worker Involvement and Behavior</td>
<td>Chapters 14 – 22</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Holiday (no class meeting)</td>
<td></td>
<td></td>
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<tr>
<td>19</td>
<td>Integrating Safety throughout the Project: Sustainability, Lean, BIM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Integrating Safety throughout the Project: Sustainability, Lean, BIM</td>
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<tr>
<td></td>
<td>** Final Exam (2:00 – 3:50 p.m.)</td>
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</tbody>
</table>

** Chapters in “Construction Safety,” 2nd Edition, by Jimmie Hinze, in addition to papers and articles distributed in class.