



Course Description

Advanced study of system safety with an emphasis on risk control of engineering and technological systems. Addresses basic and essential information about the identification, evaluation, analysis, and control of hazards in components, systems, subsystems, processes, and facilities.

Course Textbook

Leveson, N. G. (2011). *Engineering a safer world: Systems thinking applied to safety*. Cambridge, MA: Massachusetts Institute of Technology.

Course Learning Outcomes

Upon completion of this course, students should be able to:

1. Summarize fundamental concepts in safety engineering.
2. Analyze public policy issues with consideration given to societal norms and preferences related to engineering systems.
3. Evaluate new approaches to safety based on modern systems thinking and theory.
4. Assess safety data analysis methods that are used for achieving a satisfactory state of safety.
5. Evaluate decision and evaluation tools to reduce accidents and to make systems and sophisticated products safer.

Credits

Upon completion of this course, the students will earn three (3) hours of college credit.

Course Structure

1. **Unit Learning Outcomes:** Each unit contains Learning Outcomes that specify the measurable skills and knowledge students should gain upon completion of the unit.
2. **Unit Lessons:** Each unit contains a Unit Lesson, which discusses unit material.
3. **Reading Assignments:** Each unit contains Reading Assignments from one or more chapters from the textbook. Suggested Readings are listed in the Unit I-VII study guides to aid students in their course of study. The readings themselves may or may not be provided in the course, but students are encouraged to read the resources listed if the opportunity arises as they have valuable information that expands upon the lesson material. Students will not be tested on their knowledge of the Suggested Readings.
4. **Learning Activities (Non-Graded):** These non-graded Learning Activities are provided in each unit to aid students in their course of study.
5. **Unit Assessments:** This course contains five Unit Assessments, one to be completed at the end of Units I-III, VI, and VII. Assessments are composed of written response questions.
6. **Unit Assignments:** Students are required to submit for grading Unit Assignments in Units IV, V, and VIII. Specific information and instructions regarding these assignments are provided below. Grading rubrics are included with each assignment. Specific information about accessing these rubrics is provided below.

7. **Ask the Professor:** This communication forum provides you with an opportunity to ask your professor general or course content related questions.
8. **Student Break Room:** This communication forum allows for casual conversation with your classmates.

CSU Online Library

The CSU Online Library is available to support your courses and programs. The online library includes databases, journals, e-books, and research guides. These resources are always accessible and can be reached through the library webpage. To access the library, log into the myCSU Student Portal, and click on "CSU Online Library." You can also access the CSU Online Library from the "My Library" button on the course menu for each course in Blackboard.

The CSU Online Library offers several reference services. E-mail (library@columbiasouthern.edu) and telephone (1.877.268.8046) assistance is available Monday – Thursday from 8 am to 5 pm and Friday from 8 am to 3 pm. The library's chat reference service, *Ask a Librarian*, is available 24/7; look for the chat box on the online library page.

Librarians can help you develop your research plan or assist you in finding relevant, appropriate, and timely information. Reference requests can include customized keyword search strategies, links to articles, database help, and other services.

Unit Assignments

Unit IV Case Study

1. Review the information in your textbook (Leveson, 2011, pp. 75-100) related to the STAMP model.
2. Download the two peer-reviewed journal articles, located in the required reading section for this unit, from the CSU Library (Academic Search Complete database) and read both articles.
3. Use the CSU APA-styled paper as a formatting template. Click [here](#), to access the template:
 - a. Compare and contrast the Construction Accident Causation model and the STAMP model.
 - b. Identify STAMP model features inherent within the Accident Causation Management System.
 - c. Describe the benefits and limitations of the STAMP model, the Construction Accident Causation model, and the Accident Causation Management System as each attempt to assist OSHA in the mission of addressing the aspect of human behavior within their respective designs.
4. Prepare a minimum three-page Case Study with no fewer than the three sources identified for the study.

Information about accessing the Blackboard Grading Rubric for this assignment is provided below.

Unit V Homework

Using the sample APA-styled paper (title page, abstract, body, and reference page), write a minimum two-page paper that includes the following:

1. First heading (APA Level 1 heading) should be "STPA." Explain the STPA process, the background behind it, and how it is reflected in systems engineering. Also, describe how the STPA process may be used as a technique to accommodate human controllers. Provide at least one scenario to support your explanation.
2. Second (APA Level 1 heading) should be "Safety-Guided Design Process." Explain the Safety-Guided Design process as it relates to industrial robotics. Also, describe how it may be used as a technique to accommodate humans within the control systems, including managing and designing for human error and error tolerances. Provide at least one scenario to support your explanation.

You are required to use at least one outside source. All sources used, including the textbook, must be referenced; paraphrased and quoted material must have accompanying APA citations.

Information about accessing the Blackboard Grading Rubric for this assignment is provided below.

Unit VIII Homework

Operations Safety Management Plan

- Review the information in your textbook (Leveson, 2011, pp. 412-414) related to the Operations Safety Management Plan design.
- Review the Figure C.1 depiction of a sample Safety Control Structure in your textbook (Leveson, 2011, p. 500).
- Review and use a minimum of five (5) peer-reviewed journal articles from the CSU Online Library (Academic Search Complete) to support your design work.

Then, select one (1) of the following options:

Option 1: Design an Operations Safety Management Plan for your own organization or an organization that is familiar to you.

Option 2: Design an Operations Safety Management Plan for a bulk tank railcar off-loading facility for hydrocarbon products that has the following features:

- a. one railcar switch located next to an interstate highway,
- b. capacity to off-load both liquid hydrocarbon products and liquefied, compressed, natural gas products,
- c. two 500,000-gallon bulk liquid storage tanks for liquid hydrocarbon products,
- d. two 45,000-gallon bullet-styled, horizontal, liquid storage tanks for liquefied, compressed natural gas products,
- e. one off-loading station (single-sided) that is elevated 12 feet from the ground,
- f. one flare for over-pressurized gas tank railcars,
- g. one 3,000-gallon condensation storage tank, and
- h. one switch engine for staging railcars at the off-loading station and at railcar storage tracks.

Using the CSU APA-styled paper as a formatting template, design a minimum eight-page Operations Safety Management Plan with a minimum of five (5) scholarly sources (books and articles) using the following APA Level 1 headings:

1. General Considerations
2. Safety Organization
3. Procedures
4. Schedule
5. Safety Information System
6. Operations Hazard Analysis
7. Evaluation and Planned Use of Feedback for System Maintenance
8. Safety Control Structure Diagram (Design a Safety Control Structure Diagram for your work system and use as the content.)

Information about accessing the Blackboard Grading Rubric for this assignment is provided below.

APA Guidelines

The application of the APA writing style shall be practical, functional, and appropriate to each academic level, with the primary purpose being the documentation (citation) of sources. CSU requires that students use APA style for certain papers and projects. Students should always carefully read and follow assignment directions and review the associated grading rubric when available. Students can find CSU's Citation Guide in the myCSU Student Portal by clicking on the "Citation Resources" link in the "Learning Resources" area. This document includes examples and sample papers and provides information on how to contact the CSU Success Center.

Grading Rubrics

This course utilizes analytic grading rubrics as tools for your professor in assigning grades for all learning activities. Each rubric serves as a guide that communicates the expectations of the learning activity and describes the criteria for each level of achievement. In addition, a rubric is a reference tool that lists evaluation criteria and can help you organize your efforts to meet the requirements of that learning activity. It is imperative for you to familiarize yourself with these rubrics because these are the primary tools your professor uses for assessing learning activities.

Rubric categories include: (1) Assessment (Written Response) and (2) Assignment. However, it is possible that not all of the listed rubric types will be used in a single course (e.g., some courses may not have Assessments).

The Assessment (Written Response) rubric can be found embedded in a link within the directions for each Unit Assessment. However, these rubrics will only be used when written-response questions appear within the Assessment.

Each Assignment type (e.g., article critique, case study, research paper) will have its own rubric. The Assignment rubrics are built into Blackboard, allowing students to review them prior to beginning the Assignment and again once the Assignment has been scored. This rubric can be accessed via the Assignment link located within the unit where it is to be submitted. Students may also access the rubric through the course menu by selecting "Tools" and then "My Grades."

Again, it is vitally important for you to become familiar with these rubrics because their application to your Assessments and Assignments is the method by which your instructor assigns all grades.

Communication Forums

These are non-graded discussion forums that allow you to communicate with your professor and other students. Participation in these discussion forums is encouraged, but not required. You can access these forums with the buttons in the Course Menu. Instructions for subscribing/unsubscribing to these forums are provided below.

Once you have completed Unit VIII, you **MUST** unsubscribe from the forum; otherwise, you will continue to receive e-mail updates from the forum. You will not be able to unsubscribe after your course end date.

[Click here for instructions on how to subscribe/unsubscribe and post to the Communication Forums.](#)

Ask the Professor

This communication forum provides you with an opportunity to ask your professor general or course content questions. Questions may focus on Blackboard locations of online course components, textbook or course content elaboration, additional guidance on assessment requirements, or general advice from other students.

Questions that are specific in nature, such as inquiries regarding assessment/assignment grades or personal accommodation requests, are **NOT** to be posted on this forum. If you have questions, comments, or concerns of a non-public nature, please feel free to email your professor. Responses to your post will be addressed or emailed by the professor within 48 hours.

Before posting, please ensure that you have read all relevant course documentation, including the syllabus, assessment/assignment instructions, faculty feedback, and other important information.

Student Break Room

This communication forum allows for casual conversation with your classmates. Communication on this forum should always maintain a standard of appropriateness and respect for your fellow classmates. This forum should **NOT** be used to share assessment answers.

Grading

Assessments (5 @ 14%)	=	70%
Unit IV Case Study	=	8%
Unit V Homework	=	8%
Unit VIII Homework	=	14%
Total	=	100%

Course Schedule/Checklist (PLEASE PRINT)

The following pages contain a printable Course Schedule to assist you through this course. By following this schedule, you will be assured that you will complete the course within the time allotted.