

LSC Use Only No:	LSC Action-Date:	UWUCC USE Only No.	UWUCC Action-Date:
		Senate Action Date:	
		App <sup>06-51a</sup> 5-1-07	App. 4/3/07

**Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee**

Contact Person Dr. Lon Ferguson	Email Address Ferguson@iup.edu
Proposing Department/Unit Safety Sciences	Phone 7-3019

**Check all appropriate lines and complete information as requested. Use a separate cover sheet for each course proposal and for each program proposal.**

<b>1. Course Proposals (check all that apply)</b>		
<input type="checkbox"/> New Course	<input type="checkbox"/> Course Prefix Change	<input type="checkbox"/> Course Deletion
<input checked="" type="checkbox"/> Course Revision	<input checked="" type="checkbox"/> Course Number and/or Title Change	<input checked="" type="checkbox"/> Catalog Description Change
SAFE 111 Principles of Industrial Safety I		SAFE 111 Principles of Safety I - General Industry
<i>Current Course prefix, number and full title</i>		<i>Proposed course prefix, number and full title, if changing</i>
<b>2. Additional Course Designations: check if appropriate</b>		
<input type="checkbox"/> This course is also proposed as a Liberal Studies Course.	<input type="checkbox"/> Other: (e.g., Women's Studies, Pan-African)	
<input type="checkbox"/> This course is also proposed as an Honors College Course		
<b>3. Program Proposals</b>		
<input type="checkbox"/> New Degree Program	<input type="checkbox"/> Program Title Change	<input type="checkbox"/> Program Revision
<input type="checkbox"/> New Minor Program	<input type="checkbox"/> New Track	<input type="checkbox"/> Other
<i>Current program name</i>		<i>Proposed program name, if changing</i>
<b>4. Approvals</b>		<b>Date</b>
Department Curriculum Committee Chair(s)	<i>La H. Ferguson</i>	<i>2/9/07</i>
Department Chair(s)	<i>La H. Ferguson</i>	<i>2/14/07</i>
College Curriculum Committee Chair	<i>Elizabeth Palmer</i>	<i>3-5-07</i>
College Dean	<i>Arleen P. Zoni</i>	<i>3/13/07</i>
Director of Liberal Studies *		
Director of Honors College *		
Provost *		
Additional signatures as appropriate: (include title)		
<b>Received</b> UWUCC Co-Chairs	<i>Gail Sedquist</i>	<i>4-3-07</i>
<b>MAR 19 2007</b>		

# Course Revision: SAFE 111 Principles of Safety I – General Industry

## Part II. Description of the Curriculum Change

### 1. Syllabus of Record.

The new syllabus of record for this revised course is attached in Appendix A.

### 2. A summary of the proposed revisions:

- a. Course name was changed to illustrate the focus on general industry.
- b. The course objectives were expanded to better reflect slight modification to course content.
- c. Course content was revised by adding coverage of walking and working surfaces, and hand and power tools and merging robotics safety in with a unit on “Special Industry Machinery and Processes”.
- d. Course description was changed slightly by removing reference to robotics safety and adding working and walking surfaces.

## New Course Description

Course Title: SAFE 111 Principles of Safety I – General Industry  
Prerequisites: SAFE 101

3 lecture hours  
0 lab hours  
3 credits  
(3c-01-3cr)

Stresses an understanding of the complexity of the industrial hazard control problem by thoroughly examining elements of safety and health enumerated in the OSHA promulgated general industry standards and various consensus standards. Emphasis given to plant layout and design, powered industrial vehicles, boilers and unfired pressure vessels, working and walking surfaces, machine guarding, and an introduction to industrial processes.

## Old Course Description

Course Title: SAFE 111 Principles of Industrial Safety  
Prerequisites: SAFE 101

3 class hours  
0 lab hours  
3 credits  
(3c-01-3cr)

Stresses an understanding of the complexity of the industrial hazard control problem by thoroughly examining elements of safety and health enumerated in the OSHA promulgated standards and various consensus standards. Emphasizes plant layout and design, powered industrial vehicles, boilers and unfired pressure vessels, machine guarding, robotics safety and an introduction to industrial processes.

3. Justification/rationale for the revision.

The slight changes to this course were necessary because we are also revising SAFE 211 Principles of Industrial Safety II which was at one time a companion course. Over the past ten years the department has been responding to Alumni and our Advisory Committee suggestions that we cover construction safety topics and gradually that has happened in SAFE 211. We are now at the point where the majority of SAFE 211 is construction safety and based on recommendations from our Advisory Committee we have decided to change SAFE 211 so that it focuses primarily on construction. Because of this change we needed to make slight changes to SAFE 111.

4. The old syllabus of record.

The old syllabus of record is attached in Appendix B.

5. Liberal Studies course approval.

Not applicable

**Part III. Letters of Support or Acknowledgement**

These course changes will not affect other departments, therefore letters of support from other departments were not necessary.

# SYLLABUS OF RECORD

## I. Catalog Description

Course Title: SAFE 111 Principles of Safety I – General Industry  
Prerequisites: SAFE 101

3 lecture hours  
0 lab hours  
3 credits  
(3c-01-3cr)

Stresses an understanding of the complexity of the industrial hazard control problem by thoroughly examining elements of safety and health enumerated in the OSHA promulgated general industry standards and various consensus standards. Emphasis given to plant layout and design, powered industrial vehicles, boilers and unfired pressure vessels, working and walking surfaces, machine guarding, and an introduction to industrial processes.

## II. Course Objectives

Students will be able to:

- A. distinguish among basic types of manufacturing processes.
- B. demonstrate competency in the legal aspects of safety by using the Occupational Safety and Health Administration (OSHA) standards to identify specific violations of current standards.
- C. identify other sources of safety and health standards such as the American National Standards Association (ANSI).
- D. describe important considerations in building design and layout such as egress, walking surfaces, materials handling, sanitation and traffic control.
- E. define the specific classes of industrial trucks, the common hazards associated with their operation and control strategies to reduce hazards.
- F. identify point of operation and power transmission exposures for a variety of industrial equipment
- G. develop implementation strategies for reducing machine related exposures exposures.
- H. discuss safety considerations involved in the construction, installation and maintenance of boilers and unfired pressure vessels.
- I. describe design consideration in working and walking surfaces to reduce falls.

## III. Course Outline

- A. Occupational Safety & Health General Industry Standards (Week # 1)
  1. Development of standards
  2. Enforcement of standards
  3. Consensus standards
- B. Introduction to Industrial Processes (Week # 2)
  1. Types of processes
  2. Process flow
  3. Process related hazards
- C. Industrial Building and Plant Layout (Week #3)
  1. Site planning
  2. Building layout
  3. Egress and traffic control
  4. Industrial sanitation and personnel facilities

- D. Powered Industrial Vehicles** (Week # 4-5)
1. Classes of industrial trucks/vehicles
  2. Safe operation of vehicles
  3. Maintenance and inspection of vehicles
  4. Training of operators
  5. Automatic guided vehicles
- E. Boilers and Unfired Pressure Vessels** (Week # 6)
1. Construction and installation
  2. Inspection and maintenance
- F. Walking and Working Surfaces** (Week # 7)
1. Significance of exposure to employees and public
  2. Slips and falls - coefficient of friction
  3. Choosing floor materials
  4. Stairways and ramps
- Midterm Examination** (Week # 8)
- G. General Requirements for Machine Guarding** (Week # 8-9)
1. Point of operation guarding
  2. Power transmission guarding
  3. Administrative controls
- H. Metal and Wood Working Machinery** (Week # 10-11)
1. Grinders, shapers and sanding machines
  2. Lathes and mills
  3. Sawing machines
  4. Drilling machines
- I. Cold and Hot Forming Machinery** (Week # 12)
1. Cold and hot metal process
  2. Mechanical and hydraulic punch presses
  3. Press brakes and shears
  4. Forging hammers
- J. Hand and Power Tools** (Week # 13)
1. Identification of hazards
  2. Control of hazards
- K. Special Industry Machinery and Processes** (Week # 14)
1. Introduction to robotic safety
  2. Saw mills and logging
  3. Meat cutting
  4. Rubber making
- Final Examination** (Finals Week)

#### **IV. Evaluation Methods**

The faculty person assigned to teach this course could be one of several faculty within the Safety Sciences Department. What follows is an example of the evaluation methods and weighting used by one of those faculty.

The final grade in this class will be determined using a combination of the following:

- A. At least two examinations (60%)  
All examinations will be announced and will be closed book except for the use of the Code of Federal Regulations (29CFR 1910) during certain sections. Questions on exams will be short answer, multiple choice, true/false and matching.
- B. Quizzes (10%)  
Quizzes will be similar in format to the examinations, however they will not be announced. Quizzes will emphasize readings from the text, handouts and current notes.
- C. Homework (15%)
  - 1. Industrial scenarios which require the use of OSHA and ANSI standards to identify hazards and possible control strategies.
  - 2. Written chapter summaries from the text.
- D. Individual and Group Projects (15%)  
Projects will include case studies of industrial exposures.

#### **V. Grading Scale**

The following grading scale will be used to assign letter grades, related to the evaluation of student performance based on a percentage scale:

A = 90-100%  
B = 80-89%  
C = 70-79%  
D = 60-69%  
F = Below 60%

#### **VI. Attendance Policy**

The attendance policy for this course conforms to the University's Undergraduate Course Attendance Policy in that all students are expected to attend and participate in class to enhance their learning.

#### **VII. Required Text**

Laing, Patricia M., Editor. Accident Prevention Manual for Industrial Operations – Engineering and Technology. Twelfth Edition. Chicago: National Safety Council, 2006.

Code of Federal Regulations 29 Parts 1900 to 1910 (up to section 1000) General Industry Standards. Current Edition. Washington DC: US Government Printing Office.

## **VIII. Special Resource Requirements**

None

## **IX. Bibliography**

Brauer, Roger L. Safety and Health for Engineers. New York: Van Nostrand Reinhold, 2006.

Hammer, Willie. Occupational Safety Management and Engineering. Fifth Edition. Englewood Cliffs, NJ: Prentice Hall, 2001.

Laing, P.M. Power Press Safety Manual. Chicago, IL: National Safety Council, 2004.

MacCollum, D.V. Crane Hazards and Their Prevention. Des Plaines, IL: American Society of Safety Engineers, 2000.

### **Historical Bibliography**

Grimaldi, J. and Simmins, R. Safety Management. Sixth Edition. Boston, MA: Irwin, 1998.

Yankee, H.W. Manufacturing Processes. Englewood Cliffs, NJ: Prentice Hall, 1999.

## Appendix B Old Syllabus of Record

### I. Catalog Description

Course Title: SAFE 111 Principles of Industrial Safety

Prerequisites: SAFE 101

3 credits

0 lab hours

3 semester hours

(3c-01-3sh)

Stresses an understanding of the complexity of the industrial hazard control problem by thoroughly examining elements of safety and health enumerated in the OSHA promulgated standards and various consensus standards. Emphasis given to plant layout and design, powered industrial vehicles, boilers and unfired pressure vessels, machine guarding, robotics safety and an introduction to industrial processes.

### II. Course Objectives

Students completing this course will be able to:

1. Distinguish between some basic types of manufacturing processes.
2. Demonstrate competency in using the OSHA standards by identifying specific violations of current standards.
3. Identify other sources of safety and health standards such as ANSI, NFPA, etc.
4. Describe important considerations in building design and layout such as egress, walking surfaces, materials handling, sanitation and traffic control.
5. Define the specific classes of industrial trucks, the common hazards associated with their operation and control strategies to reduce hazards.
6. Identify point of operation and power transmission exposures for a variety of industrial equipment as well as develop control strategies to reduce exposures.
7. Discuss safety considerations involved in the construction, installation and maintenance of boilers and unfired pressure vessels.
8. Describe the basic components of an industrial robot as well as common hazards and safeguards.

### III. Course Outline

- A. Occupational Safety & Health Standards (4 hours)
1. Development of standards
  2. Enforcement of standards
  3. Consensus standards
- B. Introduction to Industrial Processes (3 Hours)
1. Types of processes
  2. Process flow
  3. Process related hazards
- C. Industrial Building and Plant Layout (6 Hours)
1. Site planning
  2. Building layout
  3. Egress and traffic control
  4. Industrial sanitation and personnel facilities
  5. Walking and working surfaces

- D. Powered Industrial Vehicles (6 Hours)
  - 1. Classes of industrial trucks/vehicles
  - 2. Safe operation of vehicles
  - 3. Maintenance and inspection of vehicles
  - 4. Training of operators
  - 5. Automatic guided vehicles
  
- F. Boilers and Unfired Pressure Vessels (3 Hours)
  - 1. Construction and installation
  - 2. Inspection and maintenance
  
- F. General Requirements for Machine Guarding (4 Hours)
  - 1. Point of operation guarding
  - 2. Power transmission guarding
  - 3. Administrative controls
  
- G. Metal and Wood Working Machinery (6 Hours)
  - 1. Grinders, shapers and sanding machines
  - 2. Lathes and mills
  - 3. Sawing machines
  - 4. Drilling machines
  
- H. Cold and Hot Forming Machinery (6 Hours)
  - 1. Cold and hot metal process
  - 2. Mechanical and hydraulic punch presses
  - 3. Press brakes and shears
  - 4. Forging hammers
  
- I. Robotics Safety (4 Hours)
  - 1. Types of robots
  - 2. Uses for robots
  - 3. Hazards associated with robots
  - 4. Controls for robotics hazards

#### **IV. Evaluation Methods**

The faculty person assigned to teach this course could be one of several faculty within the Safety Sciences Department. What follows is an example of the evaluation methods and weighting used by one of those faculty.

The final grade in this class will be determined using a combination of the following:

- A. At least two examinations (60%)
 

All examinations will be announced and will be closed book except for the use of the Code of Federal Regulations (29CFR 1910) during certain sections. Questions on exams will be short answer, multiple choice, true/false and matching.
  
- B. Quizzes (10%)
 

Quizzes will be similar in format to the examinations, however they will not be announced. Quizzes will emphasize readings from the text and handouts and current notes.

### C. Homework (15%)

1. Industrial scenarios which require the use of OSHA and ANSI standards to identify hazards and possible control strategies.
2. Written chapter summaries from the text.

### D. Individual and Group Projects (15%)

Projects will include case studies of industrial exposures and the development of a crane inspection form.

The following grading scale will be used to assign letter grades, related to the evaluation of student performance based on a percentage scale:

A = 90-100%  
B = 80-89%  
C = 70-79%  
D = 60-69%  
F = Below 60%

At the discretion of the instructor, a grading curve that results in an appropriate distribution of grades may be used in place of the scale described above.

## V. Required Text

Laing, Patricia M., Editor. Accident Prevention Manual for Industrial Operations – Engineering and Technology. Tenth Edition. Chicago: National Safety Council, 1990

Code of Federal Regulations 29 Parts 1900 to 1910 (up to section 1000) General Industry Standards. 1995 Edition. Washington DC: US Government Printing Office, 1995.

## VI. Special Resource Requirements

None

## VII. Bibliography

Brauer, Roger L. Safety and Health for Engineers. New York: Van Nostrand Reinhold, 1994.

Grimaldi, J. and Simmins, R. Safety Management. Fifth Edition. Boston, MA: Irwin, 1989.

Hammer, Willie. Occupational Safety Management and Engineering. Fourth Edition. Englewood Cliffs, NJ: Prentice Hall, 1989.

Laing, P.M. Power Press Safety Manual. Chicago, IL: National Safety Council, 1989.

MacCollum, D.V. Crane Hazards and Their Prevention. Des Plaines, IL: American Society of Safety Engineers, 1993.

Yankee, H.W. Manufacturing Processes. Englewood Cliffs, NJ: Prentice Hall, 1989.

## **VIII. General Course Outline**

### **Unit 1 Occupational Safety and Health Standards (4 hours)**

Students are familiarized with the current procedures for the development of OSHA standards including emergency and temporary standards, variances and appeal procedures. Enforcement methods are discussed in detail; inspections, penalties, imminent hazards and appeals. The student is introduced to Volume 29 of the Code of Federal Regulations via discussion of definitions, coverage, and the referencing of specific standards. The students are also introduced to consensus standards such as ANSI, NFPA, and FM.

#### **Unit Objective**

Students will demonstrate competency in using the OSHA and consensus standards by identifying specific standards violated via homework assignments and case studies. The student will also be able to identify the procedures for developing OSHA standards as well as enforcement methods.

### **Unit 2 Introduction to Industrial Processes (3 hours)**

The students will be introduced to the most common processes used in industry. This will include defining the variety of processes, explaining material flow through the process and the human interface with the process. Emphasis will be placed on identifying the common hazards associated with the operation of the processes.

#### **Unit Objective**

Students will be able to identify and discuss the most common industrial processes used in industry as well as the common hazards associated with these processes.

### **Unit 3 Industrial Building and Plant Layout (6 hours)**

All planning considerations such as site selection, plant layout, sanitation, storage of hazardous materials, product flow and transport facilities are discussed. Students are familiarized with the design of aisle ways for personnel and vehicular traffic as well as means of egress considerations.

#### **Unit Objective**

Students will be able to describe some of the important considerations in site selection, building layout, storage of hazardous materials and transport facilities and identify appropriate reference sources available to assist in building and plant layout.

### **Unit 4 Powered Industrial Vehicles (6 hours)**

The student will be introduced to the basic types of powered industrial trucks including automatic guided vehicles. This introduction will include a review of the classes of industrial trucks, common hazards associated with the operation of such vehicles, safe operation practices, maintenance/inspection and training of operators.

#### **Unit Objective:**

Students will be able to define the specific classes of industrial trucks, and common hazards associated with their operation and control strategies to reduce hazards.

**Unit 5 Boilers and Unfired Pressure Vessels (3 Hours)**

The students are introduced to the basic operation of boilers and unfired pressure vessels. Laws covering construction, installation, inspection and maintenance are covered, with special emphasis on hazard control measures.

**Unit Objective:** Students will be able to discuss the safety considerations involved in the construction, installation and maintenance of boilers and unfired pressure vessels.

**Unit 6 General Requirements for Machine Guarding (4 Hours)**

Important definitions for understanding machine guarding, such as point of operation (PO) and power transmission (PT) are discussed in detail. Students will be introduced to the common types of hazards associated with the PO and PT and will learn the variety of options available for safeguarding the PO and PT. Administrative controls such as training, inspection and maintenance will also be discussed.

**Unit Objective**

Students will be able to describe the difference between PO and PT and identify the safeguarding options available for both.

**Unit 7 Metal and Woodworking Machinery (6 Hours)**

Different types of metal and woodworking machinery are illustrated to the students. The basic operation of the machinery is discussed including actual/potential exposures. Safeguarding the specific types of machinery is discussed in detail.

**Unit Objective**

Students will be able to identify specific types of metal and woodworking machinery and describe the common hazards associated with their operation. Students will also be able to discuss in detail the safeguards necessary for the specific types of metal and woodworking machinery.

**Unit 8 Cold and Hot Forming Machinery (6 Hours)**

Various types of cold and hot forming machinery are illustrated to the students. Specific types of machinery include: mechanical and hydraulic punch presses, press brakes, roll formers, shears, upsetters and forging hammers. The hazards associated with the operation of the above machinery is discussed in detail along with the variety of options available for safeguarding the machinery. The student is also introduced to the maintenance, inspection and training programs necessary to support press operations.

**Unit Objectives**

Students will be able to distinguish between the specific types of cold and hot forming machinery and discuss the common hazards associated with their operation. Students will also be able to describe the safeguards necessary for the specific types of cold and hot forming machinery.

## Unit 9

### Robotics Safety (4 hours)

The student will be introduced to the types of industrial robots as well as their common uses in industry. The basic components of industrial robots will be reviewed, along with a discussion of the working envelope of a robot. The common hazards associated with the operation of robots will be discussed along with the safeguards necessary to reduce hazards.

#### Unit Objective

Students will be able to identify the basic components of an industrial robot as well as common hazards and safeguards.

## Appendix C

### Catalog Description

Course Title: SAFE 111 Principles of Safety I – General Industry  
Prerequisites: SAFE 101

3 lecture hours  
0 lab hours  
3 credits  
(3c-01-3cr)

Stresses an understanding of the complexity of the industrial hazard control problem by thoroughly examining elements of safety and health enumerated in the OSHA promulgated general industry standards and various consensus standards. Emphasis given to plant layout and design, powered industrial vehicles, boilers and unfired pressure vessels, working and walking surfaces, machine guarding, and an introduction to industrial processes.