LSC Use Only No:	LSC Action-Date:	UWUCC USE Only No.	UWUCC Action-Date:	Senate Action Date:
		02-39b	App 2/4/03	App 2/25/03

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person Dr. Laura Rhodes	Email Address lhrhodes@iup.edu
Proposing Department/Unit Safety Sciences	Phone 7-2357

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

1. Course Proposals (check all that apply)

_____New Course _____Course Prefix Change _____Course Deletion

XXX Course Revision _____Course Number and/or Title Change _____Catalog Description Change

***Current* Course prefix, number and full title**	***Proposed* course prefix, number and full title, if changing**
SAFE 211 Principles of Industrial Safety II	

2. Additional Course Designations: check if appropriate

_____ This course is also proposed as a Liberal Studies Course.

_____ This course is also proposed as an Honors College Course.

_____ Other: (e.g., Women's Studies, Pan-African)

3. Program Proposals

_____Catalog Description Change _____Program Revision

_____New Degree Program _____Program Title Change _____Other

_____New Minor Program _____New Track

***Current* program name**	***Proposed* program name, if changing**

4. Approvals		**Date**
Department Curriculum Committee Chair(s)	Lan H. Ferguson	10/21/02
Department Chair	Lan H. Ferguson	10/21/02
College Curriculum Committee Chair		11-22-02
College Dean	Kathleen A. Zane	25 Nov 02
Director of Liberal Studies *		
Director of Honors College *		
Provost *		
Additional signatures as appropriate: (include title)		
UWUCC Co-Chairs	Gail S. Sechrist	2/4/03

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RECEIVED JAN 30 2003 LIBERAL STUDIES

Course Revision: SA 211 Principles of Industrial Safety II

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. Additional topics have been added to this course, specifically, more information on construction, permit required confined spaces, and specialized industrial processes (robotics, logging, sawmills, rubber making, and meat cutting)

   b. Upgrades in laboratory exercises to utilize new lecture material and to provide hands-on use of new equipment purchased for the laboratory.

   c. Updated Bibliography

3. Justification/rationale for the revision.

   This is a major revision to an existing course. Changes reflect the resolutions made at a day-long faculty retreat held in May 2002, based on results of alumni surveys which identified short-comings in the existing course content. These major changes will not require changes in the content or descriptions of other existing courses in the B.S. or M.S. Program in Safety Sciences.

4. The old syllabus of record.

   The old syllabus of record is attached in Appendix B.

5. Liberal Studies course approval.

   These changes do not affect the Liberal Studies requirements.

Part III. Letters of Support or Acknowledgement

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

Appendix A: New Syllabus of Record

I. Catalog Description

Course Title: SAFE 211 Principles of Industrial Safety II

Prerequisites: SAFE 101

3 class hours
3 lab hours
4 credit hours

(3c-31-4cr)

Stresses an understanding of the complexity of industrial hazard control by thoroughly examining elements of safety and health enumerated in the Occupational Safety and Health Administration promulgated standards and in various consensus standards. Emphasis is placed on welding and cutting, walking and working surfaces, materials handling and storage, electrical safe work practices, construction safety and personal protective equipment. Application of hazard control strategies is accomplished in laboratory sessions.

II. Course Objectives

Students completing this course will be able to:

A. Identify the sources of safety standards such as consensus standards, and OSHA's interpretations of those standards through computer searches of the Internet and safety related databases.

B. Identify the need for engineering controls of safety hazards, use personal protection equipment where necessary and preparation of programs which address their uses, limitations, maintenance, and inspection.

C. Demonstrate the knowledge of hazards for welding and cutting and their evaluation and control mechanisms, including hot work permitting and permit required confined space standards.

D. Explain the hazards, evaluation, and control mechanisms related to wall and floor openings, stairways, ramps, catwalks, ladders, scaffolds, and other walking and working surfaces.

E. Identify the hazards associated with common material handling equipment such as cranes, hoists, derricks; hazards related to the rigging for such equipment are also identified.

F. State the fundamental principles of electrical safe practices and the use of electrical testing equipment.

G. Identify the control of hazards associated with motorized equipment, trenching, blasting, tunneling, steel erection and power transmission equipment in construction.

H. Describe the control of hazards for specialized machinery used in operations such as robotics, pulp, paper and paperboard mills, textiles, sawmills and logging.

III. Course Outline

A. Occupational Safety and Health Standards (3 hours)

1. Development of Standards
2. Enforcement Methods
3. Computer Search Methods
4. Interpretation of Standards

B. Personal Protective Equipment (3 hours)

1. Identifying Needs
2. Maintenance and Inspection Programs
3. Training Programs
4. 1926.95-.107,1910 Subpart I

C. Electrical Safety (6 hours)

1. Principles of Electricity
2. Elements of Electrical Equipment
3. Choosing Electrical Equipment for Hazardous Locations
4. Lockout/tagout Procedures
5. Electrical Power Transmission
6. Wiring and its Associated Hazards
7. Switches/Ground Fault Circuit Interrupters
8. Electrical Grounding as a Safeguard
9. Electrical Test Equipment

D. Welding and Cutting Operations (3 hours)

1. Safeguarding Compressed Gas Cylinders
2. Types of Welding and their Unique Hazards
3. Hot Work Permit Systems
4. Non-Destructive Testing

E. Permit Required Confined Spaces (PCRS) (5 hours)

1. Regulations Governing Spaces
2. Space Classifications
3. Permitting
4. PRCS Program Elements

F. Materials Handling and Storage (4 hours)

1. Mechanized Systems – Conveyors, Hoists, Cranes, Derricks
2. Chain and Sling Rigging Hazards
3. Manual Systems
4. Maintenance, Inspection, and Training

Midterm Examination (1 hour)

G. Trenching (4 hours)

1. Significance of Exposure
2. Mechanics of Collapse
3. Soil Classifications
4. Safeguarding-Sloping, Shoring, Shielding
5. Regulations Governing Operations

H. Scaffolds and Ladders (4 hours)

1. Types of and Use of Scaffolds
2. Identifying Typical Hazard Exposures
3. Regulations Governing Operations and Hazard Control

I. Fall Protection (4 hours)

1. Significance of Exposure
2. Physics of Falls-The Human Experience
3. Options for Protection
4. Regulations Governing Fall Protection

J. Walking and Working Surfaces (2 hours)

1. Significance of Exposure to Employees and Public
2. Coefficient of Friction
3. Choosing Floor Materials
4. Stairways, Ramps, Catwalks

K. Special Industry Machinery and Processes (3 hours)

1. Introduction to Robotic Safety
2. Saw Mills and Logging
3. Meat Cutting
4. Rubber Making
5. 1910 Subpart R

L. Culminating Activity (2 hours)

Laboratory Exercises (42 hours, each at 3 hours)

The following laboratory exercises are an integral part of the course, giving the students an opportunity to observe and apply many of the fire safety concepts first hand, at appropriate times during the course. Separate grades will be issued for the laboratory exercise, see Evaluation Methods section.

The specific laboratory exercises are described below:

1. Introduction to laboratory equipment, methods of operation, and presentation of data and results. Agreement on what constitutes a "hazard". Review of quantitative and qualitative assessments typically conducted by the safety professional. Conduct basic hazard assessment in the lab and identify control measures in place (Engineering, Administrative and PPE) as well as the consensus standards applicable.

2. Computer identification of standards and interpretation of standards. Exposure to useful safety resources on line and software packages.

3. Hazard Assessment for PPE; Selecting cost effective PPE and convincing management of the need to purchase PPE.

4. Development of a JSA for Welding operations by performing and assessing sample welding. Conduct Non-Destructive testing on weld.

5. Determine the slip hazards by determining coefficients of frictions on walking surfaces; use of slipometer. Compare readings to OSHA and ADA mandates.

6. Crane and hoist sling tension analysis. Use of algebra to calculate sling tension and compare findings to measured tensions. Identify sources of error in tension calculations.

7. Conduct hazard assessment in a Power Generation and Distribution facility. Solidify understanding of Permit Required Confined Spaces.

8. Wire simple receptacles on "breadboard" and identify errors in wiring using test instruments Become familiar with both 3-wire and double-insulated tool testing equipment and use each in testing equipment, (2 Labs).

9. Determine which equipment in the Safety Lab must be locked out or tagged out by standards and describe the devices to do such. Prepare a lockout/tagout procedure for one hard wired piece of equipment in the laboratory. .

10. Use of 1/3 scale tubular scaffold. Identify elements of a scaffold. Prepare a ladder and scaffold inspection checklist for the equipment available.

11. Become familiar with the soil testing equipment and perform tests, determine the sloping required for a given trench condition. Conduct an OSHA hazard assessment of an actual trench and/or determine safeguards for OSHA published *"Fatal Facts."*

12. Become familiar with a number of fall protection devices as used on a series of elevations and working surfaces; determine their advantages and/or shortcomings.

13. Conduct an OSHA hazard assessment of a construction fall exposure and/or determine safeguards for OSHA published *"Fatal Facts."*

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:

Classroom Evaluation

Weighting:

Midterm exam	20%
Final	20%
Group Project	20%
Quizzes/Tests	25%
Assignments	10%
Participation*	5%

*This includes but is not limited to: individual participation in whole class and small group discussions and other brief class presentations

No make-up examinations will be given except in the case of illness (confirmed in writing by the infirmary or MD) or a documented (in writing) family emergency. Regardless of reason, absolutely no make-up exams will be given unless the instructor is contacted prior to the scheduled test period.

Laboratory Evaluation

Students receive a separate grade for the laboratory exercises and final grade in the laboratory portion of this course will be determined from and will be weighted as described below:

A. Quizzes (10%)
   Quizzes may be open book and unannounced. They may be made up of short answer, true/ false, or multiple choice questions.

B. Participation (5%)
   Students must attend the entire lab period in order to receive full credit.

C. Laboratory Reports (75%)
   Laboratory reports will be prepared for most sessions and will follow a specific format as provided in the SAFE 211 LAB REPORT GUIDELINES. Report grades will be based on accuracy, completeness and originality.

D. Portfolio (10%)

A minimum of three (3) improved versions of laboratory activities must be presented in a portfolio suitable for a job interview. These pieces should demonstrate 1) ability to work with others,
2) ability to identify, evaluate and control hazards, and
3) computer skills.

V. Example Grading Scale:

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

Grading will be based on the portfolio's professional appearance, organization, timeliness, evidence of the above three items, evidence of improved work, and a reflective statement. 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.

VI. Attendance Policy

Although there is no formal attendance policy for this class, student learning is enhanced by regular attendance and participation in class discussions and the university expects all students to attend class.

VII. Required Text

Laing, Patricia M., Editor. (2001). *Accident prevention manual for business and industry – engineering & technology.* 12th Edition. Chicago: National Safety Council.

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

Alerich, W. & Keljik, J. (1996). Electricity: AC/DC Motors, Controls and Maintenance, Sixth Edition. Albany, NY: Delmar Publishers.

Alerich, W. & Keljik, J. (1996). Electricity: Power Generation and Delivery, Sixth Edition. Albany, NY: Delmar Publishers.

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

Herman S. (1999). Delmar's Standard Textbook of Electricity, Second Edition. Albany, NY: Delmar Publishers.

Kubala, T. (1996). Electricity: Devices, Circuits and Materials, Volumes 1 & 2, Sixth Edition. Albany, NY: Delmar Publishers.

Laing, P., Editor. (2000). Accident Prevention Manual for Business and Industry – Engineering & Technology, 12th Edition. Chicago, IL: National Safety Council.

Historical Bibliography

Balchin, N. & Castner, H. (1993). Health and Safety in Welding and Allied Processes, Fourth Edition. New York, NY: McGraw-Hill.

Grimaldi, J. & Simmons, R. (1989). Safety Management. Boston, MA: Irwin.

Hammer, W. (1989). Occupational Safety Management & Engineering. Englewood Cliffs, CA: Prentice-Hall.

Levitt, R. & Semelson, N. (1993). Construction Safety Management, Second Edition. New York, NY: McGraw-Hill.

MacCollum, D. (1993). Crane Hazards and Their Prevention. Des Plaines, IL: American Society ofSafety Engineers.

APPENDIX B: OLD SYLLABUS OF RECORD

I. Catalog Description

Course Title: SAFE 211 Principles of Industrial Safety II
Prerequisites: SAFE 111

4 credits
3 lecture hours
3 lab hours
(3c-31-4sh)

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 in various consensus standards. Emphasis is placed on personal protective equipment, welding and cutting, walking and working surfaces, materials handling and storage, electrical safe work practices, and construction safety. Application of hazard control strategies is accomplished in laboratory sessions.

II. Course Objectives

Students completing this course will be able to:

A. Identify the sources of safety standards such as OSHA and interpretations of those standards through the use of a computer database.

B. Identify the need for programs to include personal protection equipment, its use, maintenance, and inspection.

C. Demonstrate the knowledge of hazards for welding and cutting and their evaluation and control mechanisms.

D. Define the selection methods for, hazards and controls for the safe use of hand and power pools.

E. Explain the hazards of, evaluation for, and control mechanisms related to wall and floor openings, stairways, ramps, catwalks, ladders, scaffolds, and other walking and working surfaces.

F. Identify the hazards associated with common material handling equipment such as cranes, hoists, derricks; hazards related to the rigging for such equipment are also identified.

G. State the fundamental principles of electrical safe practices and the use of electrical testing equipment.

H. Identify the control of hazards associated with motorized equipment, trenching, blasting, tunneling, steel erection and power transmission equipment in the construction business.

I. Describe the control of hazards for specialized machinery used in the operation of bakeries, laundries, rubber processing, textiles, agriculture, and others.

III. Course Outline

A. Occupational Safety and Health Standards (3 hours)
   1. Development of standards
   2. Enforcement methods
   3. Computer search methods
   4. Interpretation of standards

B. Personal Protective Equipment (4 hours)
   1. Identifying needs
   2. Maintenance and Inspection programs
   3. Training programs

C. Welding and Cutting Operations (5 hours)
   1. Gas welding hazards
   2. Arc welding hazards
   3. Resistance welding hazards
   4. Compressed gas cylinders
   5. Hot work permit systems

D. Hand and Power Tools (5 hours)
   1. Metal cutting tools
   2. Torsion tools
   3. Miscellaneous tools
   4. Centralized tool control
   5. Maintenance and inspection
   6. Powder actuated tools

E. Walking and Working Surfaces (4 hours)
   1. Floor and wall openings
   2. Stairways, ramps, catwalks
   3. Design and use of ladders and scaffolds

F. Materials Handling and Storage (5 hours)
   1. Mechanized systems – conveyors, hoists, cranes, derricks
   2. Chain and sling rigging hazards
   3. Manual systems
   4. Maintenance, inspection, and training

G. Electrical Safety (6 hours)
   1. Principles of electricity
   2. Principles of electrical equipment
   3. Electrical grounding as a safeguard

4. Electrical test equipment
5. Lockout/tagout procedures
6. Static electricity and control

H. Construction Safety (8 hours)
1. Motorized equipment hazards
2. Trenching
3. Blasting
4. Tunneling
5. Steel erection
6. Electrical power transmission

I. Special Industry Machinery and Processes (2 hours)
1. Special hazards of specialized equipment

J. Laboratory Exercises (42 hours)

Exercises will be performed in a laboratory setting and are described below. A summary showing where these exercises fit into the course outline follows that description.

Introduction to laboratory equipment, methods of operation, and presentation of data and results.

Computer identification of standards and interpretation of standards.

Needs assessment for PPE; develop requirements for Safety Lab, including welding.

Inspection of gas and electric welding operation; development of Hot Work Permit procedure.

Determine the slip hazards by determining frictions on walking surfaces; use of slipometer.

Crane and hoist sling tension and stress analysis; develop a crane and hoist inspection checklist for the crane and hoist in the Safety Lab and perform an inspection of each.

Determine electrical items to be tested using a number of test instruments and perform inspection using those instruments. Become familiar with both 3-wire and double-insulated tool testing equipment and use each in testing equipment. Determine what equipment in the Safety Lab must be locked out or tagged out and describe the devices to do such; prepare a lockout/tagout procedure for the lab.

Prepare a ladder and scaffold inspection checklist for the equipment available and develop an inspection procedure for both. Become familiar with the soil testing equipment and perform a test on a series of samples; determine the sloping required

for a given trench condition. Become familiar with a number of fall protection devices as used on a series of elevations and working surfaces; determine their advantages and/or shortcomings, and develop a fall protection plan.

Prepare a JSA for a number of tasks described on the equipment in the lab.

Summary:

Title of Lab Exercise	# of Hours	Lecture Units Covered in Course Outline
Introduction – Lab Equipment	3	--
Computer Standards I, D.	3	A
PPE Assessment	3	B
Gas/Electric Welding	3	C
Slip Hazards	3	E
Cranes/Hoists Analyses	6	F
Electrical Safety	9	G
Construction Safety	9	H
JSA Development	3	C, D, F, G, I

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:

A. At least two examinations (50%)
All examinations will be announced and will be closed book except for the use of the Code of Federal Regulations (29 CFR 1900 through 1910) during certain sections of the exam. Questions on exams may be short answer, multiple choice, true/false, or matching. The final exam will be comprehensive, covering the total semester.

B. Quizzes (10%)
Quizzes will be similar in format to the examinations; however, they may not be announced. Quizzes will emphasize readings from the texts, CFRs, handouts, and current notes.

C. Homework (15%)
Homework may include the following:
1. Industrial scenarios which require the use of OSHA, ANSI, etc. standards to identify hazards and possible control strategies.
2. Written chapter summaries from the text.
3. Individual and group projects involving case studies of industrial exposures.
4. Other problems requiring the use of material covered.

D. Laboratory Exercises (25%)
Laboratory exercises are a regular requirement of this course. Students will complete a number of exercises that will entail the preparation of a formal technical report.

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 Business and Industry – Engineering & Technology. 10th Edition. Chicago: National Safety Council, 1992.

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

Balchin, Nigel C. and Castner, Harvey R. Health and Safety in Welding and Allied Processes. Fourth Edition. New York: McGraw-Hill, Inc., 1993.

Grimaldi, J. and Simmons, R. Safety Management. Boston, MA: Irwin, 1989.

Hammer, Willie. Occupational Safety Management & Engineering. Englewood Cliffs, NJ: Prentice-Hall, 1989.

Laing, Patricia M., Editor. Accident Prevention Manual for Business and Industry – Engineering & Technology. 10th Edition. Chicago: National Safety Council, 1992.

Levitt, Raymond and Semelson, Nancy. Construction Safety Management. Second Edition. New York: McGraw-Hill, 1993.

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

VIII. General Course Outline

Unit 1 Occupational Safety and Health Standards (3 hours)

Students review the current procedures for the development of OSHA standards including emergency and temporary standards, variances, and appeal procedures. Enforcement methods are also reconsidered as well as an update of inspections, standards related to the topics of this course via the use of a computer. Techniques for searching the standards and for the investigation of recent interpretations are discussed.

Unit Objective

Recognize that (1) the OSHA Act incorporated many consensus standards within its promulgated standards, (2) the OSHA Act has powers to enforce compliance with its standards, (3) employers and employees have certain rights under the OSHA act, and (4) how to search the standards and interpretations using the computer.

Unit 2 Personal Protective Equipment (4 hours)

Students are completely familiarized with the need for and design of personal protective equipment for head, eyes, face, body, feet and hands. Programs for maintenance and inspection for such equipment are reviewed along with human resistance to such protective equipment. Training programs are discussed for persons who are required to wear protection.

Unit Objective

Identify the need for, design, and selection of personal protective equipment for all parts of the body. The students must explain the programs for training in the use of equipment; and the maintenance and inspection of such equipment.

Unit 3 Welding and Cutting Operations (5 hours)

Gas welding is discussed in detail including the generation, transmission, and storage of welding gases. Hazards of gases and the welding operations are covered. Handling of compressed gas cylinders is reviewed. Arc welding is also discussed. Students are familiarized with hot work permit systems and procedures for welding in confined spaces and structures utilized for storing flammables.

Unit Objective

Demonstrate an understanding of the hazards and controls involved in the welding and cutting operations. The hazards of compressed gas cylinders and gases will be recognized. Control procedures for hot work and welding in confined spaces will be identified.

Unit 4 Hand and Power Tools (5 hours)

The use of various hand tools is surveyed including: metal cutting tools, torsion tools, and miscellaneous hand tools. Students are familiarized with centralized tool control systems for improving maintenance and the inspection of power tools is discussed in detail with emphasis on electric and pneumatic tools. Hazards and operation of powder activated tools are also covered.

Unit Objective

Identify the selection, hazards, and controls for safe use of hand and portable power tools. The safe practices required, including the hazards of the power sources, will be defined. The specific hazards of and controls for power activated tools and the benefits of a centralized tool control program will be described.

Unit 5 Walking and Working Surfaces (4 hours)

All general requirements are covered including housekeeping, aisles and passageways, corners and guardrails, and floor loading protection. A detailed discussion is made on guarding practices for floor and wall openings and holes. The student is indoctrinated in all design requirements for industrial stairways, ramps, catwalks, and ladders. Design and use of scaffolds is reviewed in detail.

Unit Objective

Explain the ANSI, NFPA and OSHA standards for walking and working surfaces; will result in well guarded floor and wall openings, industrial stairways, ramps, catwalks, ladders, and scaffolds.

Unit 6 Materials Handling and Storage (5 hours)

Modes of materials handling are discussed together with associated hazards and requirements: conveyers, hoists, cranes, derricks, and manual methods. Material storage methods and requirements are covered. Maintenance, inspection and training procedures are investigated together with methods for administering these functions. Students are introduced to rigging techniques, fixtures (ropes, chains, and slings) and all associated safety requirements. Introduction to manual lifting techniques will also be discussed.

Unit Objective

Recognize that conveyors, hoists, cranes, derricks, have required design specifications and requirements for maintenance, inspection, and operator training.

Unit 7 Electrical Safety (6 hours)

The students will review the principles of electricity: voltage, current resistance, polarity, insulation, and circuitry. Electrical equipment, its functions, and associated hazards are surveyed together with switches, fuses, circuit breakers, motors, generators, conductors, and transformers. Electrical grounding systems are discussed in detail. The use of electrical test equipment is covered together with lockout tagging procedures and the safety of maintenance operations. Students are familiarized with the nature of static electricity and measures for controlling it.

Unit Objective

Demonstrate an understanding of the principles of electricity, electrical operating and test equipment, and grounding systems. Control measures for electrical safety including lockout/tagout systems must be described.

Unit 8 Construction Safety (8 hours)

An introduction is given to construction operations and hazards. The design, operations and maintenance of motorized equipment used in the construction industry are covered. Trenching operations and requirements are discussed in detail. Students are familiarized with blasting operations, the transportation, handling, and storage of explosives and the inadvertent initiation of blasting charges. Special problems associated with tunneling, steel erection, and construction of electrical power transmission equipment are discussed.

Unit Objective

Identify the general hazards and controls applied in construction operations. Specific knowledge will be applied concerning the hazards in operations involving motorized equipment, trenching, blasting, tunneling, steel erection, and power transmission equipment.

Unit 9 Special Industry Machinery and Processes (2 hours)

A discussion is made of the processes and specialized machinery used in various industries. Hazards and hazard control measures are discussed in detail: paper making operation, bakeries, laundries, rubber processing, textile operations and agriculture. Students are familiarized with all appropriate standards.

Unit Objective

Describe the hazards, hazard control measures, and standards relating to specialized machinery and processes discussed.

Unit 10 Laboratory Exercises (42 hours)

Introduction to laboratory equipment, methods of operation, and presentation of data and results. (3 hours)

Computer identification of standards and interpretations of standards. (3 hours)

Needs assessment for PPE; develop requirements for Safety Lab, including welding. (3 hours)

Inspection of gas and electric welding operation; development of Hot Work Permit procedure. (3 hours)

Determine the slip hazards by determining frictions on walking surfaces; use of slipometer. (3 hours)

Crane and hoist sling tension and stress analysis; develop a crane and hoist inspection checklist for the crane and hoist in the Safety Lab and perform an inspection of each. (6 hours)

Determine electrical items to be tested using a number of test instruments and perform inspection using those instruments. Become familiar with both 3-wire and double-insulated tool testing equipment and use each in testing equipment. Determine what equipment in the Safety Lab must be locked out or tagged out and describe the devices to do such; prepare a lockout/tagout procedure for the lab. (9 hours)

Prepare a ladder and scaffold inspection checklist for the equipment available and develop an inspection procedure for both. Become familiar with the soil testing equipment and perform a test on a series of samples; determine the sloping required for a given trench condition. Become familiar with a number of fall protection devices as used on a series of elevations and working surfaces; determine their advantages and/or shortcomings, and develop a fall protection plan. (9 hours)

Perform an inspection of the equipment in the Safety Lab for proper guarding; describe the requirements for each and evaluate whether there is compliance. Prepare a JSA for a number of tasks described on the equipment in the lab. (3 hours)

Appendix C: Catalog Description

Course Title: SAFE 211 Principles of Industrial Safety II (3c-31-4sh)

Prerequisites: SAFE 101

Stresses an understanding of the complexity of industrial hazard control by thoroughly examining elements of safety and health enumerated in the Occupational Safety and Health Administration promulgated standards and in various consensus standards. Emphasis is placed on welding and cutting, walking and working surfaces, materials handling and storage, electrical safe work practices, construction safety and personal protective equipment. Application of hazard control strategies is accomplished in laboratory sessions.