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Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

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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.

1. Course Proposals (check all that apply) ☐ New Course ☐ Course Prefix Change ☐ Course Deletion ☒ Course Revision ☒ Course Number and/or Title Change ☐ Catalog Description Change		
SAFE 311 Fire Protection		
<u>Current Course prefix, number and full title</u>		<u>Proposed course prefix, number and full title, if changing</u>
2. Additional Course Designations: check if appropriate ☐ This course is also proposed as a Liberal Studies Course. ☐ Other: (e.g., Women's Studies, Pan-African) ☐ This course is also proposed as an Honors College Course.		
3. Program Proposals ☐ New Degree Program ☐ Program Title Change ☐ Program Revision ☐ New Minor Program ☐ New Track		
<u>Current program name</u>		<u>Proposed program name, if changing</u>
4. Approvals		
Department Curriculum Committee Chair(s)	Lon H. Ferguson	10/19/02
Department Chair(s)	Lon H. Ferguson	10/19/02
College Curriculum Committee Chair	J. Affron	11-22-02
College Dean	Robert R. Zoni	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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LIBERAL STUDIES

Course Revision: SAFE 311 Fire Protection

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. The course description was changed to include the new content proposed for the revised course, name change and the addition of the laboratory sessions, see below:

Old Course Description:

SAFE 311 Industrial Fire Protection

3c-0l-3sh

Prerequisites: MATH 217, PHYS 112, SAFE 211

Introduces fundamental concepts in protection of industrial workers and property from fire and explosion. Fire chemistry, control of ignition sources in industry, and properties of combustible materials are discussed. Fire detection and extinguishment are covered along with building construction for fire prevention, life safety, fire codes, and related topics.

New Course Description:

SAFE 311 Fire Protection

2c-3l-3sh

Prerequisites: SAFE 211, CHEM 102, and PHYS 112

This course is designed to provide coverage of fundamental concepts involved in the protection of people and property from fire and explosion. Basic fire safety terminology, fire chemistry and extinguishment, fire safety references and standards and fire program management are discussed along with the properties of hazardous materials. The class will also discuss control measures for common fire and explosion hazards, and the design of buildings in terms of life safety and fire suppression systems. Development of programs in fire safety as well as the evaluation and control of fire and explosion hazards will be studied in laboratory sessions. Practical application of fire principles will be completed in laboratory sessions.

- b. The course objectives have been expanded from 3 to 10. The three original objectives on the old syllabus of record were very broad and were not behavioral oriented. The new objectives are more specific to the content covered in the course and are behavioral oriented.
- c. The course content was reorganized and a specific unit was added on Hazardous Materials. To add this additional material some previous content was condensed into other units. For example, the previous units on the mechanism of heat transfer, nature of ignition, combustion and extinguishment were added

to unit #1 under the chemistry and physics of fire and the previous units on flammable and combustible materials, storage and process hazards and industrial ignition source control are now covered in a single unit called common and special hazards.

- d. In 2000, the department received outside support that allowed us to finish the fire laboratory in Room 110 of Johnson Hall. The fire laboratory now has the capability to demonstrate a variety of fire suppression systems including a wet pipe, dry pipe and deluge system in addition to a variety of detection and alarm systems. This new equipment, in addition to some existing fire equipment and facilities, allows the department to expand this course to include some hands-on laboratory exercises for the students. There will be 14 laboratory exercises which are identified on the new course syllabus. The reports completed following these laboratory sessions will account for 25% of the students grade.

3. Justification/rationale for the revision.

In general, these revisions were necessary to update the teaching of new material in the area of "Hazardous Materials" and to allow the students hands-on exercises in a laboratory setting. Coverage of "Hazardous Materials" was necessary to better meet the needs of students in their role as safety and health professionals, as well as the requirements of our accrediting agency, the Applied Science Commission of the Accrediting Board for Engineering and Technology. The hands-on exercises in the laboratories will increase student learning of the concepts taught in the lecture portion of the class.

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

SAFE 311 Fire Protection

2 lecture hours

3 lab hours

Prerequisites: SAFE 211, CHEM 102, and PHYS 112

3 credit hours

(2c-3l-3cr)

Designed to teach the fundamental concepts involved in the protection of people and property from fire and explosion. Basic fire safety terminology, fire chemistry and extinguishment, fire safety references and standards and fire program management are discussed along with the properties of hazardous materials. The class will also discuss control measures for common fire and explosion hazards, and the design of buildings in terms of life safety and fire suppression systems. Development of programs in fire safety as well as the evaluation and control of fire and explosion hazards will be studied in laboratory sessions. Practical application of fire principles will be completed in laboratory sessions.

II. Course Objectives

Students completing this course will be able to:

- A. Define basic fire prevention terminology and identify five reference sources available for the safety and health profession related to fire safety.
- B. Describe the OSHA requirements for the development of a fire brigade.
- C. Identify the five classifications of building construction and be able to evaluate a building in terms of life safety.
- D. Discuss the basic chemistry and physics of fire to include the four components of the Fire Tetrahedron and the three types of heat transfer.
- E. Identify an example of a hazardous material for each of the nine classes of Hazardous Materials as defined by the Department of Transportation (DOT).
- F. Demonstrate competency in using the National Fire Protection Association (NFPA) Fire Protection Guide on Hazardous Materials and the DOT North American Emergency Response Guidebook.
- G. Develop control measures to address the fire hazards associated with electricity and the storage and use of flammable and combustible liquids, gases and solids in industry.
- H. Discuss the common fire extinguishment agents used and the different options available in terms of fire suppression, fire detection and alarm systems.
- I. Demonstrate how to use and inspect a portable fire extinguisher.
- J. Develop design criteria for a sprinkler system based on specific building occupancies.

III. Course Outline

A. Introduction to Fire Safety

(3 hours)

- Importance of Fire Safety
- Fire Safety Terminology
- Sources of Information on Fire Safety
- Chemistry and Physics of Fire

- B. Hazardous Materials (3 hours)
- DOT Hazardous Materials Classifications
 - Sources of Information on Hazardous Materials
 - Hazard Ratings
 - Oxidizing Agents
- C. Common and Special Hazards (5 hours)
- Electricity as a Fire Hazard
 - Electrical Hazard Classifications
 - Processes Involving Flammable Gases
 - Processes Involving Flammable Liquids
 - Processes Involving Combustible Solids
- D. Building Construction (3 hours)
- Fire Resistive Ratings
 - Types of Building Construction
 - Building Codes
 - Considerations in Building Construction
- E. Means of Egress (4 hours)
- Life Safety Terminology
 - General Requirements for Life Safety
 - Evaluating Exit Capacity
 - NFPA Hazard Content Classifications
- F. Fire Extinguishment (7 hours)
- Fire Detection and Alarms
 - Fire Extinguishment Agents
 - Portable Fire Extinguishers
 - Fixed Fire Extinguishment Systems
 - Explosion Prevention
- G. Fire Program Management (3 hours)
- Planning a Response Strategy
 - Elements of an Emergency Response Plan
 - OSHA Requirements on a Fire Brigade
 - Fire Investigations
- H. Culminating Activity (2 hours)
- Final Exam Week

Laboratory Exercises (14 three hour laboratories)

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.

Laboratory Number	Title of Laboratory	Lecture Units Covered
1	Introduction to Lab (equipment and write-up of reports)	A
2	Web Based Fire Sites	A
3 - 4	Response to Hazardous Materials	B
5	Design of Flammable Liquid Storage Rooms	C
6	Design of Spray Paint Booth	C
7 - 8	Life Safety (building design and evaluation)	D - E
9	Portable Fire Extinguishers (use/inspection and training)	F
10 - 12	Sprinkler Systems (design, operation and inspection)	F
13	Emergency Response Plans	G
14	Fire Inspections and Audits	B - G

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 for this course:

Your final grade in this class will be a compilation of the following:

A. Unit Quizzes (A-G)	40%
B. Homework	25%
C. Laboratory Reports	25%
D. Course Portfolio	5%
E. Class Participation	5%

NOTE: These percentages are approximates and may be changed based on course developments and instructor needs.

Unit Quizzes: The seven quizzes will be short answer, multiple choice, true/false and matching with material coming from lecture notes, the text and handouts. Quizzes will not be made up unless prior arrangements have been made with the instructor.

Homework: Homework will include specific assignments related to material covered in the specific unit, many of which are case studies and small group projects involving fire safety, as well as assignments involving the use of OSHA and NFPA standards. Late homework will be penalized 10% per day and will not be accepted after it has been returned to the class.

Laboratory Reports: Students will complete a laboratory report after each laboratory session. The format for these reports as well as a grading rubric will be provided during the first laboratory class.

Course Portfolio: All students will be required to complete a course portfolio. The specific requirements for the portfolio will be provided during the first class meeting.

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

V. Example Grading Scale

The following grading scale will be used to assign letter grades for this course:

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

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 Texts

Cote, B. (1991). Principles of Fire Protection. Quincy, MA: National Fire Protection Association.

Supplemental Readings:

The instructor at the start of each unit will provide additional readings and other course handouts.

VIII. Special Resource Requirements

None

IX. Bibliography

Brannigan, F. (1999). Building Construction for the Fire Service, 3rd edition. Quincy, MA: National Fire Protection Association.

Bunker, M. and Moore, W. (editors). (1999). National Fire Alarm Code Handbook. Quincy, MA: National Fire Protection Association.

Collins, L. and Schneid, T. (2001). Disaster Management and Preparedness. New York, NY: Lewis Publishers.

Cote, A. (editor). (2000). Fire Protection Handbook, 18th edition. Quincy, MA: National Fire Protection Association.

Cote, R. (editor). (2000). Life Safety Code Handbook, 8th edition. Quincy, MA: National Fire Protection Association.

Friedman, R. (1998). Principles of Fire Protection Chemistry and Physics, 3rd edition. Quincy, MA: National Fire Protection Association.

NFPA. (1997). Fire Protection Guide to Hazardous Materials, 12th Edition, Quincy, MA: National Fire Protection Association.

Puchovsky, M. (editor). (1999). Automatic Sprinkler Systems Handbook, 8th edition. Quincy, MA: National Fire Protection Association.

Quintiere, J. (1998). Principles of Fire Behavior, Boston, MA: Delnar Publishers.

Schram, P and Earley, M. (1997). Electrical Installations in Hazardous Locations, 2nd edition. Quincy, MA: National Fire Protection Association.

US Dept of Transportation, Transport Canada, and Secretariat of Commerce and Transportation of Mexico. (2000). North American Emergency Response Guidebook. Retrieved from <http://hazmat.dot.gov/guidebook.htm>

Historical Bibliography

Benedetti, R. (1996). Flammable and combustible liquids code handbook, 6th edition. Quincy, MA: National Fire Protection Association.

Ladwig, T. (1991). Industrial Fire Prevention and Protection. New York, NY: Van Nostrand Reinhold.

Appendix B: Old Syllabus of Record

I. Catalog Description

SAFE 311 Industrial Fire Protection

3c-01-3sh

Prerequisites: CHEM 102, PHYS 112, SAFE 211

Introduces fundamental concepts in protection of industrial workers and property from fire and explosion. Fire chemistry, control of ignition sources in industry, and properties of combustible materials are discussed. Fire detection and extinguishment are covered, along with building construction for fire prevention, life safety, fire codes and related topics.

II. Course Objective

To gain an understanding of the principles of fire prevention, suppression, and life safety.

III. Course Outline

- A. Introduction (1.5 hours)
- B. Fire Program Management and the Industrial Fire Brigade (1.5 hours)
- C. Building Construction and Means of Egress (3 hours)
- D. Mechanisms of Heat Transfer (6 hours)
- E. The Nature of Ignition, Combustion, and Extinguishment (3 hours)
- F. Flammable and Combustible Materials L(9 hours)
- G. Storage and Process Hazards (3 hours)
- H. Industrial Ignition Source Control (3 hours)
- I. Fire Extinguishment Agents (3 hours)
- J. Fire Detection and Alarm (3 hours)
- K. Fixed Fire Extinguishment Systems and Portable Fire Extinguishers (6 hours)

IV. Evaluation Methods

The final grade will be determined by using any combination of at least four (4) of the following evaluation methods within the range of weights shown as determined by the individual faculty member and which must total 100%.

0-60% Exams

There will be a minimum of two written exams consisting of combinations of multiple choice, true/false, matching, completion, and essay questions; or other interactive exams. Make-up exams are at the discretion of the individual faculty member.

0-25% Quizzes	Periodic quizzes will be given. Some individual faculty members may utilize unannounced quizzes. Make-up quizzes are at the discretion of the individual faculty member.
0-15% Homework	Periodic out-of-classroom assignments will be given.
0-40% Term Papers/ Projects	Each student will prepare various assignments in class utilizing free-style writing techniques as scheduled by the individual faculty member.
0-20% In-Class Writing	Each student will prepare various assignments in class utilizing free-style writing techniques as scheduled by the individual faculty member.
0-25% Presentations	Each student will participate in an oral presentation topic approved by the individual faculty member.

Extra credit can be assigned to any one of the above evaluation methods at the discretion of the instructor.

The grading scale will be based on the following:

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

or at the discretion of the faculty member a grading curve that results in a normal distribution of grades.

V. Required Textbooks, Supplemental Books and Readings

Cote, Arthur E., (Editor). Fire Protection Handbook, 17th Edition. National Fire Protection Association, Quincy, MA., 1991.

VI. Special resource Requirements

None

VII. Bibliography

Francis L. Brannigan. Building Construction for the Fire Service, 2nd Edition. National Fire Protection Association, Quincy, MA, 1989.

Campbell, Ballou and Slade. Form and Style: Theses, Reports, Term Papers, 8th Edition. Houghton Mifflin Company, Boston.

Dougal Drysdale. An Introduction to Fire Dynamics. John Wiley and Sons, New York, NY, 1986.

Richard L. Tuve. Principles of Fire Protection Chemistry. National Fire Protection Association, Quincy, MA, 1988.

Charles E. Zimmerman. Fire Alarm Signaling Systems Handbook, 2nd Edition. National Fire Protection Engineers, Boston, MA, 1988.

Appendix C: Catalog Description

SAFE 311 Fire Protection

(2c-3l-3cr)

Prerequisites: SAFE 211, CHEM 102, and PHYS 112

Designed to teach the fundamental concepts involved in the protection of people and property from fire and explosion. Basic fire safety terminology, fire chemistry and extinguishment, fire safety references and standards and fire program management are discussed along with the properties of hazardous materials. The class will also discuss control measures for common fire and explosion hazards, and the design of buildings in terms of life safety and fire suppression systems. Development of programs in fire safety as well as the evaluation and control of fire and explosion hazards will be studied in laboratory sessions. Practical application of fire principles will be completed in laboratory sessions.