LSC Use Only Proposal No:	*UWUCC Use Only* Proposal No: 11-53F
LSC Action-Date:	UWUCC Action-Date: AP - 12/13/11 Senate Action Date: App - 01/24/12

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

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

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

1. Course Proposals (check all that apply)

_____ New Course _____ Course Prefix Change _____ Course Deletion

__X__ Course Revision _____ Course Number and/or Title Change __X__ Catalog Description Change

Current course prefix, number and full title: ***SAFE 311 Fire Protection***

Proposed course prefix, number and full title, if changing: _____

2. Liberal Studies Course Designations, as appropriate

_____ This course is also proposed as a Liberal Studies Course (please mark the appropriate categories below)

_____ Learning Skills _____ Knowledge Area _____ Global and Multicultural Awareness _____ Writing Intensive (include W cover sheet)

_____ Liberal Studies Elective (please mark the designation(s) that applies – must meet at least one)

_____ Global Citizenship _____ Information Literacy _____ Oral Communication

_____ Quantitative Reasoning _____ Scientific Literacy

3. Other Designations, as appropriate

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_____ Honors College Course _____ Other: (e.g. Women's Studies, Pan African)

4. Program Proposals

Liberal Studies

_____ Catalog Description Change _____ Program Revision _____ Program Title Change _____ New Track

_____ New Degree Program _____ New Minor Program _____ Liberal Studies Requirement Changes _____ Other

Current program name: _____

Proposed program name, if changing: _____

5. Approvals	**Signature**	**Date**
Department Curriculum Committee Chair(s)	Dr. Jan K. Wachter Jank Wachter	9-13-2011
Department Chairperson(s)	Dr. Lon Ferguson Lon H. Ferguson	9-15-2011
College Curriculum Committee Chair	Dr. Jan K. Wachter Jank Wachter	10-20-2011
College Dean	Dr. Mark Swinker Mary E Swinker	10/21/11
Director of Liberal Studies (as needed)		
Director of Honors College (as needed)		
Provost (as needed)		
Additional signatures (with title) as appropriate:		
UWUCC Co-Chairs	Received NOV 4 2011 Gail S. Sechrist	12/19/11

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OCT 24 2011

Liberal Studies

Please Number All Pages

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 lab component of the course was removed and the lecture was increased from 2 to 3 credits. The total number of credits for the course (3) remains the same.

   b. Course description was changed to reflect change in credit hours and to remove the last two sentences: "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."

   c. Course content was revised by combining content into the broad areas of "Fire Prevention" and "Fire Protection" and by removing material on building components.

      New Course Description

      Teaches 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. Also discusses control measures for common fire and explosion hazards, and the design of buildings in terms of life safety and fire suppression systems.

      Old Course Description

      Provides 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. Also discusses 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, is studied in laboratory sessions. Practical application of fire principles is completed in laboratory sessions.

   d. Course objectives were changed to better track ABET accreditation criteria for student outcomes.

3. Justification/rationale for the revision.

   The revisions (e.g., the elimination of the various hands-on components) to SAFE 311 were necessary for several reasons. From a pedagogical perspective the lab was created in year 2000 to provide the students with some "hands on" lab exercises directed at the chemistry and physics of fire, fire suppression design and maintenance, life safety, etc. When the lab was originally created there were 110 students in the entire Safety Sciences Program, averaging 25 students in SAFE 311. The labs averaged 10 -12 students which allowed working in lab groups of 2 students. This was an acceptable number but is was still "tight" as the specific fire chemistry and physics lab hands-on assignments in this fire course had to be completed in the burn room which contained a variety of equipment. This burn room, housed in Room 110 Johnson Hall, is 12 ft X 30 ft (360 sq ft). For the past four years the program has expanded tremendously. There are now 275 students and the fire class for the past three years has averaged 50 students with labs averaging 20 students. There are now lab groups of 4-5 students contained in the 360 sq ft. burn room. It is not only unsafe to complete these labs in such a cramped room but from a pedagogical perspective there is a significant drop off in learning when lab groups are this large and covering this specific type of learning material (chemistry and physics of fire initiation and propagation).

   Faculty believed that students would learn just as much if the instructor of the class demonstrated and explained exercises in class and had in-class or take-home assignments for the students to complete based on the demonstrated material. The instructor-led demonstrations would be done during the one hour class period that would be added when the course went to 3 hours lecture. Most of the information covered in the current lab course can be covered via instructor-led, in-class demonstrations and discussions. Fundamentals of fire initiation and propagation can be demonstrated through videos.

   These revisions were also necessary to accommodate the need for four new safety courses (8 credits) that are necessary to meet our new Safety, Health and Environmental accreditation criteria by the Applied Science Accreditation Commission of ABET, see Appendix D. To add the new courses to our program we also needed to find ways to reduce faculty load so we could make these changes without increasing faculty complement. Based on input from faculty and our Advisory Committee, it was decided the best way to do that was to eliminate the lab in the fire class and take the most critical content from the labs and add to the fire lecture which increases by one credit. This resulted in a savings of 10 credits of faculty load each year associated with this SAFE 311. To save an additional eight credits each year, we also decided to reduce SAFE 211 from a three credit lecture to a two credit lecture making it more in line with our existing SAFE 347 and will no longer offer two sections of LBST 499 Safe Living. These savings will allow us to add the 8 credits of new SAFE courses with existing faculty complement.

4. The old syllabus of record.

   The old syllabus of record is attached in Appendix B.

5. Liberal Studies course approval.

   These course 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 — 3 lecture hours, 0 lecture hours, 3 credit hours **(3c-0l-3cr)**

Prerequisite: CHEM 101 or instructor permission

Teaches 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. Also discusses control measures for common fire and explosion hazards, and the design of buildings in terms of life safety and fire suppression systems.

II. Course Objectives

Students will be able to:

A. Demonstrate an understanding of the fundamental aspects of fire safety.
B. Demonstrate an ability to anticipate, identify, and evaluate potentially hazardous fire agents, conditions and practices and to develop fire control designs, methods, procedures and programs.
C. Identify and apply applicable fire-related standards, regulations and codes.
D. Apply business and risk management concepts as they relate to fire protection program management.
E. 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.
F. Demonstrate how to use and inspect a portable fire extinguisher.
G. Develop design criteria for a sprinkler system based on specific building occupancies.

III. Course Outline

A. Introduction to Fire Safety — (10 hours)

1. Importance of Fire Safety
2. Fire Safety Terminology
3. Sources of Information on Fire Safety
4. Chemistry and Physics of Fire
5. Fire Tetrahedron
6. Fire Extinguishment

Examination — **(1 hour)**

B. Fire Prevention — (13 hours)

1. Building Construction
   - Fire Resistive Ratings
   - Types of Building Construction
   - Building Codes

- Considerations in Building Construction

2. Common and Special Hazards
   - Electricity as a Fire Hazard
   - Electrical Hazard Classifications
   - Processes Involving Flammable Gases, Liquids and Solids
3. Means of Egress
4. Common Life Safety Code Issues
5. Detection and Alarm Systems

Examination **(1 hour)**

C. Fire Protection **(13 hours)**

1. Portable Fire Extinguishers
2. Fire Extinguishment Agents
3. Fire Detection and Alarms
4. Fixed Fire Extinguishment Systems
5. Variations on Sprinkler Designs
6. Explosion Prevention

Examination **(1 hour)**

D. Fire Program Management **(3 hours)**

1. Hot Work Permit Programs
2. Fire & Emergency Response Plans
3. Fire Investigations

E. Culminating Activity (Final Exam, during final exams week) **(2 hours)**

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 weightings to be used for this course:

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

A. Unit Exams	40%
B. Projects	35%
C. Homework	20%
D. Class Participation	5%

Unit Exams: The exams will be short answer, multiple choice, true/false and matching with material coming from lecture notes, the text and handouts.

Projects: Students will work in groups of three students to complete two projects. The first projects will be the recognition, evaluation and control of a specific fire hazard. The second project will involve the design of a sprinkler system based on a given case study.

Homework: Homework will include specific assignments related to material covered in the specific unit, many of which involve the use of OSHA and NFPA standards.

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

The undergraduate course attendance policy will be consistent with the university undergraduate attendance policy included in the Undergraduate Catalog.

VII. Required Texts

Ferguson, L. & Janicak, C. (2005). *Fundamentals of Fire Protection for the Safety Professional.* Lanham, MD: Government Institutes.

VIII. Special Resource Requirements

None.

IX. Bibliography

Brannigan, F. (2007). *Building Construction for the Fire Service, 4th edition.* Quincy, MA: National Fire Protection Association.

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

Cote, A. (editor). (2008). *Fire Protection Handbook, 20th edition.* Quincy, MA: National Fire Protection Association.

Cote, R. & Harrington, G. (editors). (2009). *Life Safety Code Handbook, 2009th edition.* Quincy, MA: National Fire Protection Association.

Lake, J. (editor). (2010). *Automatic Sprinkler Systems Handbook, 2010th edition.* Quincy, MA: National Fire Protection Association.

Richardson, L. & Roux, R. (editors). (2010). *National Fire Alarm Code Handbook.* Quincy, MA: National Fire Protection Association.

3. Rationale for Program Changes:

A. ***Program name change from Safety Sciences to Safety, Health and Environmental Applied Sciences and the addition of the four new SAFE courses to the major.***

Rationale: For the past 15 years there has been an on-going merger of the Safety, Occupational Health and the Environmental Safety professions. This convergence has been well documented and in 2005 our accrediting agency, the Applied Science Accreditation Commission of the Accreditation Board for Engineering and Technology, developed separate accreditation criteria for Safety, Health and Environmental Programs (see Appendix A). During the April 2011 Safety Sciences Advisory Committee meeting, the program name change issue was discussed at length. As you can see in the attached minutes (Appendix B), the committee overwhelmingly recommended we change our program to meet the Safety, Health and Environmental criteria. This was discussed at our May 2011 Department Meeting and faculty voted to support this change.

To meet the new ABET/ASAC criteria, the title of the program has to be changed (to include the words safety, health and environmental) and we needed to add four additional courses so we can meet several new student outcomes (see Appendix A). The name change as well as the addition of the four new SAFE courses (SAFE 215, 335, 361, and 435) will make the program more in line with current practice and position us as one of only **three** programs in the nation accredited by ASAC in the Safety, Health and Environmental criteria. Two environmental courses were added to the undergraduate curriculum (SAFE 335 and 361) to complement the existing environmental course (SAFE 310) being offered in order to satisfy the more environmentally-oriented ABET/ASAC accreditation criteria (see Appendix A).

It is noted that there is an environmental health track offered by IUP's Department of Biology that could appear to "overlap" with this program's name and course offerings. Based on discussions with the chairperson and undergraduate curriculum coordinator in the Biology Department, any areas of overlap have been addressed in this program revision and course revisions (see letter of support from Department of Biology in Appendix D). In summary, what the biology department has concluded is that *"It is clear to us that Safety Sciences has a focus on what goes on inside the "box" that defines the boundaries of a factory or manufacturing site. On the other hand, Biology has a focus on what goes on outside the factory box. Terms such as "industrial", "workplace" and "occupational" apply to the focus of your department; terms such as "ecological", "physiological" and "medical" apply to ours."*

It is also noted that there is a B.S. Geology/Environmental track offered by IUP's Department of Geology. As stated in the catalog, this track covers pollution that may impact the subsurface environment in ways that are difficult to detect and remediate. Based on the description of the track and the courses contributing to this track, there is not an overlap with the Safety, Health and Environmental Applied Sciences Program. Although SAFE 361 covers air and water pollution, the major emphasis is on the analysis and control of industrial water and air pollution *at the source* (mainly within the confines of industrial or contractor facilities), and not subsurface groundwater pollution. Hydrology, geochemistry and environmental geology concepts are not covered in the Safety, Health and Environmental Applied Sciences Program curriculum.

Appendix B: Old Syllabus of Record

I. Catalog Description

SAFE 311 Fire Protection — 2 lecture hours, 3 lab hours

Prerequisites: CHEM 102, PHYS 112 and SAFE 211 — 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. 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 reference sources available for the safety and health profession related to fire safety.

b. develop an emergency evacuation plan.

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. 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.

f. discuss the common fire extinguishment agents used and the different options available in terms of fire suppression, fire detection and alarm systems.

g. demonstrate how to use and inspect a portable fire extinguisher.

h. develop design criteria for a sprinkler system based on specific building occupancies.

III. Course Outline

A. Introduction to Fire Safety (6 hours)

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

B. 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

C. Building Construction (3 hours)

- Fire Resistive Ratings
- Types of Building Construction
- Building Codes
- Considerations in Building Construction

D. Means of Egress (4 hours)

- Life Safety Terminology
- General Requirements for Life Safety
- Evaluating Exit Capacity
- NFPA Hazard Content Classifications

E. Fire Extinguishment (7 hours)

- Fire Detection and Alarms
- Fire Extinguishment Agents
- Portable Fire Extinguishers
- Fixed Fire Extinguishment Systems
- Explosion Prevention

F. Fire Program Management (3 hours)

- Planning a Response Strategy
- Elements of an Emergency Response Plan
- OSHA Requirements on a Fire Brigade
- Fire Investigations

G. 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	Fire Chemistry	A-B
4	Design of Flammable Liquid Storage Rooms	B
5-6	Fire Resistance	C
7 - 8	Life Safety (building design and evaluation)	D
9	Portable Fire Extinguishers (use/inspection and training)	E
10 -12	Sprinkler Systems (design, operation and inspection)	E
13	Emergency Response Plans	F
14	Fire Inspections and Audits	B - F

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:

E. Unit Quizzes (A-G)	40%
F. Homework	25%
G. Laboratory Reports	25%
H. Course Portfolio	5%
I. Class Participation	5%

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.

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.

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

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 Texts

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

Supplemental Readings:

Laboratory Manual available from Pro Packet.

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/gydebook.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 C: Proposed Revised Catalog Description

SAFE 311 Fire Protection **3c-0l-3cr**
Prerequisite: CHEM 101 or instructor permission

Teaches 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. Also discusses control measures for common fire and explosion hazards, and the design of buildings in terms of life safety and fire suppression systems.

Appendix D – ABET Accreditation Criteria

ACCREDITATION CRITERIA 2011/12
Criteria for Accrediting Applied Science Programs

PROGRAM CRITERIA FOR ENVIRONMENTAL, HEALTH, AND SAFETY AND SIMILARLY NAMED APPLIED SCIENCE PROGRAMS

Lead Societies: American Industrial Hygiene Association or American Society of Safety Engineers

These program criteria apply to applied science programs having environmental, health, and safety in their program titles. Each program evaluated under these Program Criteria must designate which society is to serve as Lead Society for that program.

I. PROGRAM CRITERIA FOR BACCALAUREATE LEVEL PROGRAMS

Program Criteria presented herein provide the specificity needed to interpret the General Criteria with respect to the discipline of Environmental, Health, and Safety and furnish a framework upon which a given program may develop the more general Outcomes and Assessment requirements of Criteria 3.(a) through (k). In all cases, the program must demonstrate that graduates possess the knowledge, skills, and attitudes necessary to competently and ethically practice the applicable scientific, technical, and regulatory aspects of this discipline.

The basic level criteria as applied to the field of Environmental, Health, and Safety should be interpreted with respect to the following curricular content areas:

(a) environmental, health, and safety fundamentals;
(b) physiological and/or toxicological interactions of physical, chemical, biological, and ergonomic
agents, factors, and/or stressors with the human body;
(c) anticipation, identification, and evaluation of potentially hazardous agents, conditions and practices;
(d) fundamental exposure assessment techniques (both qualitative and quantitative);
(e) environmental, health, and safety data interpretation including statistical and epidemiological principles;
(f) development of hazard control designs, methods, procedures and programs;
(g) accident/incident investigation and analysis;
(h) industrial and construction safety;
(i) legal aspects of environmental, health, and safety practices;
(j) environmental, health and safety program management;
(k) hazardous materials/waste recognition, control, and remediation;
(l) air pollution fundamentals and control technologies;
(m) water pollution fundamentals and control technologies;
(n) environmental regulations and permitting processes
(o) environmental sampling and measurement methodologies.

Note: In this context, the terms hazard and hazardous incorporate issues related to the broad context of occupational environmental, health, and safety. Environmental, Health, and Safety programs are expected to provide breadth across the range of topics implied by the title. Thus, these curricular content areas are considered to be minimum requirements. Other areas may be added as dictated by the Mission and Program Educational Objectives of the specific program. Additionally, the extent to which each content area is developed and emphasized in a given program must also be consistent with the program's mission and objectives. Depending on the program, a given area may be addressed in a devoted course, a portion of a course, or in an appropriate extracurricular experience. Based upon this content, program faculty are free to develop unique outcomes at appropriate functional levels that embrace Criterion 3.(a) through (k) of the General Criteria.

Baccalaureate-level Faculty

The majority of core Environmental, Health, and Safety and other supporting faculty must hold an earned doctorate. ("Core faculty" pertains to those who are teaching Environmental, Health, and Safety courses and does not include faculty members teaching courses such as epidemiology, statistics, etc.). The majority of core faculty should hold certifications issued by nationally accredited credentialing bodies such as Certified Industrial Hygienist or Certified Safety Professional. Faculty must also demonstrate external professional activity, including, but not limited to, participation on national, regional, state, and/or local committees and advisory boards, professional practice, and/or editorial reviews of professional publications. A full-time faculty member must be identified as administratively in charge of the program.