

LSC Use Only Proposal No:
LSC Action-Date:

UWUCC Use Only Proposal No: 11-531
UWUCC Action-Date: App-12/13/11

Senate Action Date: App 01/24/12

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person(s) Jan K. Wachter	Email Address jan.wachter@iup.edu
Proposing Department/Unit Safety Sciences	Phone 7-3275

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

Current course prefix, number and full title: SAFE 461 Air Pollution

Proposed course prefix, number and full title, if changing: SAFE 361 Air and Water Pollution

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

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

4. Program Proposals

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 <i>Jan K Wachter</i>	9-13-2011
Department Chairperson(s)	Dr. Lon Ferguson <i>Lon H. Ferguson</i>	9-15-2011
College Curriculum Committee Chair	Dr. Jan K. Wachter <i>Jan K Wachter</i>	10-20-2011
College Dean	Dr. Mary Swinker <i>Mary E. Swinker</i>	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	<i>Gail Sechrest</i>	12/13/11

Received

OCT 24 2011

Liberal Studies

Course Revision: SAFE 461 Air Pollution

Part II. Description of the Curriculum Change

1. New 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 number and name is being changed from SAFE 461 Air Pollution to **SAFE 361 Air and Water Pollution**.
- b. The credits were changed from 3 credits to 2 credits.
- c. Course description was changed to reflect an emphasis on both air and water pollution.

New Course Description (changes in bold)

Focuses on major aspects of air **and water** pollution problems. Includes sources and **analysis of air and water pollution**, evaluation **and control of air and water** pollutants, and atmospheric **and water** chemistry. Particular emphasis on information that is practical for the safety management, industrial health, or environmental health professional.

Old Course Description

Focuses on major aspects of the air pollution problem. Includes sources of air pollution, evaluation and engineering of pollutants, government regulations, atmospheric chemistry and dispersion, and human and nonhuman effects. Particular emphasis on information that is practical for the safety management, industrial health, or environmental health professional.

- d. Course content was revised to include the assessment, evaluation and control of water pollution. The course was also revised (topics deleted) to reflect that some content of the old course is now being covered in another course titled SAFE 335 Industrial and Environmental Stressors. The content was additionally changed to become more general in covering the topics presented (less modeling) to be presented at the Junior, rather than the Senior, level.
 - e. Course prerequisite was changed to SAFE 220.
- ### 3. Justification/rationale for the revision:
- a. These course revisions (title, course content) are necessary to meet our new Safety, Health and Environmental accreditation criteria by the Applied Science Accreditation Commission of ABET, see Appendix D. Specifically, the course is being revised to meet the following criteria:

- (l) air pollution fundamentals and control technologies;
- (m) water pollution fundamentals and control technologies;
- (o) environmental sampling and measurement methodologies.

- b. Based on the proposed program revision to the Safety Sciences Curriculum, this course is now being targeted for Junior year standing students rather than Senior year standing students. Thus the course number was changed from SAFE 461 to SAFE 361 to reflect this.
- c. The credits are being reduced from 3 credits to 2 credits to reflect the fact that a significant amount of the old course content is now being exclusively covered in a new course titled SAFE 335 Industrial and Environmental Stressors as well as an existing course SAFE 310 Environmental Safety and Health Regulations and Sustainability.
- f. Course prerequisite was changed to SAFE 220 since the old prerequisite (SAFE 301) is not longer being offered by the Safety Sciences Department.

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 361: Air and Water Pollution

2 class hours

0 lab hours

Prerequisite: SAFE 220

2 credits

(2c-0l-2cr)

Focuses on major aspects of industrial air and water pollution management. Includes sources and analysis of industrial air and water pollution, evaluation and control of air and water pollutants, and atmospheric and water chemistry. Particular emphasis is placed on information that is practical for the safety management, industrial health, or environmental health professional.

II. COURSE OUTCOMES:

Students will be able to:

1. Demonstrate an understanding of air and water pollution fundamentals and control technologies.
2. Demonstrate an understanding of environmental permitting, sampling and measurement methodologies.
3. Identify the common sources and major classes of environmental contaminants contained within air, water, and wastewater resources.
4. Integrate the frequently used sampling and analysis methods for collecting and identifying contaminants in air, water, and wastewater.
5. Select the appropriate methods to be used to treat and control industrial pollution in water, wastewater and air resources.
6. Conduct an impact analysis that focuses on industrial pollutant emission data/information and recommends courses of action.

III. COURSE OUTLINE

- | | | |
|----|---|-------------|
| A. | Introduction: pollution and environmental ethics | (1 hour) |
| B. | Water pollution: sources (point/non-point) and types | (1 hour) |
| C. | Water pollution: sampling and measurement | (2.5 hours) |
| E. | Water pollution: treatment and controls
(e.g., flocculation, coagulation, softening, sedimentation, filtration, disinfection, novel methods) | (3 hours) |

F.	Wastewater pollution: treatment and controls (e.g., on-site disposal systems, municipal wastewater treatment systems, pretreatment, primary treatment, secondary treatment, disinfection, advanced treatment methods, land treatment, sludge treatment, sludge disposal)	(3.5 hours)
G.	Midterm	(1 hour)
H.	Industrial solid waste management (e.g., utilization and disposal, including incineration)	(3 hours)
I.	Air pollution: sources and types	(1.5 hours)
J.	Air pollution: meteorology, dispersion and fate	(1 hour)
K.	Air pollution: sampling and measurement	(3 hours)
L.	Air pollution: controls for stationary and mobile sources (e.g., primary particles, volatile organic compounds, sulfur oxides, nitrogen oxides, mercury)	(4.5 hours)
M.	Environmental impact analysis and economic assessments	(3 hours)
N.	Final (during exams week – 2 hours)	
	Total:	(28 hours)

IV. EVALUATION METHODS

A. Exams (50%)

There will be a mid-term exam (20% of grade) and a final exam for the class (30% of grade). The format for these exams could include the following question types: multiple choose, fill-in-the-blank, short-answer, matching and/or short essay.

B. Homework Assignments (40%).

Four homework assignments (10% of grade for each assignment) will be given during the course. These homework assignments could involve problem solving exercises, investigating specific environmental pollution, analysis and control issues, and/or analyzing case studies.

C. Attendance and Classroom Participation (10%)

Classroom attendance and participation by individual students will be evaluated (e.g., degree and quality of asking and answering questions; spot-check results on classroom attendance).

V. EXAMPLE GRADING SCALE

- A: 90 - 100%
- B: 80 - 89%
- C: 70 - 79%
- D: 60 - 69%
- F: less than 60%

VI. UNDERGRADUATE COURSE ATTENDANCE POLICY

The undergraduate course attendance policy will be consistent with the university undergraduate attendance policy.

VII. REQUIRED TEXTBOOKS, SUPPLEMENTAL BOOKS AND READINGS

Spellman, F.R. & Whiting, N.E. (2006). *Environmental Science and Technology – Concepts and Applications, 2th Edition*. Government Institutes – The Scarecrow Press, Inc.: Lanhan, Maryland.

VIII. SPECIAL RESOURCE REQUIREMENTS

No special resource requirements are assigned for this course.

IX. BIBLIOGRAPHY

Davis, M. L. & Masters, S.J. (2008). *Principles of Environmental Engineering*. McGraw Hill: New York, New York.

de Nevers, N. (2010). *Air Pollution Control Engineering, 2nd Edition*. Waveland Press, Inc.: Long Grove, Illinois.

Nemerow, N. L., Agardy, F.J., Sullivan, P. & Salvato, J.A. (2009). *Environmental Engineering, 6th Edition*. John Wiley & Sons, Inc.: Hoboken, New Jersey.

Peirce, J. J., Weiner, R.F. & Vesilind, P.A. (1998). *Environmental Pollution and Control, 4th Edition*. Butterworth-Heinemann: Woburn, Massachusetts.

Spellman, F.R. & Whiting, N.E. (2006). *Environmental Science and Technology – Concepts and Applications, 2th Edition*. Government Institutes – The Scarecrow Press, Inc.: Lanhan, Maryland.

Appendix B: Old Syllabus of Record

SYLLABUS OF RECORD

SA 461 - AIR POLLUTION

I. COURSE DESCRIPTION

SA 461 Air Pollution

Prerequisite: SA 301 or consent

3c-01-3sh

Focuses on major aspects of the air pollution problem. Includes sources of pollution, evaluation and engineering of pollutants, government regulations, atmospheric chemistry and dispersion, and human and nonhuman effects. Particular emphasis on information that is practical for the safety management, industrial health, or environmental health professional.

II. COURSE OBJECTIVES

- A. Students should be familiar with the history of the air pollution problem along with the economic and philosophic aspects of this problem.
- B. Students should be able to associate specific pollutants with specific pollutants with industries **or** operations. They must know the industrial sources and they should be familiar with natural sources of specific pollutants.
- C. The general principles of air pollution toxicology and environmental epidemiology should be understood and the human effects of common pollutants must be known.
- D. Students should be familiar with government standards for air pollution.

III. COURSE OUTLINE

- A. Introduction and History (2 hours)
- B. Sources of Air Pollution (4 hours)
- C. Human Effects (4 hours)
- D. Non-Human Effects (4 hours)

- E. Atmospheric Chemistry (4 hours)
- F. Evaluation of Pollutants (4 hours)
- G. Standards (4 hours)
- H. Dispersion of Pollutants (4 hours)
- I. Engineering Pollution Control Measures (4 hours)
- J. Case Studies (4 hours)
- K. The Future of Air Pollution (4 hours)

IV. EVALUATION METHODS

The final grade will be determined 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 formal paper(s) or project(s) on a topic approved by the individual faculty member.
0-15% In-Class Writing	Each student will participate in an oral presentation topic approved by the individual faculty member.

member.

0-25% Presentation	Each student will participate in an oral presentation topic approved by the individual faculty member.
0-20% Participation	Each student will provide active engagement in the classroom.
0-25% Group Activity	Students will be assigned various activities requiring a collaborative effort with other students.

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 or grades.

V. **REQUIRED TEXTBOOKS, SUPPLEMENTAL BOOKS AND READINGS**

Sedlinfeld, John H. Atmospheric Chemistry and Physics of Air Pollution. New York: John Wiley & Sons, 1994.

Postel, Sandra. Air Pollution, Acid Rain, and the Future. Washington, D.C. Worldwatch Institute, 1984.

Air Pollution and Acid Rain. Bowling Green Station, N.Y. Gordon Press, 1986.

Flagan, Richard C., and John H. Seinfeld. Fundamental of Air Pollution Engineering. Englewood Cliffs, N.J. Prentice-Hall, 1988.

VI. **SPECIAL RESOURCE REQUIREMENTS**

VII. **BIBLIOGRAPHY**

Code of Federal Regulations: 10 CFR and 29 CFR 1910, Latest Edition.

Lapp, Ralph and Howard Andrews. Nuclear Radiation Physics, 5th Edition. Prentice-Hall. Englewood Cliffs, N.J., 1986.

Plog, Barbara, editor. Fundamentals of Industrial Hygiene, 4th Edition. National Safety Council. Chicago, IL 1989.

Shleien, Bernard and Michael Terpilak, editors. The Health Physics and Radiological Health Handbook. Nucleon Lectern Associates. Olney, MD 1984.

U.S. Department of Health and Human Services. The Industrial Environment--Its Evaluation and Control. NIOSH, U.S. Superintendent of Documents. Government Printing Office, Washington, D.C.

Appendix C: 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.

Appendix D: Proposed Revised Catalog Description

SAFE 361 Air and Water Pollution

2c-0l-2cr

Prerequisite: SAFE 220

Focuses on major aspects of industrial air and water pollution management. Includes sources and analysis of industrial air and water pollution, evaluation and control of air and water pollutants, and atmospheric and water chemistry. Particular emphasis is placed on information that is practical for the safety management, industrial health, or environmental health professional.