

Occupational Safety, Health, and Environment (OSH&E) Program Department of Computer Science and Industrial Technology Southeastern Louisiana University SLU 10847 Hammond, LA 70402

February 11, 2009

Dear OSH&E Industrial Advisory Committee Member,

On behalf of Southeastern Occupational Safety, Health, and Environment (OSH&E) Program, we would like to give our sincere appreciation for your involvement in the OSH&E Industrial Advisory Committee as well as your participation in the meetings and discussion.

Enclosed please find the report of the OSH&E Industrial Advisory Committee meeting that was held on January 23, 2009. Please feel free to let us know your questions and comments!

It is great honor and pleasure to invite you to our next quarterly meeting, which is tentatively scheduled from 11:30 AM to 2:00 PM on **April 24, 2009** at the **Hammond** campus. A formal letter will be sent to you when the meeting date and venue are determined.

Thank you very much for your consistent contribution to the program!

Sincerely,

Mr. Lawrence Maderman

Coordinator, OSH&E

Dr. Lu Yuan

Assistant Professor

Ms. Dorinda Folse

OSH&E IAC Chairperson

OSH&E Program Industrial Advisory Committee January 23, 2009 Meeting Report by Ms. Dorinda Folse and Dr. Lu Yuan

The last Occupational Safety, Health, and Environment (OSH&E) Industrial Advisory Committee (IAC) meeting was held from 11:30 AM to 2:30 PM on January 23, 2009 at Southeastern School of Nursing in Baton Rouge. (Please see the attached example photos!) The attendees include ten of the fifteen OSH&E IAC members (Appendix A with updated information). Ms. Dorinda Folse, the OSH&E IAC Chairperson, hosted the meeting. Mr. Lawrence Mauerman, Drs. Ephraim Massawe and Lu Yuan, the three full-time faculty members of OSH&E program, were the co-hosts. Two current OSH&E students, Jeremy Spears and Daniel Rice, were present. Drs. Peter Territo and Cris Koutsougeras attended the meeting as well. Absent were Don Jones, James Kerr, Buddy Mincey, Kathleen Loup, and Dr. Harold Leggett.

Appendix B includes the agenda of the meeting, which started with the welcoming and introduction from Ms. Dorinda Folse. The attendees then introduced themselves and a short break was held for lunch.

When the meeting resumed, items on the agenda were discussed in order. Under old business, Mr. Mauerman first reported the approved request for curriculum change (Appendix C). In particular, he mentioned the change for IT 391/492, *Industrial Internship/Research and Development in Industrial Technology*. Dr. Pete Territo, the internship coordinator, explained the procedure and requirement for companies who would like to provide internships to the OSH&E students. As Dr. Territo is the only person who is in charge of this IT internship course, he agreed to make the information about internship available and assessable ASAP. During the presentation, Mr. Steven Pereira handed out a short memo from ASSE journal *Professional Safety*, addressing the necessity of acquiring both technical and managerial skills to become versatile SH&E pro.

Dr. Yuan then explained the revision of Major Field Assessment Plan (Appendix D), which focused on the inclusion of specific OSHE course numbers for assessment of expected outcomes. Such a decision was made based on a meeting held with Dr. Michelle Hall, the Director of Institutional Research & Assessment at Southeastern in the end of last semester.

In terms of the OSH&E website, Mr. Mauerman and Dr. Yuan conducted a meeting with the university web coordinator officer earlier this semester. The new web page (Appendix E) included more complete and appropriate description of the program. A link to ASSE Southeastern Student Section website has also been made, which hopefully would accelerate the web reconstruction and management of the student section. Further, more information about the program including OSH&E faculty (both full-time and adjunct instructors), OSH&E Industrial Advisory Committee, internship information, job opportunities, and scholarships, etc., has been collected and is ready to be posted. It was suggested by the group that links be made to environmental groups as well as links to other professional groups. Mr. Mauerman asked Alan Rovira and Wayne LaCombe to assist in getting links for AIHA.

The last item under old business was cordially presented by Mr. Rick Saizan. He explained using Bloom's Taxonomy (Appendix F) to develop and modify the existing OSHE course specification sheets, particularly the course objectives. He used OSHE 111 *Introduction to Safety & Health* as an example to demonstrate the application of such taxonomy. The OSH&E faculty members felt that it was important to continue such an effort for other OSHE courses. A call for OSHE course specification development sub-committee was made and members who are interested in this specific issue could contact Mr. Mauerman and/or Dr. Yuan by mid-February. A special meeting was planned to be held in the end of February or early March.

Ms. Dorinda Folse led the group to the discussion of support for OSH&E program after all old business was presented. She used OSHA Baton Rouge Office as an example to illustrate the kinds of support that her office has given to local schools that have safety and health related programs. The following is a list of examples of support that the industrial advisory committee members and other pertinent colleagues might consider:

- **1. Internships**: We are grateful for the cooperation of those organizations that have already provided internships to our students. Companies who desire an OSH&E intern please contact Dr. Peter Territo at 985-549-2071 or pterrito@selu.edu for more information!
- 2. Equipment & Software: Ms. Folse discussed how her agency makes donations of equipment that is no longer used by OSHA. Other suggestions made were to ask vendors about testing new equipment or purchasing equipment used for demonstrations by vendors at reduced prices or as donations. It was also discussed that the department should consider compiling a list of existing equipment along with a "wish" list and those lists could be circulated among the committee and perhaps other organizations such as GBRIA, GNOIC, and LCIA/LCA.
- **3. Instructional Help**: Ms. Folse talked about the university's need for Adjunct Professors and guest speakers. Ms. Folse offered to assist by providing guest speakers. Mr. Mauerman explained that Adjunct Professors would need to have a M.S. and be certified as a CIH or CSP. It was suggested that Glen Young and/or Ronnie Meyers might be good candidates to provide instructional help.
- **4. Research Partnership**: There was discussion regarding OSHA's Susan Harwood Grant as well as collaboration between Southeastern faculty and industrial colleagues on scientific research and/or safety training.
- **5.** Others: A request was made for sponsors for future meetings.

Dr. Yuan mentioned a tentative plan to complete the self-study questionnaire from ABET later this semester. Preliminary results may be reported during the next OSH&E IAC quarterly meeting in April, depending on where such a study is.

Mr. Mauerman then took a head-shoulder portrait on each meeting attendee. This photo, along with a biography that is requested from each committee member, is ready to be posted on the OSH&E website. Meanwhile, the questionnaire about opinions on the program aspects (Appendix G) was handed out to those members that did not attend last meeting in October. So

far, eight completed questionnaires have been received. It is greatly appreciated that other committee members could finish and return it to Dr. Yuan ASAP.

The meeting adjourned at 2:30 PM after group pictures were taken.





Appendix A OSH&E Program Industrial Advisory Committee

Members

Steven P. Pereira, CSP Telephone: 225-665-6000

President spereira@professionalsafety.com

Professional Safety Associates, Inc.

1027 North Range Avenue Denham Springs, LA 70726

Richard Matherne, CIH Telephone: 225-963-7424

Home: 36102 Alligator Bayou Road rnmatherne@hotmail.com

Prairieville, LA 70769

Office (retired): Senior Industrial Hygiene Advisor/Product Stewardship

Albemarle Corporation Richard Matherne@albemarle.com

Health & Environment 451 Florida Street

Baton Rouge, LA 70801-1765

Donald S. Jones, Sr. CSP, PE, MBA Telephone: 225-353-6097

Safety Manager/Global Expert Partner djones@dow.com

The Dow Chemical Company P.O. Box 150, Bldg 3502 Plaquemine, LA 70765-0150

Wayne LaCombe, MSPH, CSP Telephone: 225-977-4108

MOH – Industrial Hygiene wayne.m.lacombe@exxonmobil.com

ExxonMobil, Baton Rouge

4999 Scenic Hwy CPWO # 1423

Baton Rouge, LA 70805

William J. Kerr, CSP Telephone: 225-252-2978

Eagle Environmental Services, Inc. James.Kerr@eaglered.com

18369 Petroleum Dr. Baton Rouge, LA 70809

Dorinda Folse, OSHA Area Director Telephone: 225-298-5458

Occupational Safety & Health Administration Folse.Dorinda@dol.gov

9100 Bluebonnet Centre Blvd, Suite 201

Baton Rouge, LA 70809

Beth Inbau, President & CEO, South Louisiana Chapter (New Orleans) Telephone: 504-888-7618

National Safety Council beth@metrosafety.org

P.O. Box 858, Kenner, LA 70063-0858

4713 Utica Street, Metairie, LA 70006

Rick Saizan, Safety Council LCA Telephone: 225-282-3291

> 8180 Siegen Lane rsaizan@safetylca.org

Baton Rouge, LA 70810

Chris Buzbee, President, ASSE New Orleans Chapter Telephone: 504-388-8088

Office: Bollinger Shipyards, Inc. cabuz98@cox.net

P.O. Box 250

Lockport, LA 70374

Lance Roux, CSP, President, ASSE Greater Baton Rouge Chapter Telephone: 225-247-7011

SafetyPro Resources, LLC lroux@safetyproresources.com

8550 United Plaza Blvd, Suite 702

Baton Rouge, LA 70809

Telephone: 504-257-0881 Alan J. Rovira, Senior Industrial Hygienist

Lockheed Martin Space Systems Company Alan.j.Rovira@maf.nasa.gov

Michoud Assembly Facility, Dept 3732

P.O. Box 29304

New Orleans, LA 70189

Don Steadman, CWCP, CPSI Telephone: 225-413-5626 dsteadman@brec.org

BREC Senior Risk Manager

6201 Florida Blvd.

Baton Rouge, LA 70806

Buddy Mincey Jr., Safety Director Telephone: 225-673-5302 buddy@volksconst.com

Volks Construction 10983 Hwy. 1033

Denham Springs, LA 70726

Kathleen R. Loup, Safety Director Telephone: 985-536-1425

> River Parish Contractors, Inc. kathleen.loup@rpcontractors.com

P.O. Box 2650

Reserve, LA 70084

Harold Leggett, PhD Telephone: 225-919-3950

Secretary harold.leggett@la.gov

Department of Environmental Quality

Office of the Secretary

P. O. Box 4301

Baton Rouge, LA 70821-4301

Student Members

Jeremy Spears Telephone: 225-788-8044

> 10236 Lockhart Rd Apt.A Jeremy.Spears-2@selu.edu

Denham Springs, LA 70726

Daniel Rice Telephone: 225-931-4687

13447 Acres Ct. Daniel.Rice@selu.edu

Baker, LA 70719

*Mary Faust, Program Chair, ASSE Southeastern Student Section Telephone: 985-517-7034

12330 Larock Rd maryfaust2@yahoo.com

Amite, LA 70422

Faculty Members

Mr. Lawrence Mauerman, MAS, PE, CSP

Coordinator, OSH&E Degree Programs

Department of Computer Science and Industrial Technology

Southeastern Louisiana University

SLU 10847

Hammond, LA 70402

Dr. Lu Yuan, ScD

Assistant Professor

Occupational Safety, Health, and Environment (OSH&E)

Department of Computer Science and Industrial Technology

Southeastern Louisiana University

SLU 10847

Hammond, LA 70402

Dr. Ephraim Massawe, ScD

Assistant Professor

Occupational Safety, Health, and Environment (OSH&E)

Department of Computer Science and Industrial Technology

Southeastern Louisiana University

SLU 10847

Hammond, LA 70402

Dr. Cris Koutsougeras, PhD

Professor, Department Head

Department of Computer Science and Industrial Technology

Southeastern Louisiana University

SLU 10847

Hammond, LA 70402

Dr. Pete Territo, Jr. PhD

Internship Coordinator and Associate Professor

Department of Computer Science and Industrial Technology

Southeastern Louisiana University

SLU 10847

Hammond, LA 70402

Telephone: 985-549-3925 Lu.Yuan@selu.edu

Telephone: 985-549-3476

lmauerman@selu.edu

Telephone: 985-549-2243 Ephraim.Massawe@selu.edu

Telephone: 985-549-2189

Telephone: 985-549-2071

pterrito@selu.edu

ck@selu.edu

^{*} indicates a former member

Appendix B OSH&E Program **Industrial Advisory Committee**

<u>Quarterly Meeting Agenda</u> January 23, 2009

<u>Time</u>	<u>Issues</u>	Actions
11:30 - 11:45 am	Welcome & Introduction (By Ms. Dorinda Folse)	
11:45 am - 12:15 pm	Lunch	
12:15 - 12:45 pm	Old Business	
	Curriculum Request for Change (By Mr. Lawrence Mauerman)	
	 Major Field Assessment Plan Update (By Dr. Lu Yuan) 	
	3. OSH&E Website Update (By Dr. Lu Yuan)	
	4. OSHE Course Objective Development (By Mr. Rick Saizan)	
12:45 - 1:30 pm	New Business	
	 Support for OSH&E Program (By Ms. Dorinda Folse) 	
	a. Internships	
	b. Equipment & Software	
	c. Instructional Help	
	d. Research Partnership	
	e. Others	
	 Self-Study Questionnaire (By Dr. Lu Yuan) 	
1:30 - 2:00 pm	Portraits, Bios & Questionnaire	

Appendix C CURRICULUM IN OCCUPATIONAL SAFETY, HEALTH AND ENVIRONMENT LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

(AS IN 2008-2009 CATALOG)

The Bachelor of Science Degree program in Occupational Safety, Health and Environment is designed to enable graduates to enter business and industry as safety, industrial hygiene and environmental professionals.

F	FIRST	YEAR	
FIRST SEMESTER	S.H.	SECOND SEMESTER	S.H.
English 101	3	English 102	3
Mathematics 161 ⁴	3	Mathematics 162	
OSHE 111		OSHE 112	
General Biology 151		OSHE 121.	
Biology Lab 152		Psychology 101	
Computer Science 110 or 173		15) \$1010 8) 101	
Southeastern 101			
	16-19		15
	SECON	D YEAR	
Chemistry 101	3	PHYS 191	3
Chemistry Lab 103		PLAB 193	1
Mathematics 241		CHEM 261	
Zoology 241		COMM 211	3
OSHE 241		OSHE 251	
OSHE 261		OSHE 242	
	17		16
	THIRI	YEAR	
Economics 201	3	Physical Science ¹	4
English 230 or 231 or 232	3	History 101 or 102 or 201 0r 202	3
OSHE 231	3	Industrial Technology 242	
OSHE 281	3	Industrial Technology 322	
OSHE 282	3	2.7	
			13
	15		13
		H YEAR	
OSHE 371		OSHE 321	
Management 351		OSHE 324	
Arts ²	3	OSHE 341	3
Professional Elective ³		Industrial Technology 391 ³ Professional Elective ³	3
Professional Elective ³	3	Professional Elective ³	3
			15
Total agreements have a residual			100 105
Total semester nours required	• • • • • • • • • • • • • • • • • • • •		122-125

¹ Select Chemistry 102/104 or Physics 192/194. ² Select one course in Art, Dance, or Music or Theatre.

³ Professional electives should be selected in consultation with advisors.

⁴ Students with an ACT Math score if 20 or lower will take Math 155 (5 credit hours) in place of Math 161, which will increase 2 credit hours the total number of hours required for the degree.

CURRICULUM IN OCCUPATIONAL SAFETY, HEALTH AND ENVIRONMENT LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

(AS APPROVED FOR THE 2009-2010 CATALOG)

The Bachelor of Science in Occupational Safety, Health, and Environment (OSH&E) program is designed to provide an academically comprehensive curriculum that prepares graduates with the ability and competency to become highly qualified safety, industrial hygiene, and environmental professionals.

FIRST	YEAR
FIRST SEMESTER	SECOND SEMESTER
English 101	English 102
Mathematics 161 ¹ 3	Mathematics 162
OSHE 111	Computer Science 173
OSHE 112	OSHE 121
General Biology 1513	OSHE 141
Biology Lab 1521	
Southeastern 1010-3	
16-19	15
SECON	D YEAR
Chemistry 101	Physics 191
Chemistry Lab 103	Physics Lab 1931
Mathematics 241	Communication 211
Psychology1013	OSHE 231
OSHE 251	OSHE 242
	OSHE 261
13	16
THIRI	YEAR
Chemistry 102	Chemistry 261
Chemistry Lab 104	History 101 or 102 or 201 0r 202
Economics 201	Industrial Technology 242
English 230 or 231 or 232	English 322
Zoology 241	OSHE 341
17	15
	H YEAR
OSHE 424	OSHE 382
OSHE 471	OSHE 421
Management 351	Industrial Technology 391/4923Professional Elective33
Arts ²	Professional Elective ³ 3 Professional Elective ³ 3
Professional Elective ³ 3	Professional Elective 3
Total semester hours required.	

¹ Students with an ACT Math score of 20 or lower will take Math 155 (5 credit hours) in place of Math 161, which will increase 2 credit hours the total number of hours required for the degree.

² Select one course in Art, Dance, Music or Theater

³ Professional electives should be selected in consultation with advisors

Appendix D Major Field Assessment Plan Occupational Safety, Health, and Environment (OSH&E)

The Bachelor of Science in Occupational Safety, Health, and Environment (OSH&E) program is designed to provide an academically comprehensive curriculum that prepares graduates with the ability and competency to become highly qualified safety, industrial hygiene, and environment professionals.

The educational objectives of the OSH&E program are to prepare students who:

1. Apply knowledge and principles of mathematics, science, technology, and management in industry, business, or other related areas of employment as occupational safety, health, and environment professionals.

Expected Outcomes

Students completing the Baccalaureate degree in OSH&E will demonstrate the ability to apply basic mathematical and scientific knowledge in the safety, health, and environment field.

Assessment

In the selected relevant courses (OSHE 111, 112, 121, 241, 242, 261, 281, 282, 321, 324, and 441), the exams and assignments should be designed to reflect the course objectives. Students are able to score at least 75% on math, statistics, and science related problems in the exams and assignments.

2. Apply practical-oriented knowledge and skills in safety, health, and environment to anticipate, identify and evaluate hazardous conditions and practices, to develop hazard control designs, methods, procedures and programs, and to implement and manage effective safety and health programs.

Expected Outcomes

Students completing the Baccalaureate degree in OSH&E will demonstrate the ability to anticipate, identify and evaluate safety, health, and environment hazards, and to develop and implement hazard control methods, programs, and system designs.

Assessment

- ➤ In the majority of courses, students are able to score at least 75% on technical problems regarding safety, health, and environment in the exams. Approximately 70% of the grade for each of those courses is based on the exam performance.
- ➤ In the selected relevant courses (OSHE 111, 112, 121, 241, 242, 281, 282, 324, 341, and 441), students are able to anticipate, identify, evaluate, and control hazards by scoring at

least 75% on a research project in a simulated industrial work environment. Approximately 30% of the grade for each of those courses is based on the quality of the research project.

3. Become effective communicators and ethical facilitators within the practice of safety, health, and environment.

Expected Outcomes

Students completing the Baccalaureate degree in OSH&E will demonstrate the ability to express thoughts effectively in oral and written communications, and to understand ethical behaviors and professional responsibility.

Assessment

- In the majority of courses, students are required to either write a technical research paper, or make an oral presentation of project, or both. Students are able to scoring at least 75% on those requirements. Approximately 30% of the grade for each of those courses is based on the quality of the research paper and/or presentation.
- The exams in selected courses (OSHE 111, 112, 121, 282, 321, 322, and 324) include questions regarding codes of professional ethics. Students are expected to score at least 75% on those questions. For those who have opposite opinions on the ethical codes, individual counseling or discussion will be issued.
- 4. Continue professional development to address the need of applying principles of safety, health, and environment within a constantly changing and increasingly diverse environment.

Expected Outcomes

Students completing the Baccalaureate degree in OSH&E will demonstrate the ability to broaden education and life-long learning necessary to understand safety, health, and environment issues within a global and social context.

Assessment

- Students are encouraged to become a member of ASSE (American Society of Safety Engineers) Southeastern Louisiana University Student Section and be actively involved in the events and activities organized by the Student Section. At least 50% of upper-level students are ASSE members.
- ➤ Students are encouraged to continue personal growth and improvement by pursuing the widely recognized certifications including Certified Safety Professional (CSP) and Certified Industrial Hygienist (CIH). As measured on the Southeastern Alumni Survey, 50% of the OSH&E graduates will become CSPs.

Appendix E



Southeastern Home > Future Students > Degrees & Special Programs > Degree Programs >

Bachelor of Science in Occupational Safety, Health, and Environment

Department

Department of Computer Science and Industrial Technology

College

College of Science and Technology

Overview of the program

The Bachelor of Science in Occupational Safety, Health, and Environment (OSH&E) degree program is designed to provide an academically comprehensive curriculum that prepares graduates with the ability and competency to become highly qualified safety, industrial hygiene, and environmental professionals.

The OSH&E Bachelor degree program is undergoing a preparation for the Accreditation Board for Engineering and Technology (ABET) accreditation. The OSH&E two-year Associate of Applied Science degree program has been accepted for the National Association of Industrial Technology (NAIT) accreditation. Because of these, students have access to both the highly-qualified courses and the most technologically advanced equipment in the state.

Mission Statement

The educational objectives of the OSH&E program are to prepare students who:

- 1. Apply knowledge and principles of mathematics, science, technology, and management in industry, business, or other related areas of employment as occupational safety, health, and environmental professionals;
- 2. Apply practical-oriented knowledge and skills in safety, health, and environment to anticipate, identify, and evaluate hazardous conditions and practices, to develop hazard control designs, methods, procedures, and programs, and to implement and manage effective safety, health, and environment programs;
- 3. Become effective communicators and ethical facilitators within the practice of safety, health, and environment;
- Continue professional development to address the need of applying principles of safety, health, and environment within a constantly changing and increasingly diverse environment.

Strengths of the program

Southeastern's OSH&E program emphasizes both the technical and managerial skills to assure that its graduates are ready to enter the workforce to make significant contributions from their very first day. Their education has been drawn from a variety of disciplines to provide knowledge with both the depth and breadth necessary for this very complex profession. Some of the salient aspects of the program are:

- Qualified full-time and adjunct faculty with not only outstanding academic qualification but also real-world experience.
- A sound foundation in the physical and biological sciences essential to the application of workplace safety and health, and environmental preservation.
- Established communication skills, both written and oral.
- Ability to direct safety, health, and environment programs within the overall context of the management organization.
- Close association with professional safety and health organizations, both on and offcampus, to provide support and additional educational opportunities.
- Required internships and guided learning experiences.

Preparing for a job in the program

The OSH&E program prepares students to succeed as occupational safety, health, and environment professionals with a broad technical and managerial background. Typically included in this background are a functional knowledge and understanding of safety, health, and environment fundamentals; legal aspects of safety, health, and environmental practices; interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors on the human body; basic principles of fire prevention and protection in the workplace; industrial and construction safety throughout work processes; industrial management and human relations; communication skills, mathematics, sciences, and statistics; and practical skills of basic laboratory techniques associated with industrial hygiene and basic sciences; fundamental exposure assessment techniques; accident/incident investigation and analysis; measurement of safety performance; safety, health, and environment program management; performance of education and training for safety.

Careers in the program

The OSH&E major prepares students for work in a wide variety of employments including, but not limited to, the following:

- · Industry, both heavy and light
- Commercial and retail organizations
- Regulatory and other governmental organizations
- Insurance carriers
- Health care
- Consulting

Starting Salaries after completing the program (estimates only)

Starting salaries of the OSH&E graduate are commensurate with those of other 4-year technical and engineering graduates.

Campus organizations and activities affiliated with the program

- American Society of Safety Engineers
- National Association of Industrial Technology
- Epsilon Pi Tau

How do I know this is the degree for me? Common Strengths and interests of students in the program

A degree in Occupational Safety, Health, and Environment is right for you if you want a career that is challenging and requires application of your extensive technical knowledge in real life situations. As the result of your work, workers will find significant improvements in conditions affecting their own

safety and health, and the environment will be better protected. In addition, the organizations for which you work will operate more effectively and efficiently.

Contact Information

Department of Computer Science and Industrial Technology

College of Science and Technology Lawrence Mauerman, MAS, PE, CSP Coordinator, OSH&E Program SLU 10847

Hammond, LA 70402

On Campus: Anzalone Hall, Room 110-3

Telephone: 985-549-3479

Fax: 985-549-5532

E-mail: Imauerman@selu.edu

Appendix F

Setting Educational Objectives that Insure Learning Takes Place at All Cognitive Levels

by: Rick Saizan

One of the things noticed when reviewing the course descriptions was that, in general, for courses from OSHE 111 through OSHE 322, the objectives only address a portion of the six levels of cognitive learning. The knowledge, comprehension and application elements of Bloom's Taxonomy of Cognitive Learning are in general addressed in all the objectives, but evaluation, synthesis, and analysis are not addressed in the objectives for these courses at all and not consistently in the higher level courses. I think that it is important that more of Bloom's higher level learning elements should be addressed in the objectives.

Bloom's Taxonmomy is a heirarchal classification of the cognitive levels at which learning take place. It also helps educators to define the objectives of learning so that educational techniques can be utilized to insure that learning takes place at the appropriate level for the materila being taught.

Skills in the **cognitive domain** revolve around knowledge, comprehension, and "thinking through" a particular topic. Traditional education tends to emphasize the skills in this domain, particularly the lower-order objectives.

There are six levels in the taxonomy, moving from the lowest order processes to the highest:

Knowledge

Exhibit memory of previously-learned materials by recalling facts, terms, basic concepts and answers

- Knowledge of specifics terminology, specific facts
- Knowledge of ways and means of dealing with specifics conventions, trends and sequences, classifications and categories, criteria, methodology
- Knowledge of the universals and abstractions in a field principles and generalizations, theories and structures

To evaluate knowledge, use questions like: What is...?

Comprehension

Demonstrative understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas

- Translation
- Interpretation
- Extrapolation

To evaluate comprehension, use questions like: How would you compare and contrast...?

Application

Using new knowledge. Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way

To evaluate application, use questions like: Can you organize to show...?

Analysis

Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations

- Analysis of elements
- Analysis of relationships
- Analysis of organizational principles

To evaluate analysis, use questions like: How would you classify...?

Synthesis

Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions

- Production of a unique communication
- Production of a plan, or proposed set of operations
- Derivation of a set of abstract relations

To evaluate synthesis, use questions like: Can you predict an outcome?

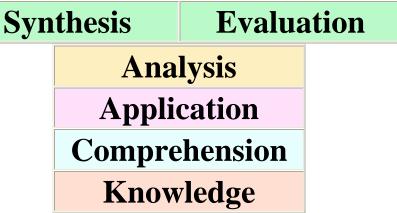
Evaluation

Present and defend opinions by making judgments about information, validity of ideas or quality of work based on a set of criteria

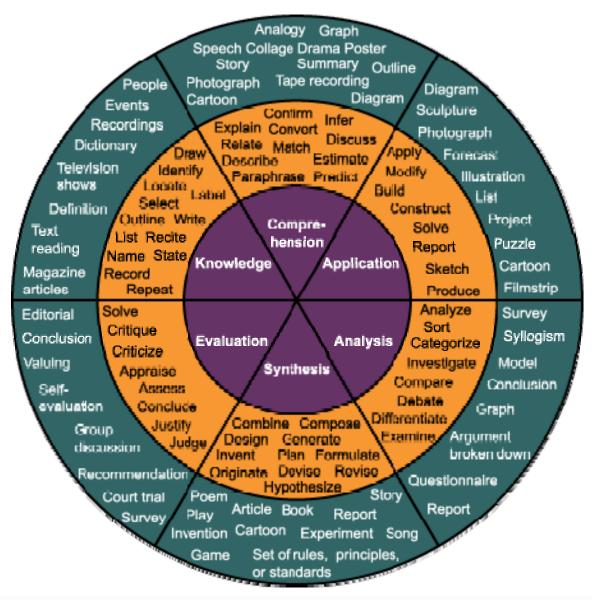
- Judgments in terms of internal evidence
- Judgments in terms of external criteria

To evaluate evaluation, use questions like: Do you agree with....?

Some critiques of Bloom's Taxonomy's cognitive domain ackanowledge the existence of these six categories, but question the existence of a sequential, hierarchical link as shown in the graphic below. Also the revised edition of Bloom's taxonomy has moved Synthesis in higher order than Evaluation. Some consider the three lowest levels as hierarchically ordered, but the three higher levels as parallel. Others say that it is sometimes better to move to Application before introducing concepts.



Below is a Bloom's Taxonomy model that provides an easy view of the levels of learning (purple), likely verbs that would be used in writing objectives (orange), and potential products that would demonstrate learning at that level (green).



References

- Taxonomy of Educational Objectives: The Classification of Educational Goals; pp. 201-207; B. S. Bloom (Ed.) Susan Fauer Company, Inc. 1956.
- A Taxonomy for Learning, Teaching, and Assessing A Revision of Bloom's Taxonomy of Educational Objectives; Lorin W. Anderson, David R. Krathwohl, Peter W. Airasian, Kathleen A. Cruikshank, Richard E. Mayer, Paul R. Pintrich, James Raths and Merlin C. Wittrock (Eds.) Addison Wesley Longman, Inc. 2001
- 1. <u>^ Learning Domains or Bloom's Taxonomy Donald R. Clark</u>

2. ^ Paul, R. (1993). Critical thinking: What every person needs to survive in a rapidly changing world (3rd ed.). Rohnert Park, California: Sonoma State University Press.

Portions of this information were retrieved from "http://en.wikipedia.org/wiki/Taxonomy of Educational Objectives"

The following page shows an example of using Bloom's Taxonomy to develop course specification for OSHE 111.

Course Specification Sheet OSHE 111 Introduction to Safety & Health

Course Description:

This course presents general safety and health concepts and terms, historical developments, program concepts and terms, legislative overview including worker's compensation law, problem identification, hazard recognition, evaluation and control concepts, and program management.

Minimum Topics:

- 1. Historical Perspectives
- 2. Safety and Health Professions
- 3. Theories of Accident Causation
- 4. Regulatory History
- 5. Workers' Compensation
- 6. Loss Control Programs
- 7. Injury and Illness Record Keeping
- 8. Identifying Hazards
- 9. Safety Audit & Inspection
- 10. Accident Investigation and Analysis
- 11. Computers and Information Management
- 12. Safety Training & Promoting Safety

Course Objectives:

- 1. Describe the history of the safety movement in the United States, including significant safety legislation and the importance of worker's compensation. (Comprehension)
- 2. Describe important sources of loss control information. (Comprehension)
- 3. Demonstrate how loss control information is analyzed and used to develop effective loss control programs. (Application)
- 4. Describe the organization of effective industrial health programs including the principles of occupational health, industrial hygiene and ergonomics. (Comprehension)
- 5. Demonstrate the organization of effective environmental programs, including the response to industrial emergencies. (Application)
- 6. Describe the organization of effective safety programs, including employer and employee motivation; safety and health training; use of various types of media; and implementation and use of safety awareness programs. (Comprehension)
- 7. Analyze safety issues in the workplace. (Analysis)
- 8. Research, organize and present ideas and opinions from other writers on OSHE topics. (Synthesis)
- 9. Develop and communicate your own opinions about a selected workplace hazard. (Synthesis)

Appendix G OSH&E Program Industrial Advisory Committee

Quarterly Meeting Questionnaire

October 17, 2008

The following questions are based on the nine criteria for accrediting Applied Science programs from ABET. It will take approximately 20 minutes to finish. Your kindly response is very much appreciated!

1.		udents How do you feel a graduates?	bout the compe	etencies of Southea	astern's OSH&E Bachelor I	Degree Program
		☐ Very good	\square Good	☐ Just OK	\square Not good enough	☐ Not applicable
	2)	_	eed to strengthe) nd statistical kn n skills ary teamwork ed knowledge a	en? (Please select anowledge	idents enrolled in Southeast all that applies and rank the	
2.		and Goals?	bout the descri		ern's OSH&E Bachelor Deg	-
		☐ Very good	\square Good	☐ Just OK	□ Not good enough	☐ Not applicable
3.		ogram Outcomes How do you feel a Assessment Plan?	bout the descri	ption of Southeast	ern's OSH&E Bachelor Deg	gree Program Major Field
		☐ Very good	\square Good	☐ Just OK	☐ Not good enough	☐ Not applicable
	2)	all that applies and ☐ Ability to apply field ☐ Ability to antici ☐ Ability to devel	rank them using basic mathematic pate, identify, a op and implements thoughts efforts.	ng numbers where atical and scientificand evaluate safety ent hazard control ectively through or	t should be emphasized or p 1 means the highest!) c knowledge in the safety, h y, health, and environmental methods, programs, and sy ral and written communication	ealth, and environment hazards stem designs
4.	Co	ontinuous Improvem	ent			
	1)		l rank them usi	ng numbers where	inuous improvement of the 1 means the highest!)	program? (Please select

21

	 □ Consult colleagues from the institutional organizations that have already been accredited □ Build close and consistent connection with OSH&E industrial advisory committee □ Others (Please specify!)
5.	Curriculum 1) How do you feel about the overall course offerings of Southeastern's OSH&E Bachelor Degree Program? ☐ Very good ☐ Good ☐ Needs adding more courses, such as ☐ Needs deleting some courses, such as
	 Which academic discipline(s) should the program emphasize, considering the local industrial environment? (Please select all that applies and rank them using numbers where 1 means the highest!) □ Industrial Hygiene □ Ergonomics □ Environmental Protection □ Safety & Security □ Others (Please specify!)
6.	Faculty 1) How do you feel about the qualifications and competencies of faculty (both full-time and adjunct) for Southeastern's OSH&E Bachelor Degree Program? □ Very good □ Good □ Just OK □ Not good enough □ Not applicable
	2) How do you feel about the numbers of full-time faculty for Southeastern's OSH&E Bachelor Degree Program? ☐ Very good ☐ Good ☐ Just OK ☐ Not good enough ☐ Not applicable
7.	 Facilities 1) How do you feel about the importance of scientific laboratories and associated equipment for occupational safety and health field? □ Very important □ Important □ Just OK □ Not so important □ Not applicable 2) What kind of laboratories do you feel that should be established for Southeastern's OSH&E Bachelor Degree Program? (Please select all that applies and rank them using numbers where 1 means the highest!) □ Industrial Hygiene Lab □ Ergonomics Lab □ Safety Engineering Lab □ Fire/Hazardous Materials Lab □ Others (Please specify!)
	☐ Others (Please specify!)

8. Support

1) In your opinion, which channel(s) should Southeastern's OSH&E Bachelor Degree Program try through which to obtain institutional support, financial resources, and constructive leadership? (Please select all

that applies and rank them using numbers where 1 means the highest!) Internal program budget External educational grant Industrial sponsorship Others (Please specify!)
Program Progr
Program Criteria 1) How do you feel about the overall quality of Southeastern's OSH&E Bachelor Degree Program? □ Very good □ Good □ Just OK □ Not good enough □ Not applicable
Which area(s) of the program do you feel that should be strengthened? (Please select all that applies and rank them using numbers where 1 means the highest!) Program objectives and outcomes Course offerings Student recruitment Faculty qualifications and competencies Facilities and laboratories Others (Please specify!) se feel free to write any other comments below!