

# EHS 454: Health Hazards in Industrial Processes

Winter 2019

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Lectures: Mondays, 5p – 7p, Room CHS 61-235. 2 hours.

Field Visits: Mondays, 1p-5p unless otherwise indicated. Meet in CHS 61-235 unless otherwise indicated. Off site field trips begin at 1p. UCLA field trips begin at 3p except when notified otherwise.

## Lecture Date/Topic /Plant Visit/Date, (Schedule subject to change per facility availability)

The objective of this course is to cover the major unit processes in the workplace relative to exposure hazards, how to integrate anticipation/recognition/identification, evaluation, control, and prevention of them, and to observe and assess specific representative workplace operations to gain an immediate understanding of their potential for excessive workplace exposure(s) to chemicals, physical agents, biological agents, mechanical forces, and stresses from ergonomic and safety situations and their control and future prevention ; to observe and assess workplace operations to determine their potential for injuries related to ergonomics and safety; and to observe and record safety hazards (e.g. unguarded or ineffectively guarded production equipment) or workplace conditions (e.g. wet floors; poor housekeeping; poor records; safety data sheets are not present or publically available ) that could result in incident or injury.

The environmental health competencies for MS students are the following: A1 Retrieve and organize literature; synthesize and critically evaluate scientific literature in environmental health, public health and other relevant fields; A2 Use existing databases to provide background information or data to address research questions and draw appropriate inferences/ estimates from environmental health data; A3 Evaluate seminars and presentations in environmental health and distill the critical and salient issues from them; B5 Be able to articulate interdisciplinary approaches to solving public health problems; C1 Use computer systems and analytic software packages; D1 Make reasonable inferences from results of analysis of observational and analytic studies; E1 Prepare presentation materials including outlines, posters, and Powerpoint presentations; E2 Deliver effective oral presentations individually and as part of a team; E3 Explain and interpret research findings for students, professionals, the public, and media; E4 Identify and implement appropriate safety controls and practices; F4 Identify and implement appropriate safety controls and practices.

The EHS Master of Public Health competencies involved are: C1 Describe major direct and indirect human health and safety effects of major environmental or occupational agents; C2 Describe physiologic and psychosocial factors that affect susceptibility to adverse health outcomes following exposure to environmental hazards; C3 Describe federal and state regulatory programs, guidelines, and authorities that control environmental health issues; C5 Specify approaches for assessing, preventing and controlling environmental hazards that pose risks to human health and safety; C6 Identify key sources of data and use existing databases to provide background or supportive data to address environmental health questions; C7 Discuss various risk management and risk communication

approaches, including their relation to issues of environmental justice and equality. The following cross-cutting public health competencies are also reflected in the design and content of the course: communication and informatics; leadership; professionalism; program planning; systems thinking.

**Reports:** All field trips require a full field visit report.

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**01/07 No Field Trip;** Introduction (surveys, field trips & reports), process flow charts, generalized unit operations, cradle to grave; feedstocks; wastes; recycling; safety; mechanization , logistics, and human factors; checklists; chemical processing. Burgess: pp3-9; 277-302.

**01/14:** Chevron Oil Refinery, El Segundo, field site visit, 1p. Oil Refining Burgess pp. 303-317;452-457. Plastics, Composites . Burgess pp 363-371.

**01/21 Martin Luther King Jr Holiday. No lecture or field trip**

**01/28 UCLA Hazardous Waste Facility field site visit, 1p.** Batteries Burgess pp401-408. Smelting Burgess 435-442;Metal Working ,Cleaning Foundry, ,Metal Machining, Welding; Burgess pp.13-246; Abrasive Products Burge pp458-463; Foundry pp106-139

**02/04 Bell Foundry , field site visit, 1p:** Metals cont'd; Ceramics Burgess pp 474-482

02/11 **UCLA Ceramics Shop field site visit, 3p.** Semiconductors Burgess pp375-408.

**02/18 President's Day holiday. No lecture or field trip**

02/25: **UCLA Co-generation plant, field site visit, 2p:** Mining and Milling; Burgess 275-276;411-434

03/04. **UCLA Machine Shop site visit, 3p;** Rereview Metal Machining Burgess pp140-166

03/11: Catch up and Review.

**Final Oral Exam : TBA**

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Dates/sites are subject to change.

**Trip reports:** They shall be organized per standards discussed in class, and shall include a title page, abstract (one page), introduction, walk through survey details, site map , observations, discussion (operation, hazard, control, what was good, what was bad, opportunities for improvement, prioritized recommendations, relevant hygienic and safety guidelines , references, and appendices .

Reports are due the Monday following the field visit. The body of the field visit report shall be typed, double spaced, and no longer than 5 or 6 pages in length excluding maps and tables.

**Final Examination:** Oral. The presentation topic shall be chosen randomly at the time of the exam. The presentation will be without notes; however the student can illustrate concepts on the board. The presentation shall include process descriptions, recognized hazards and their control. The instructor will ask questions following the presentation, seeking clarity and the student's appreciation for the most important health and safety risks and their control.

**NOTE:**

Students needing academic accommodations based on a disability should contact the Center for Accessible Education (CAE) at [\(310\)825-1501](tel:3108251501) or in person at Murphy Hall A255. When possible, students should contact the CAE within the first two weeks of the term as reasonable notice is needed to coordinate accommodations. For more information: [www.cae.ucla.edu](http://www.cae.ucla.edu)

**Texts:**

Burgess, W.A., Recognition of Health Hazards in Industry, 2<sup>nd</sup> Edition, Wiley-Interscience, New York (1995)—required.

Anna, DH (ed.): The Occupational Environment, Its Evaluation, Control and Management, 3rd edition, AIHA Press, Fairfax, VA 2003. Chapters 30 (Ergonomics); 33 (Occupational Health Psychology); 46 (Confined Spaces); 48 (Hazardous Waste Management); 50 (Occupational Health Programs); 51 (Report Writing); 52 (Occupational Safety);

Plog, B.A. and Quinlan, P.J. (eds.): Fundamentals of Industrial Hygiene, 5<sup>th</sup> edition, National Safety Council, 2002, Chapter 15 (Evaluation), 29 (History of Federal OSHA).