Greener Solutions Course
Syllabus – 2012

Course Description
Green chemistry seeks to promote the design and adoption of safer, more efficient chemicals, products and processes through the implementation of 12 Principles. The Greener Solutions Course is an interdisciplinary 3-unit project-based class in which graduate students in public health, chemistry, environmental studies, engineering, business and law apply their knowledge to address a research question relevant to a host organization that is working to advance green chemistry.

Teams of 4-5 students will work with the host organization on a topic related to the design, manufacture, use, and/or marketing of safer chemicals in products, materials or manufacturing operations.

Student teams will prepare a final report and present their findings on campus and to the host organization. While the class lectures, discussion and assignments will support the technical aspects of the project, significant emphasis will also be placed on developing the requisite process-oriented skills: gathering information, working in teams, and communicating effectively in both written and oral form.

Learning Goals
1. Understand the principles of green chemistry and pollution prevention, and be able to apply them in the context of the practices of a host organization.

2. Be able to effectively access information and use tools to evaluate and compare the hazard profiles of chemicals and materials.

3. Gain experience framing research questions and developing solutions in an applied setting.

4. Develop tools to measure the effectiveness of a project.

5. Be able to communicate complex technical ideas clearly and effectively in written and oral form.

Intended Audience
Graduate students in the School of Public Health, College of Chemistry, College of Engineering, College of Natural Resources, School of Law, and School of Business.

Prerequisites
Graduate standing, or advanced undergraduate with instructor approval; general chemistry or equivalent knowledge.

**Course Texts**

Required readings will be drawn from the scientific literature and the following books:


**Class Structure**

Class is a combination of instruction, guest lectures, and in-class team meetings. Students should spend approximately 9 hours/week on the course; 3 in class and 6 outside of class, including at least one team meeting per week outside of class.

**Coursework**

Students will complete their research projects over the course of the semester, meeting interval deadlines and culminating in a final group report. Final deliverables consist of:

1. Research project report (20 pages)
2. Presentations to class and host organization

**Student Evaluation**

1. Research project: Report, and interval steps (scope of work, outline, annotated bibliography)--50% of the course grade
2. Presentations--30% of the course grade
3. Group Participation: attendance at class meetings, group meetings, and contribution to team work and discussion--20% of the course grade.

**Instructors**

Megan Schwarzman, MD, MPH
Martin Mulvihill, PhD

**Office Hours**
Instructors are available for in-class meetings, email correspondence, and additional coaching of student teams as needed.

**Course Expectations**

*Respect:*
Our goal is to create an interdisciplinary class where ideas can be freely exchanged. This requires an atmosphere of respect in which everyone feels at ease to express ideas and ask questions. With so many different disciplines being discussed, your instructors will strive to avoid discipline-specific jargon, and will gladly explain unfamiliar terms and concepts. We expect the same from all of the students.

*Professionalism:*
Because this class puts you in close contact with host organizations, please be cognizant that your conduct reflects on the UC Berkeley community as a whole. We expect that you will bring professionalism to all aspects of your communication and work with your peers and with the host organizations.

**Course Calendar**

**Week 1: Introduction and Orientation to Course**
**Topics:** Overview of pollution prevention and green chemistry; introduction of research projects, teams, deliverables, and course process.
**Presenters:** M Schwarzman, M Mulvihill, Karl Palmer, PhD (DTSC Office of Pollution Prevention and Green Technology)

**Week 2: Working in Groups**
**Topics:** Understanding your work process and others’ to function effectively as a team
**Presenter:** TBA
**Assignment:** Work style assessment due before class

**Week 3: Consulting Skills**
**Topics:** Articulating the research question; interacting with a client company or organization
**Presenter:** TBA

**Week 4: Scientific Writing Skills I**
**Topics:** Overcoming common pitfalls in language use, syntax and grammar to produce clear and effective writing
**Presenter:** M Schwarzman
**Assignment:** Scope of Work due before class (1 pg memo with project overview and key questions) Students will revise this piece of writing based on what they learn in class.

**Week 5 Information Sources I**
Topics: Searching the peer reviewed literature; assessing quality of the evidence
Presenters: M Schwarzman, PH Librarian

Week 6 Information Sources II
Topics: Searching patents and LexisNexis; obtaining information for a market analysis
Presenters: Staff from the Technology Transfer Office; Haas School Librarians

Week 7: Information Sources III
Topics: Conducting expert interviews: identifying key informants, framing questions and using the information
Presenter: Charlotte Chang, DrPH (UCB Labor Occupational Health Program)
Assignment: Report Outline and Annotated Bibliography due before class

Week 8: Tools & Metrics I
Topics: Using existing tools, databases, and methods for assessing chemical hazard and material tradeoffs
Presenter: M Mulvihill, M Schwarzman

Week 9: Tools & Metrics II
Topics: Creating your own measures of material tradeoffs; methods for measuring project success
Presenter: M Mulvihill, Karl Palmer (DTSC Office of Pollution Prevention and Green Technology)

Week 10: Evaluating Data
Topics: Drawing conclusions and making recommendations in the face of absent or conflicting information; evaluating data sources; weight-of-evidence approaches
Presenters: M Schwarzman, M Mulvihill

Week 11: Evaluating the Experience
Topics: Methods for evaluating effectiveness of a project; midterm assessment of students’ experiences working with company & project team
Presenters: M Schwarzman, M Mulvihill
Assignment: Project progress report due before class

Week 12: Scientific Writing Skills II
Topics: Structuring rational and persuasive written reports; communication of technical content to less trained readers; putting scientific findings in context
Presenter: M Schwarzman

Week 13: Presentation Skills
Topics: Creating and delivering an effective presentation; graphic representation of data; crafting learning points
Presenters: M Schwarzman, M Mulvihill
Week 14: **In-class presentations**
*Topics:* Teams present their project findings, results and recommendations to the class

Week 15: **Off-site presentations** [RRR week]
*Topics:* Teams present their project findings, results and recommendations to their host organization in person, and/or via webinar

Week 16: **Evaluation of program** [Exam Week]
*Topics:* Structured review of the projects and course

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