

iCons 2 Renewable Energy [NatSci 290IH (2) aka i2e] – Spring 2013 Syllabus



i2e Faculty Guides:

Prof. “DV” Venkataraman, Chemistry (545-2028, dv@chem.umass.edu)

Prof. Scott Auerbach, Chemistry (545-1240, auerbach@chem.umass.edu)

i2e Spacetime:

Team-Based Learning Classroom, Goodell 608, Tuesday/Thursday, 11:15am – 12:30pm

i2e Coarse Course Structure:

Component	# of Weeks
Communication Bootcamp (TW,IC)	5
Mid-Term Assessment / Panel (TW,IC)	1
Op-Ed Piece (TW,TC)	1
Extended Case Study Project (TW,TC)	6

i2e Course Objectives: Students learn to ... in the context of Renewable Energy problems.

1. ... write effectively and clearly ...
2. ... speak effectively and clearly ...
3. ... create clear and effective visual presentations ...
4. ... communicate with non-scientists ...
5. ... engage in vigorous scientific dialogue ...
6. ... offer and utilize constructive criticism ...

i2e Communication Products:

- Communication Bootcamp (all individual communication products):
 - Reflection on Course Objectives ... week 1
 - Abstract week 2
 - Figure week 3
 - 1 PPT or Prezi Slide week 4
 - 1 pg Proposal week 5
- Mid-Term Panel: week 6
 - All: 1pg Proposal with Figure
 - Some: 1 PPT or Prezi Slide and Talk
- Extended Team Case-Study Project:
 - Op-Ed piece week 7
 - Position Paper week 8-11
 - Debate
 - Internal Debate (6 teams, 3 winners)...week 12
 - External Debate (like last year).....week 14 (Finale)
 - Poster if no External Debate.....week 14 (Finale)
- Individual Reflection on i2e.....week 13

i2e Course Rubrics: Students choose top three goal areas in initial reflection.

- A = Excellent in 2 areas and Strength in a 3rd area.
- A⁻ = Excellent in 1 area and Strength in 2 other areas.
- B⁺ = Strength in 3 areas.
- B = Strength in 2 areas.

(Very) Tentative Schedule**Week 1: Course Objectives / Form Initial Teams / “Formats Table”**

- Tuesday Jan 22: Discuss objectives, write reflection that prioritizes course objectives
- Thursday Jan 24: Discuss various formats, complete table for Communication Bootcamp

Week 2: Abstract

- Tuesday Jan 29: Discuss article, core meaning; write abstract after class
- Thursday Jan 31: Peer assessment of abstract (Abstract tips)

Week 3: Figure

- Tuesday Feb 5: Field Trip: Campus Heating and Power (CHP)
- Thursday Feb 9: Work on Energy Flow Diagram for UMass Amherst (Figure tips)

Week 4: Powerpoint or Prezi Slide

- Tuesday Feb 12: Discuss message to convey, slide format; create slide after class
- Thursday Feb 14: Peer assessment of slide (Slide tips)

Week 5: Proposal

- Tuesday Feb 19: HOLIDAY
- Thursday Feb 21: Work on 1 pg proposal for extended case-study topic (Proposal tips)

Week 6: Mid-term Assessment

- Tuesday Feb 26: MAP, students rate proposals
- Thursday Feb 28: Top 10 give talks

Week 7: Extended Case-Study Begins (remake teams)

- Tuesday Mar 5: Discuss message for Op-Ed piece, begin formatting, complete after class
- Thursday Mar 7: Continue working, submit at the end of class (Op-Ed piece tips)

Week 8: Position Paper / Debate Prep Begins

- Tuesday Mar 13: Choose Debate question / “Best Available Technology” study (lit search tips)
- Thursday Mar 15: explainer on “BAT”

Week 9: Position Paper / Debate Prep Continue

- Tuesday Mar 26: BAT Pros / Cons study / writeup
- Thursday Mar 28: “Promising Future Technology” study

Week 10: Position Paper / Debate Prep Continue

- Tuesday Apr 2: PFT Pros / Cons study / writeup
- Thursday Apr 4: Wrap up document (Exec Summary, Conclusions)

Week 11: Position Paper / Debate Prep Continue

- Tuesday Apr 9: Revise document, begin debate prep
- Thursday Apr 11: Debate prep

Week 12: Position Paper / Debate Prep Continue

- Tuesday Apr 16: Debate prep
- Thursday Apr 18: Debate prep

Week 13: Internal Debate

- Tuesday Apr 23: Debate prep
- Thursday Apr 25: Internal debates

Week 14: External Debate

- Tuesday Apr 30: Individual course reflection

Appendix I: Long List of Learning Objectives

1. Students reflect upon their work and evaluate themselves while developing a portfolio.
2. Students communicate to non-scientists through jargon-free communication skills.
3. Students develop scientific thinking skills.
4. Students experience the value of mentoring.
5. Students can expect and contribute to a positive, engaging learning environment.
6. Students will develop clear and effective writing skills in a multidisciplinary context.
7. Students will offer and utilize constructive criticism.
8. Students learn to respectfully work in teams.
9. Students apply scientific knowledge to the theme or problem area.
(Jan 24, 2012: Omit objective #9 because i2e students deemed this to be redundant with objective #10. The absence of the word “critically” in #9 – but the presence of the word in #10 – sends the message that students should not be critical with scientific “knowledge” but should be critical with scientific “literature.” Students felt that “knowledge” in, e.g., textbooks can also be wrong, so this should also be approached with skepticism. Considering that all scientific knowledge exists in some form of “literature,” it was deemed that objective #10 covers it all.)*
10. Students will critically apply and read scientific literature.
11. Students will develop clear and effective individual speaking skills in a multidisciplinary context.
12. Students will participate in vigorous scientific dialogue.
13. Students learn persuasive communication skills.
14. Students will learn to create effective visual presentations of scientific data and concepts.
15. Students will learn to make science interesting to various audiences.*
16. Students will learn the pros and cons of different communication formats.*

*Modifications/additions as per Spring 2012 i2e students on Jan 24, 2012.

Appendix II: Inventory of Inception/Reference Materials:**“Topic” Inception Materials (all from C&E News for consistent format)**

- **Plastic Solar Cells (featuring DV!)**
 - <http://cen.acs.org/articles/88/i34/Power-Plastic.html>
- **Nuclear Energy**
 - <http://cen.acs.org/articles/88/i37/Nuclear-Efficiency.html>
- **Coal Energy**
 - <http://cen.acs.org/articles/90/i47/Lurching-Toward-Low-Pollution-Coal.html>
- **Natural Gas via Hydraulic Fracturing (aka Fracking)**
 - <http://cen.acs.org/articles/90/i42/Treating-Water-Hydraulic-Fracturing.html>

“Communication Product” Inception Materials

- Example of Abstract
- Example of Figure
- Example of Slide
- Example of Proposal

Reference Materials

- McKinsey Nov 2011 Report on “Resource Revolution”
- Energy Information Association 2012 “Annual Energy Review”
- UMass Amherst Physical Plant “Sustainability Initiative” (via Ezra Small)

Appendix III: Reflection Questions (individual answers uploaded to Moodle Assignment)

1. What were the biggest challenges in completing the assignment?

2. How well did your group work as a *team*?

3. Did you yourself learn what you expected to?

4. Did you and your team reach your expectations?

5. Based on the feedback, if you were given an opportunity to do assignment again, what would you do differently? (learning from “mistakes”)

6. What communication “best practices” emerged?
