



Chemistry Capstone Seminar with Green Theme

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What Constitutes Postgraduate/Professional Experience?

- Working in teams
- Communicating knowledge/results
 - presentations and publications
- Having the opportunity to REVISE work based on peer feedback
- Peer review

Objectives of a Capstone Course

- Opportunity to demonstrate what they know
- Connect the dots to see the big picture
- Prepare students for
 - graduate studies
 - professional school or workplace
 - do research

Course Description

Critical review of research presented by visiting university and industrial chemists, and student preparation and presentation of original and library chemical research topics. The course will also explore issues related to becoming a morally responsible scientist to ethical problem solving.

Prereq: or linked course CHEM 311

CHEM 391: A Capstone Chemistry Seminar Course

- Required for all Chemistry Majors
- Credit 3 SH
- Class time 4 hours/week

Structure of the Course

- Four weeks with Dr. Roger Gilman, Philosophy Department. Devoted to the issues related to becoming a morally responsible scientist.
- Lectures by four guest Scientists
- Seminar presentations by students and paper

Communication of Chemistry & Development of Critical Thinking Skills

Communication involves :

- Writing
- Reading
- Listening
- Speaking

Texts Used

- “On Being A Scientist: Responsible Conduct in Research”. 2nd Ed. National Academy Press. Washington D.C. 1999
- “Responsible Conduct of Research”, Shamoo, A. E., and Resnik, D.B. Oxford Univeristy Press. Oxford, NY. 2003

Ethics Component

- Introduction of elements of ethics and moral decision making process
- Students assigned to teams of three
- Each team is given a case to analyze and present to the class.
- Presentations are critiqued
- Each team assigned a second case; the second presentation is graded.

Guest Lectures

- Guest speakers model good communication skills and professional behavior.
- The students use a form (developed by them) to evaluate the speakers.
- They write a one thousand word summary of the talk presented by the speaker.
- This summary is graded for understanding and accuracy of content.

Titles of Case Studies

- The Selection of Data
- A Conflict of Interest
- The Sharing of Research Materials
- Credit Where Credit is Due
- Publication Practices
- Fabrication in a Grant Application
- A Case in Plagiarism
- A Career in Balance

Speakers

- Dr. Carl Wamser-Portland State
“Artificial Photosynthesis: Energy Resources for the 21st Century”
- Dr. Brian Coppola-U of Mich
“Education in an Entrepreneurial Academic Environment: Preserving Responsible”
- Julia Markworth-Abbott Labs
(NEIU graduate)
“Preformulation Science”
- Dr. Eric Fuoco-Northeastern Illinois
“Polyatomic ions for surface analysis and modification”

Presentation and Paper

- Submit title & an abstract
- Create a handout with an outline of the talk & glossary
- References from original literature
- After presentation resubmit their abstract to meet the ACS guidelines before and after the presentation
- 15 page paper-double spaced paper on the topic after presentation
- Students and all faculty in attendance grade presentation

Seminar Titles

- Selected syntheses of ureas through phosgene substitutes”
- Life cycle analysis of cotton towels: impact of domestic laundering and recommendations for extending periods between washing
- Li-CaO Catalysed tri-glyceride transesterification for biodiesel applications
- Green Synthesis of Ibuprofen
- Synthesis of Adipic Acid, Catechol, and DHS from renewable resources using genetically altered *E. coli*
- Green Chemistry Alternatives for the Processing of Aromatic Compounds
- The use of optimize technology to eliminate problems associated with “stickies” in the manufacture of paper from recycled paper

Seminar Topics

- Theme -Green Chemistry F02
- Topic of their choice F03
- Theme -Green Chemistry F04
- Decision is made during the first class period

Seminar Titles

- Epoxidation of Soybean oil
- Deep desulfurization of oil refinery streams by extraction with ionic liquids
- Green “Leaching”: Recyclable and selective leaching of Gold-bearing Ore
- Poly(ethylene glycol)-supported nitroxyl catalysts for selective oxidation of alcohol
- CO₂ as an Environmentally Friendly Blowing Agent for the Polystyrene Foam Sheet Packaging Market
- "Altered *E. coli* use as catalyst for adipic acid, DHS and catechol
- Depolymerization of Polyethylene Terephthalate by Metholysis

2. What did you learn from preparing and presenting case studies in team?

Good Communication: 6

Ethic issues & concerns: 2

Team work: 3

Critical thinking & analytical skills: 4

Nothing:1

“I learned that team work takes a lot of time and patience in order to achieve a good outcome”

“Analyze courses in different ways”
To treat correctly the ethical issue

“learn to communicate w/others and understand other opinions. – discussing ethical views.”

6. Did you like having a theme for the seminars or should each student be allowed to pick his/her own topic?

Yes: 8

No: 4

“Students should pick there own topics. Nobody wants to spend this much time with a topic that is only mildly interesting.”

“hated the theme most topics were organic and we couldn’t do anything else. We couldn’t get something that really interested us.”

“No because most of the time the new topic could do more research and could improve the knowledge”

“Theme for Seminar was a great idea”

3b. Did you think the guest speakers were good role models for you? Why or why not?

Yes: 13

“Yes, they know how to present a topic without losing the audience”

“Yes. They let to know how to do the presentation and what behavior is good to the presenter”

“yes – organize – understand materials – able to explain the topics.”

“Yes – It was good to see Julia come back and present her work. It gave me hope of being able to do the same in the future.”

“Yes, I help me understand what is expected of myself at the graduate level.”

Further Evaluation

- Video tape classes to record and assess student development
- Ethical case studies
- Team skills
- Compare presentations of visiting scientists & students
- Abstracts before and after the presentation will be compared.
- Summaries
- Peer reviews to see if they are fair and unbiased.

Ways to implement this campus wide. Dean & Provost are committed to the project.

Acknowledgments

- Students in Chem 391
- Thomas Weaver
- Roger Gilman
- Seminar Speakers