

**The School for New Learning, DePaul University  
Truman College, City Colleges of Chicago  
Adult Bridge Program**

**SNL:Energy, Chemistry, and Society  
S1B, S1C, S2B, S3A, S3D**

**CCC: Physical Science 107 TUY  
Current Public Issues in the Physical Sciences  
IAI: P9 900**

**Course Syllabus: *Subject to change at any time*  
Winter-Spring 2012**

---

Faculty:

**Raymund Torralba, PhD**

Assistant Professor, Harry S Truman College

E-mail: [rtorralba@ccc.edu](mailto:rtorralba@ccc.edu) (best way to reach me)

Phone: 773-907-4691

Office: Truman College, Rm 3830, 1145 W Wilson Ave, Chicago 60640

**Nithya Rajan, PhD**

School for New Learning, De Paul University

E-mail: [nrajan@depaul.edu](mailto:nrajan@depaul.edu) (best way to reach me)

Phone: 630-913-0842

Office: DePaul University

Times/Dates **This class meets Thursdays from 6:00 – 9:00 p.m. from 01/19/12 – 05/03/12.**

The first eight sessions will be held at Truman College and the rest will be held at DePaul.

**About the Bridge Program**

The Bridge program is a result of a shared commitment to the success of adult students held by Wilbur Wright College, Harry S Truman College and DePaul University's School of New Learning (SNL). The bridge program offers students a unique learning experience that couples the City Colleges of Chicago (CCC) and DePaul resources, allows students an opportunity to experience the university environment at their own pace, and help adult students transition smoothly to SNL. Bridge classes are team taught by professors from the CCC and SNL. Bridge students receive extensive advising from both institutions. CCC students pay CCC tuition and earn both CCC and DePaul credit hours.

**Course Description:**

This course is designed to introduce students to the fundamental principles and processes in chemistry that will help in their understanding of energy and the environment, including their interaction with society. Current public issues (e.g., conservation, pollution, energy policy, global climate change, etc.), which covers earth sciences as well as other branches of science, serve as the framework. It integrates significant aspects of the physical sciences, particularly chemistry, with the student's other studies as well as everyday experiences. This course carefully discusses the impact of our actions on the lifetimes of the current energy resources. The

connection between the macroscopic world we experience and world of atoms and molecules will be explored. Sufficient use of quantitative and real chemistry will put the topics on a sound basis for students who have had little mathematical or scientific background.

**Learning Experiences:**

In this course, we will evaluate our own experiences related to the anthropogenic impact of energy harvest and consumption to the environment in light of new scientific knowledge and chemical concepts. Learning experiences include class discussions, small group dialogues, brief written reflections on assigned readings, and written and oral presentations of their individual project or research aligned with the choice of competencies.

**Prerequisites:**

**Truman:** A grade of “C” or higher in English 100.

**School for New Learning:** This class is open to any SNL student including those who may not yet be fully admitted, degree-seeking students.

**Required Readings:** “Chemistry in Context” (published by McGraw Hill Publishers)

Other readings will be handed out in class and made available on Blackboard

**Suggested Readings:**

1. Schobert, H.H., *Energy and Society: An Introduction*. Taylor and Francis, New York, 2002.
2. Pimentel, D. and Pimentel M., *Food, Energy, and Society*. CRC Press, New York, 2008.
3. Aubrecht, G. J., *Energy: Physical, Environmental, and Social Impact*, 3<sup>rd</sup> ed., Pearson Addison Wesley, 2006. (<http://aw-bc.com/aubrecht>)
4. Ristinen, R.A., Kraushaar, J.J., *Energy and the Environment*, 2<sup>nd</sup> ed., Wiley, New Jersey, 2006.
5. The Future of Nuclear Power  
<http://web.mit.edu/nuclearpower/>
6. The Future of the Nuclear Fuel Cycle  
<http://web.mit.edu/mitei/research/studies/nuclear-fuel-cycle.shtml>
7. The Future of Coal  
<http://web.mit.edu/mitei/research/studies/coal.shtml>
8. The Future of Geothermal Energy  
<http://web.mit.edu/mitei/research/studies/geothermal-energy.shtml>
9. The Future of Natural Gas  
<http://web.mit.edu/mitei/research/studies/natural-gas-2011.shtml>
10. An Action Plan for Cars  
<http://web.mit.edu/mitei/research/studies/coal.shtml>
11. Fueling our Transportation Future – MIT Report: On the Road in 2035  
<http://web.mit.edu/sloan-auto-lab/research/beforeh2/otr2035/>

### **Course Competencies:**

SNL students select and register up to three (3) competencies separately. Bridge students need to choose two (2) specific competencies by the end of second week, and tailor the assignments accordingly. Before selecting competencies the Bridge students need to have the Bridge Advisor at Truman go over previous courses they have taken in order to identify the competencies they would transfer into when “bridging over” to SNL. They want to select two of the competencies offered in this course that are not duplicating any prior courses taken at Truman (or other non-SNL colleges).

#### **S-1-B: Can use public or private institutions as resources for learning science.**

- 1. Uses the resources of an institution to investigate a scientific problem or question.**
- 2. Assesses the appropriateness and reliability of the institution for this investigation.**

Students demonstrate this competence by using a public or private institution (for example, a museum, zoo, botanical garden, government agency, industry, National Park) as a laboratory or setting for investigations and as a source of information. The scope of possible institutions is limited only by the institution can provide for significant learning associated with one or more branches of science.

There are a number of energy-related issues that will be discussed in the course and students will be expected to utilize certain institutions’ resources to adequately provide evidence supporting their opinions. For example they can use any waste management company, Environmental Protection Agency, Department of Energy, or university as source of information to assess the appropriateness and the reliability of their energy conservation and waste management systems and their compliance with the federal regulation. This will provide significant learning in the areas of the scientific method, data collection, data analysis, critical analysis of their findings, and finally the scope of extending this to a larger system.

#### **S-1-C: Can explain personal interactions with the physical environment using scientific principles.**

- 1. Identifies and describes a type of personal interaction with the environment.**
- 2. Uses scientific principles to explain aspects of the selected environment, the student's response, and the interaction between the student and the environment.**

Students demonstrate this competence by examining the conditions and consequences of human interactions with the environment, such as driving various motorized vehicles, rock climbing, skydiving, scuba diving, etc. Demonstrating this competence is not limited to gaining knowledge about environments. Students also need to examine the interactions with, responses to, or adaptations to the environment. Potential sources for principles and knowledge include ecology, physiology, environmental biology, chemistry, physics, and other branches of science.

We will explore anthropogenic activities that relate to energy production and utilization, including energy transformations associated with these. Students will have the opportunity to apply fundamental scientific principles in understanding and explaining their interaction with the surroundings (e.g., use and production of energy in the form of electricity, gasoline, food, etc.). They will demonstrate their competency by identifying and describing different sources of

energy, including a cost- or risk-benefit analysis on their production and use, and by reflecting on how these affect their lifestyle as far as energy use and conservation are concerned.

**S-2-B: Can describe, differentiate, and explain form, function, and variation within physical systems.**

- 1. Describes the structure and organization of a physical system (for example, mountain, ocean, galaxy, star, energy resources, carbon cycle) in terms of its constituent parts.**
- 2. Analyses the functions of the physical system's constituent parts.**
- 3. Articulates at least one theory from a physical science that explains the interrelation between form and function of the phenomenon's parts.**
- 4. Discusses how this physical system varies: internally, in comparison to related systems, or through time.**

Students demonstrate this competence by looking at physical systems, including those described by branches of science such as geology, astronomy, chemistry, and physics. Students demonstrate awareness of the ways in which scientists typically describe and define such systems. They also articulate how that system functions and varies.

In this course, we will focus on energy, how it is harvested, utilized, and quantified. There are various systems/technologies employed in the production and utilization of energy that can be compared to each other in terms of process, cost, efficiency, environmental impact, and effect on our social, economic, and political activities. They can relate the production and utilization of energy with various risks and benefits involved. They can use recent disasters or calamities such as the nuclear power plant disaster in Japan and the BP oil spill at the Gulf of Mexico.

**S-3-A: Can understand different perspectives on the relationship between technology and society, and describe the scientific principles underlying technological innovations.**

- 1. Defines technology and explains the scientific principles that underlie a technological development.**
- 2. Analyzes social, political, economic, or cultural factors that influence the creation or success of a technology.**
- 3. Evaluates the impact of a technology on social, economic, or cultural structures and beliefs.**

Students demonstrate this competence by developing a definition of technology and understanding the role it plays in shaping our lives and ideas. Students describe the underlying scientific principles, methods, goals, or reasoning of a technological development. Students examine these issues for their social, political, economic, or ethical assumptions.

There are many technological innovations pertaining to alternative energies including fuel cells, solar cells, innovation of hybrid cars etc. Students can pick any one these technological innovations and relate energy harvest and consumption to the fundamental chemical concepts underlying these inventions. They are expected to assess the use of these new technologies and their impact on the world's energy requirement and on society as a whole. Examples include the use of hydrogen fuel cells, solar cells, etc.

**S-3-D: Can use scientific knowledge to understand varying perspectives on a policy issue.**

- 1. Identifies and describes a current public policy issue that has significant scientific or technological elements.**
- 2. Analyses the scientific theories, methods, or standards taken by two or more perspectives on this issue.**

Students demonstrate this competence by taking the role of a scientifically literate citizen and investigating various scientific or technological perspectives on a public policy issue. Students should be able to apply their scientific knowledge to understand and form their own opinion on a government and/or international policy that addresses issues related to the harvest and consumption of a particular form of energy, particularly its anthropogenic impact to the environment. They should be able to compare and contrast the varying scientific perspectives relevant to these issues, which include nuclear energy utilization and waste management and greenhouse gases emission controls.

**Criteria for Assessment and Grading:**

Each competency will be assessed and graded according to the following:

Class participation	15%
Weekly quiz or response paper to assigned reading	25%
Class journal – with weekly entries noting the relevance of the class activities for each competency	20%
Group Research project – class presentation and individual paper summarizing contribution to research project and presentation	40%

**Assessment Criteria Relevant to all Competencies**

While most basic assignments will be completed by all students (such as reading the texts, writing answers to the study questions, and presenting on special topics with a study group, student course projects and final presentations will be geared toward specific competences selected.

**SNL students** are required to complete by session 6 a short (3 page) paper for each of the competences for which they are registered. In addition, SNL students taking the course for two competences must produce a paper/project for one of their competences and a 10 minute presentation with outline for the other. SNL students taking the course for 3 competences must follow the same requirements as those registered for two, but must submit an additional paper/project OR presentation for the 3rd competence. In some cases it may be possible with instructor approval to combine two competences into one lengthier, more detailed project.

**Truman students** must focus on 2 of the 3 competences offered and must complete a short (3-4 page) paper for each competence by session 6. They must also complete a final paper/project for one competence and a 10 minute final presentation for the 2nd competence by session 12 or 13. In some cases it may be possible to develop the short paper into either the final project or the presentation, as long as both competences selected have been covered.

**Common coursework:** (completed by all students)

- Active and consistent participation in class discussions
- Careful reading of course texts and selected critical articles
- Complete and developed responses to the study questions related to the assigned readings. (Note: Response papers must be turned in at the session indicated on the syllabus. Instructors will drop the lowest response paper grade, but no late work can be accepted.)
- Weekly entries to class journal on Blackboard or D2L
- Brief presentation on a special topic with an assigned study group
- One short essay for each competence due session 6
- Final paper/projects and/or final presentation due by the end of the course

Class participation -This class is designed to be interactive. It helps you learn by discussing course material together. It is important to promptly complete all assigned tasks and participate in all small group and class discussions to get maximum credit.

<b>Grade</b>	<b>Criteria</b>
<b>A</b> (90% and above)	Regular contribution to discussions that show high level of comprehension of assigned readings; thoughtful and well-supported response to the contribution of others
<b>B</b> (80%-89%)	Regular contribution to discussions (at least 80% of the time) that exhibit a solid grasp of the assigned readings, and an ability to listen and respond to the contribution of others
<b>C</b> (70%-79%)	Infrequent contribution to discussion and show only superficial understanding of assigned readings, and responses to contribution of others are not always relevant to the course material

Quizzes/Response Papers – Weekly short quizzes will be given or response papers on assigned readings are due at the beginning of each class. It is important that students arrive on time because no extra time will be given for late comers. Four (4) response papers will be required. These response papers should be 2-3 double-spaced pages, 12-pt font. Specific instructions, writing prompts, guide questions and rubrics will be handed out in class to assist you in writing your paper. If for some reason you are unable to complete the assigned paper on the due date, please make arrangements with the instructors.

Class journal – Provide ten (10) weekly journal entries on Blackboard or D2L. The entries will describe what you gained or learned from discussions in class and assigned readings as they relate to your competency. You can include up to two readings of your own choice related to your competency. Finish your journal with a 2-page summary of your learning gains in relation to the competency.

<b>Grade</b>	<b>Criteria</b>
<b>A</b> (90% and above)	Consistent, thoughtful weekly entries that show critical reflection and thorough understanding of the material as it relates to your competency
<b>B</b> (80%-89%)	Weekly entries that show valid reflection and solid understanding of the material as it relates to your competency
<b>C</b> (70%-79%)	Weekly entries that show some valid description of class discussion and readings but with limited connection drawn to your competency
<b>D</b> (60%-69%)	Primarily personal reflection that lack critical understanding of class material and readings, and poor connection drawn to your competency

Group Research Project and Panel Presentation – A group project to be done by up three or four students is required. Group/panel presentations begin on April 12, 2012. Projects will be carefully chosen within the first three weeks of the course. Presentations will be peer-evaluated based on rubrics provided by the instructors. Each member of the group should submit a write-up summarizing his or her contribution to the research project and presentation. This paper should be 2-3 double-spaced pages, 12-pt font.

<b>Grade</b>	<b>Criteria</b>
A (90% and above)	Demonstrates work of excellent quality, reflects thorough and comprehensive understanding of the issues of the environment and society. Reflects a clearly identifiable thesis and arguments to support the idea proposed in the thesis.
<b>B</b> (80%-89%)	Demonstrates work of very good quality. Presents substantive thesis and arguments to support the ideas proposed
<b>C</b> (70%-79%)	Demonstrates work which minimally meets requirements and does not fully support the ideas proposed.
<b>D</b> (60%-69%)	Demonstrates work of poor quality and inattention to development of ideas, grammar, and spelling

**Tentative Course Schedule:**

<b>Session1/Date</b>	<b>Topics</b>
1: 1-19-2012	Introduction – expectations and format of the course
2: 1-25-2012	Energy and its Transformations – General Ideas/Molecular Level
3: 2-2-2012	Chemistry of Global Climate Change – chemical principles and concepts about greenhouse gases; chemistry concepts and activities; non-renewable energy sources; Cost/Benefit Analysis
4: 2-9-2012	Policies and summit summaries of the Kyoto Protocol; current modification of the United Nations Framework Convention on Climate Change; Short Papers for the chosen competence due
5: 2-16-2012	Fossil fuels; coal – harvest and consumption
6: 2-23-2012	Past, Present, and Future of Nuclear Power, Short Papers on chosen competences
7: 3-1-2012	Update on projects; continue discussions on readings/handouts
8: 3-8-2012	Other Sources of Energy – Natural Gas and Geothermal Energy – harvest and consumption
9: 3-15-2012	Other Sources of Energy – Wind and Hydroelectric Power – harvest and consumption
10: 3-29-2012	Energy from Electron Transfer – Advantages and Limitations
11: 4-5-2012	Update on projects; continue discussions on the readings/handouts
12: 4-12-2012	Update on projects; continue discussions on the readings/handouts
13: 4-19-2012	Presentations and documenting competencies. Wrap up chemistry content materials pertaining to specific energy topics.
14: 4-26-2012	Panel Discussion
15: 5-3-2012	Wrap up, final papers are due; course evaluation

## CITY COLLEGES OF CHICAGO POLICIES AND SERVICES

**“No Show” Withdrawal (NSW) Policy:** If a student registered for a course that meets only once a week before the start time of the first class period, but did not attend the first class and failed to notify the instructor of his or her intentions to continue the class, the student will be withdrawn from the course by the instructor and issued an NSW (*Student Policy Manual*, p. 25)

<http://www.ccc.edu/departments/Documents/studentpolicymanual.pdf>.

**Active Pursuit of the Course and Administrative Withdrawals (ADW):** A student may be given an ADW at midterm if, in the instructor’s opinion, the student is not actively pursuing course requirements, including attendance and submission of all course work. In line with this policy, you will be dropped from the roster (i.e., given a grade of ADW) at midterm if up to that point at least two of the following apply:

1. Less than 70% of the assigned work (i.e., class journal, group project updates) have been completed
2. Less than 70% of the administered quizzes and response papers have been attempted
3. Class attendance is less than 70%

**Student-Initiated Withdrawal (WTH):** It is the student’s responsibility to officially withdraw from courses by April 23, 2012. Failure to withdraw may result in mandatory payment of tuition/fees, forfeiture of financial aid eligibility, and/or a failing grade (*Student Policy Manual*, p. 26) <http://www.ccc.edu/departments/Documents/studentpolicymanual.pdf>.

**Academic Integrity:** The City Colleges of Chicago is committed to the ideals of truth and honesty. In view of this commitment, students are expected to adhere to high standards of honesty in their academic endeavor. Plagiarism and cheating of any kind are serious violations of these standards and will result, minimally, in the grade of “F” by the instructor (*Student Policy Manual*, p. 40) <http://www.ccc.edu/departments/Documents/studentpolicymanual.pdf>. **Plagiarism:** In college, knowing why, when and how to cite sources is vital. By using sources appropriately, you participate in the scholarly community as you relate your ideas and experiences to those of others. When citations are lacking or incorrect, you weaken your paper by failing to clearly make those connections. You also leave yourself open to charges of plagiarism which can have serious academic consequences.

**Student Conduct:** City Colleges of Chicago students are expected to conduct themselves in a manner that is considerate of the rights of others and does not impede the educational mission of the College. Misconduct for which students are subject to College discipline (e.g. expulsion) may include the following: (1) all forms of dishonesty, such as stealing or forgery; (2) obstruction or disruption of teaching, research, administration, or disciplinary proceedings; (3) physical or verbal abuse, threats, intimidation, harassment, and/or other conduct that threatens or endangers the health or safety of any person; and (4) carrying or possession of weapons, ammunition, or other explosives (*Student Policy Manual*, p. 41).

<http://www.ccc.edu/departments/Documents/studentpolicymanual.pdf>

### **Academic Support Services:**

**Tutoring Center.** For students who need help with their assignments: Student Service Building, Suite 162, 773-907-4785.

<http://www.ccc.edu/colleges/truman/departments/Pages/Tutoring.aspx>

**Student Success and Leadership Institute (SSLI).** For students who need various other support services to achieve their educational goals: 773-907-4714,  
<http://www.ccc.edu/colleges/truman/departments/Pages/Student-Success-and-Leadership-Institute.aspx>.

**TRIO Student Support Services.** For low-income students, first generation college students, or students with disabilities who need academic support: Student Service Building, Suite 162, 773-907-4797. Registration is required at the start of each semester.  
<http://www.ccc.edu/colleges/truman/departments/Pages/TRiO-Student-Support-Services.aspx>

**Disability Access Center.** The Center verifies needs pursuant to the American Disabilities Act (ADA). It determines student academic accommodations, and issues accommodation letters. Registration is required at the start of each semester. Student Service Building, Room 165, 773-907-4725

Your success in this class is important to us. If you have any concern about participating or accomplishing the required course work because of a disability or medical condition, please contact us and the Disability Access Center as soon as possible. The center at Truman College was created to meet the needs of students with disabilities. The short-term goal is to help you develop learning techniques that ensure your success at Truman College. Long-term, Disability Access Center services are designed to help you make the transition from college to work. Students must obtain written permission from this office before any specific accommodations for disabilities are afforded.  
<http://www.ccc.edu/colleges/truman/departments/Pages/Disability-Access-Center.aspx#>

## **DEPAUL UNIVERSITY/SCHOOL FOR NEW LEARNING POLICIES**

**DePaul University Plagiarism Policy:** “DePaul University is a learning community that fosters the pursuit of knowledge and the transmission of ideas within a context that emphasizes a sense of responsibility for oneself, for others and for society at large. Violations of academic integrity, in any of their forms, are, therefore, detrimental to the values of DePaul, to the students’ own development as responsible members of society, and to the pursuit of knowledge and the transmission of ideas. Violations include but are not limited to the following categories: cheating; plagiarism; fabrication; falsification or sabotage of research data; destruction or misuse of the university’s academic resources; alteration or falsification of academic records; and academic misconduct. Conduct that is punishable under the Academic Integrity Policy could result in additional disciplinary actions by other university officials and possible civil or criminal prosecution. Refer to the Student Handbook or visit  
<http://academicintegrity.depaul.edu/Index.htm>”

**DePaul University Incomplete Policy:** Undergraduate and graduate students have two quarters to complete an incomplete. At the end of the second quarter (excluding summer) following the term in which the incomplete grade was assigned, remaining incompletes will automatically convert to "F" grades. Ordinarily no incomplete grade may be completed after the grace period has expired. Instructors may not change incomplete grades after the end of the grace period without the permission of a college based Exceptions Committee.

Note: The SNL student who wishes to receive the grade of IN must formally request in writing that the instructor issue this grade. This request must be made before the end of the quarter in which the student is enrolled in a course.

**Students with Disabilities, DePaul:** If you are a DePaul student, make sure that you have contacted the PLS Program (for LD, AD/HD) at 773-325-1677 in SC 307

**Protection of Human Subjects:** For more information see: <http://research.depaul.edu/>.

Demonstrating the acquisition of competences in this course can involve “interactions”—interviewing and or observing other people—discussing those interviews or observations with other class members and writing them up in one or more final report(s). These activities qualify as “research” with “human subjects” and are subject to University and Federal guidelines.

Because it takes place in the context of this course, your research is exempt from approval by the School for New Learning’s Local Review Board only under the following conditions:

1. The information you collect is EXCLUSIVELY for the purpose of classroom discussion and will NOT be used after the term is over. If there is any possibility that you will EVER use it in further research or for publication, you must obtain approval from the Local Review Board before you begin.
2. You assess and ensure that no “harm”—physical, mental, or social—does or could result from either your interviews and/or observations or your discussion and/or reports.
3. The privacy and confidentiality of those that you interview or observe must be protected. Unless you receive specific permission, in writing, from the person(s) you interview or observe, please change their names, and make sure that their identity cannot be readily ascertained from the information you provide.
4. If you want to use real names and relationships, they must sign an “informed consent” document. For information on creating an “informed consent document” see, for example, <http://www.research.umn.edu/consent>.