syllabus

Syllabus

ChEE 204 | Water and Energy: Conventional and Alternate Systems

3 Credit Hours

Course Instructor

Byron Hempel, PhD Environmental Engineering

Instructor, Department of Chemical and Environmental Engineering

Course Description

Where does the energy come from to light a building or power an air conditioning system? Where does the water in your facet originate, and what treatment/processing has been required? Where does the water go when you flush the toilet or drain a bathtub? How do we distribute water and energy from central facilities to individual homes and businesses? How do we avoid running out of water and energy for urban use? This course will provide fundamental information on water and energy systems and provide students with a broad education as to the past, present, and future considerations regarding sustainable water and energy system technologies.

Human population growth and increasing urbanization are stressing conventional water and energy resources. Sustainability will require the continued exploration of renewable and alternative sources of water and energy. In addition, water and energy systems are intrinsically and symbiotically related in what is known as the water-energy nexus. This course will explore the history, present, and future of these systems with an emphasis on alternative technologies for producing energy and clean water. Key areas for discussion will include atomic, solar, hydro, and wind energy system technologies, as well as water reuse and desalination. Through this course, students will become familiar with the primary sources of water and energy and the systems and technologies used for production and conveyance.

Students completing this course will gain a strong understanding of the water and energy systems used to sustain urban growth and development, as well as a vision of the future related to challenges and potential solutions for sustainability.

Course Objectives

By the end of this course, you should be able to:

1. Describe the past, present, and future of water and energy systems with an emphasis on the technologies used for alternative energy and water
2. Summarize the primary sources of water and energy and the systems and technologies used for production and conveyance
3. Discuss how water and energy systems have developed and will evolve using case studies in each section of the class
4. Critique the pros and cons of each technology, including cost, feasibility, and sustainability
5. Evaluate the environmental and societal impact of the water and energy systems used to sustain urban growth and development
6. Express a clear vision of the future challenges involved in sustainably supplying water and energy to a growing population and recommend potential solutions

Teaching Format

This is an online course taught utilizing D2L.

Prerequisites and Technology

This course has no prerequisites. As this is an online course, students will need a computer, a reliable internet connection, and a working knowledge of D2L. If you do not own a working computer, the library allows students to use computers with their log in netID. The library also offers rentals to students on a few-day basis. The following link lets you see what is available: **http://new.library.arizona.edu/tech/borrow (http://new.library.arizona.edu/tech/borrow)**

Course Materials

Textbooks:
Water and Energy by Gustaf Olsson, IWA Publishing, 2015 (2nd edition) (http://ebookcentral.proquest.com.ezproxy3.library.arizona.edu/lib/UAZ/detail.action?docID=3425858).

Water and Wastewater Treatment / Joanne E. Drinan (http://sabio.library.arizona.edu/record=b7479411~S9)

Renewable Energy: A First Course / Robert Ehrlich (https://ebookcentral-proquest-com.ezproxy1.library.arizona.edu/lib/UAZ/detail.action?docID=1634272)

Note: Digital copies of the books are available through the library for a limited number of simultaneous users.

Additional readings for this course will be posted on D2L.

Grading Guidelines

Course grades and feedback are available for your review on D2L at all times. It is your responsibility to keep track of your academic progress throughout the course.

Course grades are based on the following:

Discussions (10%)

Initial discussion posts are due on Wednesdays by 11:59 PM (MST) to allow for follow-up discussion and require completion of their associated lesson and readings. Video-based discussions will take place in FlipGrid, and text-based discussions will take place using the D2L Discussion tool. Active participation in the online discussions is a required part of this course worth 20% of the final grade. The goal of the discussions is to expand your understanding of the course material and to work with classmates towards creative solutions. Use an academic style of writing with correct grammar and spelling with correct citations. Be professional in your video responses. Discussions are graded based on the following scale:

- **Needs Improvement (0 to 2.0 points)**: Needs substantial improvement to meet guidelines and shows lack of understanding of lesson and reading material.
- **Good (2.0 to 2.5 points)**: Meets all guidelines and displays an understanding of lesson and reading material.
- **Excellent (2.5 to 3.0 points)**: Exceeds guidelines and shows substantial understanding of lesson and reading material.

Assignments (20%)

Assignments are due on Fridays by 11:59 PM (MST). Written assignments are submitted through the Assignment tool in D2L. Plagiarism will be checked through the integrated software Turnitin. Work that shows plagiarism will not be considered and will receive no credit. If plagiarism continues, the student will be referred to the Dean of Students. Assignments are graded based on the following scale:

- **Needs Improvement (0 to 3.5 points)**: Needs substantial improvement to meet guidelines and shows lack of understanding of lesson and reading material.
- **Good (4 to 7.5 points)**: Meets all guidelines and displays an understanding of lesson and reading material.
- **Excellent (8 to 10 points)**: Exceeds guidelines and shows substantial understanding of lesson and reading material.

Quizzes (20%)

There will be weekly reading quizzes to verify that you have completed the lecture or reading and to test your basic understanding of what you have watched, interacted with or read.

STEM Learning (5%)

In addition to the weekly quizzes, there will be brief supplemental quizzes that help keep the bigger picture of learning in mind.

Exams (30%)

There will be several exams throughout the course to assess your general understanding of the topics covered. These exams will be open book and open note. However, please do not use outside search engines as a reference. I trust you all to follow the Student Code of Conduct, and use ideal ethics when taking these individual exams.

Final Project (15%)

The final project, worth 20% of your final grade, gives you the opportunity to apply your newfound knowledge of our energy and water systems to explore specific ways we can create a more sustainable future. More information on this project will be provided later in the semester.

Final Course Grades and Late Policy

A = 90 – 100%
B = 80 – 89%
C = 70 – 79%
D = 60 – 69%
E = 60% or below

Late, incomplete work, and missed presentations will not be accepted, unless there is documentation of a medical or family emergency. Students are given ample opportunity before assignment due dates for instructor feedback.

Teaching Philosophy

I truly believe in your success as a student and adapting my instruction to ensure your success. Below you will find several different instructional methods to help me accomplish my goal:

1. Everyone has the right and ability to be successful in this course. I provide many chances for low-stakes points for this course. As future architects, I want to provide a level of rigor (appropriate for this course!) that will promote you to be the best architect you can be.
2. I vary my teaching methods to ensure that our courses are accessible to all students. Feel free to give me any feedback onto what works or does not work for you.
3. I believe in transparency and open communication, meaning I wish to be as clear as possible in class and give you insight into my teaching decisions. I want my classroom to be one where you can feel free to express your own ideas and thoughts to contribute to the wider discussions.
4. Foremost, I believe in student-centered active learning. Literature through education-based teaching practices support nearly every aspect and decision in this course. If you have any questions or comments about the theory and practice of different methods, once again, I would love your feedback. Just as I want you all to have a growth mindset, I too want to continuously improve this course to be the best it can be.

Netiquette

Netiquette is an abbreviation for "internet etiquette" – more simply put, guidelines for communicating online to ensure meaningful and polite exchanges. The common standards listed below work well for both the online classroom and beyond in professional online communication:

1. **Behavior**. Maintain the same standard of behavior and ethics that you would follow in a face-to-face context.
2. **Tone**. Treat others with respect. Be mindful of your tone and how that is conveyed in your writing style. DO NOT USE ALL CAPS (wasn't that loud/painful?). It is considered shouting and not appropriate in a classroom. Avoid sarcasm and irony as it is easily misinterpreted in an online environment.
3. **Clarity and Content**. Be succinct. Write, reread, and then post. Carefully consider what you have written. Does it make sense? Is is free from errors? Does is add to the conversation? Is it unnecessarily confrontational or offensive?
4. **Contribute**. Online learning is not passive. It is expected that you will share your knowledge and insight. Be an active contributor to the learning community.
5. **Be forgiving**. If someone makes a mistake or does something inappropriate, address it privately and politely. You can always let the instructor know and ask them to address it as well.

Please note: ALL University of Arizona students have agreed to abide by the standards for behavior set forth by the **Arizona Board of Regents. (https://www.azregents.edu/about/board-members)** *The* **Student Code of Conduct (https://public.azregents.edu/Policy%20Manual/5-308-Student%20Code%20of%20Conduct.pdf)** *is in place to create a safe, healthy and responsible environment that allows UA students, faculty, and staff to be successful in their daily endeavors and long term goals. Sanctions may be imposed for acts of misconduct that occur on university property or at any university-sponsored activity (including the online environment). As further prescribed in these rules, off-campus conduct may also be subject to discipline.*

Changes to the Syllabus:

The information contained in the course syllabus, other than the grade and absence policies may be subject to change with reasonable advanced notice as deemed appropriate by the instructor.

Extra Info

Requests for incompletes (I) and withdrawal (W) must be made in accordance with University policies which are available at **https://www.registrar.arizona.edu/grades/grading-policy-manual-index?audience=students&cat1=15&cat2=242 (https://www.registrar.arizona.edu/grades/grading-policy-manual-index?audience=students&cat1=15&cat2=242)**

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: **http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop (http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop)**

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, **http://policy.arizona.edu/human-resources/religious-accommodation-policy (http://policy.arizona.edu/human-resources/religious-accommodation-policy)**

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: **https://deanofstudents.arizona.edu/ (https://deanofstudents.arizona.edu/)**

The **Career Resource Library (http://www.career.arizona.edu/career-resource-library)** helps with career exploration, resumes, interviewing, graduate school and networking.

The THINK TANK provides math and science tutoring, writing support, weekly course reviews for select courses, one-on-one tutoring, academic skills tutoring, supplemental instruction, and other academic support services to online students. They provide both FREE and fee-based services – hours and availability can be found on their website. <u>Online Services with THINK TANK</u>

The Writing Skills Improvement Program (WSIP) helps students at the University of Arizona improve their writing skills and achieve academic success. Writing coaches work one-on-one with students, staff, and faculty across all majors and degree programs through writing workshops, custom workshops, and summer writing institutes. Tutoring is available online via Skype. They provide both FREE and fee-based services – hours and availability can be found on their website. **Tutoring Services with WSIP (http://wsip.arizona.edu/tutoring-services)**

The 24/7 IT Support Center (commonly known as 24/7) can help you with troubleshooting hardware, software, and any special course technology you are using and is available 24 hours a day, with the exception of University observed holidays. **Phone: (520) 626-TECH (8324) (tel:520-626-8324)**; **24/7 Website (https://it.arizona.edu/service/247-it-support)**

If you are looking for a quick answer to a D2L question, D2L Support has created several tool manuals, tutorials and an in-depth FAQ for many of the common issues and questions related to our learning management system, Desire2Learn. **Help Pages (http://help.d2l.arizona.edu/student/student-home)**

Need to talk to someone for more in-depth support? Various aspects of D2L are supported by different groups across campus, so D2L Help has put together a handy resource for finding quick and comprehensive support for any questions and issues that you may have.**D2L Help Contacts (http://help.d2l.arizona.edu/faq/where-can-i-get-help)**; **Privacy Statement (https://www.d2l.com/legal/privacy/)**; **Accessibility Statement (https://documentation.brightspace.com/EN/accessibility/-/learner/accessibility_and_navigation_intro.htm?tocpath=Getting%20Started%7CAccessibility%20and%20navigation%7C_____0)**

The University of Arizona's UACBT service (Computer-Based Training) offers 24/7 availability of FREE online training to over 1000+ courses and 98,000+ video tutorials, covering a broad range of topics and applications **browse titles here (https://www.vtc.com/)**. Most tutorials have between five and fifteen hours of

content. Each tutorial is divided into lessons from 2-10 minutes long on average. Each lesson is available as a Flash, QuickTime, Adobe Air, or Adobe Air for Linux movie. You can stop, start, rewind, and review each lesson as often as desired. **Access UA Computer-Based Training (http://uits.arizona.edu/services/uacbt)**