

GENERAL EDUCATION COURSE ENHANCEMENT GRANT COMPETITION

1. **Gary Robbins, Professor**
2. **gary.robbins@uconn.edu**
3. Currently existing course taught every spring semester and online during the winter semester
4. Introduction to Water Resources, NRE 2215E, Department of Natural Resources and the Environment
5. The objective of this project is to develop video simulators to enhance interactivity, stimulate learning and reinforce various environmental literacy concepts. In 2000, I develop a game-based CD for the Connecticut Department of Environmental Protection (Now CT DEEP) to help instruct environmental professionals on the use of advanced methods for investigating contamination. In 2001, I was awarded the U. Connecticut, Chancellor's Information Technology Award for that effort. In the years following, as an extension of the CD work, I developed the first state approved online continuing education courses for environmental professionals for Connecticut and Massachusetts. Those courses were based on the use of Shockwave animated simulations I created. In 2012, I was awarded the Licensed Site Professionals Association (of Massachusetts) Contribution to Practice Award for those courses. During this same period, I also developed online material consisting of animations, video and animated simulators for my undergraduate Introduction to Ground Water Hydrology class. The simulators gave students an opportunity to practice in virtual space field exercises before going to the field to conduct the real tests. In the spring semester of 2006, I developed my Introduction to Water Resources class (which later become a GEOC E class). Subsequently, I introduced a winter online version of that class. The online class incorporated virtual field trips which were approved by the senate as equivalence to the actual field trips I took my spring brick and mortar class on. In 2016, I was honor as the 2016-2017 University of Connecticut Innovative Teaching Professor for my simulation related work.

This past COVID-19 semester I was back teaching my undergraduate groundwater class which has a significant field exercise component. In order to provide the students with "hands-on" field experience, in case we could not get to the field owing to weather or the virus, I developed several video simulators. The video simulators show me conducting actual field tests while requiring the students to record data as it is developing in running time for subsequent analysis, as they would if they were actually in the field. For example, I conducted a pumping test to determine soil permeability. This required the students to record water levels and flow rates as a function of test running time. Then they modeled the data to obtain the permeability. The video simulators were uploaded to Youtube and hyperlinked in the class HuskyCT website. Along with the hyperlink, were links to data collection spreadsheets to be used during the video and links to data analysis software or spreadsheets for analysis.

Given the lessons learned I have decided to incorporate video simulators in my GEOC class as part of their homework quizzes to enhance both technical and non-technical subject matter. The video simulators will give the students experience in hands-on field activities which would be impossible to actually perform given their 40+ numbers. During the project period I will be scripting, developing videos and testing the videos out on volunteer undergraduate students. Tentative simulators are listed on the attached course schedule with the syllabus and discussed below.

6. As noted above I plan on testing the simulators out on volunteer undergraduates before offering them to the class. Each simulator will have analyses that need to be subsequently performed as part of homework quizzes. How well the students do on the quizzes and exams covering the same material as the simulators will be a direct measure of the effectiveness of the simulators. Of particular interest is enhancing both the enthusiasm and learning of students not majoring in STEM in understanding the broad range of water resource related topics covered in the course. I also plan on adding questions related to the simulators to the course evaluation.
7. Perhaps more than any other period, the 21st century is a period experiencing critical water resource related challenges. It is a period of water resource shortages on a huge scale owing to population and economic growth; water resource usage conflicts; and approaching water wars related to water security. Solutions require an educated public to support programs that deal with a complexity of issues that extend beyond our borders and beyond science and technology. Adding the simulations will further enhance critical thinking in an interactive way not only about science and technology solutions but also about economic, social and political related solutions to water related challenges.
8. This is an E course. It satisfies all 5 of the EL focus areas.
9. As a pedagogy tool, I believe the video simulator will enhance learning. I have gotten this feedback from hundreds of professionals that have taken my continuing education courses which use animated simulations. Real world video simulators are a next step to learning. I have also gotten positive feedback from students in my undergraduate groundwater class where I used video simulators for the first time. I plan on using them to teach fundamental water resource-related concepts. Tentatively, I plan on developing simulators that initially address: how is a discharge determined, how is stream flow measured, how do you determine groundwater elevation and flow direction, how is groundwater pollution determined and mapped, how does water treatment work, how is environmental justice applied in the regulatory arena, and how do public health officials review and approve new home water well tests. Subsequently, I plan on expanding simulators into other areas, particularly water resource management.
10. Yes in terms of methods of production, evaluation of what works and what may not, how to use a simulator and evaluating outcomes. Given that the simulators are videos, they can be uploaded to Youtube and shared amongst classes. For example, my pumping test simulated can be found at: <https://youtu.be/cYh6menItu8>. Importantly they can be applied to any size class.

11. No

12. No

13. No

14. Most of the video and other technical equipment (e.g., electrical conductivity probes) to be used have been obtained by research grants and departmental teaching funds in the past.

15. To develop the simulators, I am requesting funding for additional video equipment and to pay for a student assistant.

16. Completed

17. Arranged.

18. Syllabus Attached.

2020-2021 GENERAL EDUCATION ENHANCEMENT GRANT COMPETITION

Proposer's Name (s) __Gary Robbins_____

Proposal Title ___Development of Video Simulators to Enhance Water Resources Education_____

Guidelines for Funding:

- The maximum amount available for each proposal is \$7500, payable in the 2021 fiscal year (July 1, 2020- June 30, 2021).
- Funds for supplies or research will be paid out to recipients by early January while funds for summer salary or other expenses will be paid out before June 30
- Funds must be used during the Spring semester or early summer (before the June 30 FY deadline) for purposes that support the activities of the proposal and conform to University of Connecticut guidelines.
- Fringe costs for summer salary must be calculated and are included in the \$7500 maximum cost per year (see rate listed below the table). GEOC will adjust budget line items to reflect correct fringe if rates change or calculations are incorrect.
- **PLEASE NOTE: Summer salary is also still subject to all regular taxes and salary deductions.**

Proposers can request funds in the specified amount for that particular grant year to use for any of the following options in support of course development or revision:

- Summer salary to be paid out before June 30 of that fiscal year. The appropriate fringe rate must be factored into the award amount, and **proposers should be aware that all regular taxes and salary deductions will also be taken from the gross salary amount after fringe.**
- Supplies to be used in support of the class. Funds can be transferred to a ledger 2 account and must be used before the end of the fiscal year. Supplies should directly benefit the course itself, not the instructor. (e.g. A new laptop solely for the instructor's use would not be appropriate.) Supplies should be reusable, or the department must be able to commit to replenishing supplies after the first year.
- Travel to benefit the development of the course. Travel must be paid for before the end of the fiscal year (June 30), but the travel does not have to occur by this time. (e.g. Travel can occur in the August after the fiscal year ends as long as plane tickets, hotels, fees, etc. have been fully paid before June 30.) NOTE: Some review committees have been very reluctant to fund proposals that request travel funds; they have felt that travel tends to benefit the proposer more than the course itself. Proposers are encouraged to state very explicitly how travel will benefit course development over personal development.
- Research conducted to develop or enhance the class. Funds can be transferred to a ledger 2 account to support the implementation of a study or studies that have direct benefit to the course being proposed.
- Other options TBD. Proposers may request funds to cover other options that do not fit into the categories described above as long as awards can be used before the end of the fiscal year and their use adheres to any other university guidelines that govern the use of internal funds.

Fiscal 2021	Amount budgeted	Fringe for Summer Salary **	Total
Summer salary or Spring Salary buyout*	\$2000 2042.93	\$570 527.08	\$2570
Supplies	\$1447	None	\$1447
Travel	0	None	0
Research (Faculty Account)	0	Usually none	0
Other undergraduate assistant	\$600 1600	Usually none	\$600 1600
Total	\$4047	\$570	\$4167 5167

* Buyout: Funds can be used to pay an adjunct to teach a class normally taught by full-time faculty member during the Spring semester so that the faculty member can devote time to course development.

** The 2021 Fiscal Year fringe rate for Special Payroll summer salary is currently **28.5%**. (See <http://budget.uconn.edu/fringe-benefit-rates/>). To calculate this amount, multiply your desired salary by .285 and then add the amounts. For example, if you wish to request all \$7500 as summer salary, your “Amount Budgeted” is \$5836.57 and your Fringe Amount is \$1663.42. ($5836.57 \times .285 = 1663.42$ and $5836.57 + 1663.42 = 7499.99$)

Justification:

Please explain how the expenditure of all funds will support this proposal (100-400 words).

Please note that participants should explain how any expenses, especially travel, will benefit the COURSE, not necessarily the professional development of the proposer.

Asking for:

Summer funding for PI \$2000

Supplies to supplement existing audio and video equipment. This includes a second camera to focus on instrument readouts simultaneously in running time (\$799 T8i photo and video camera and lens) while another camera is focused on me and the overall scene, a tripod (\$149 Manfrotto with ball head), a large video monitor (27” Dell \$359) and cables (\$40) for projecting instrument readouts, for instruments that can connect to an external monitor, for video recording. Also requesting funds to upgrade editing software (\$100 Pinnacle Studio Ultimate)

Asking for \$600 for undergraduate student assistant to help setup and conduct video shoots.

Department Head's statement

Please arrange for your department head to send a message to GEOC@uconn.edu containing the following statement:

“I support the enhancement/development of this course. Upon completion of the project, I will make every effort for the course to be offered every, or every other, year at the typical class size for the duration of at least five years.”

18. See course schedule at the end of the syllabus. The proposed initial 7 video simulators will become part of the homework quizzes. Additional quiz questions will also be added to address underlying theories and concepts related to each simulator as further reinforcement. Adding simulators will require adjusting the timeframe to complete quizzes.

NRE 2215E INTRODUCTION TO WATER RESOURCES

Syllabus – SPRING 2021

Excluding materials for purchase, syllabus information may be subject to change. The most up-to-date syllabus is located within the course in HuskyCT.

Course and Instructor Information

Course Title: Introduction to Water Resources (NRE 2215)

Credits: 3

Schedule: Tuesday and Thursday 9:30 to 10:45 am

Location: online

Prerequisites: Recommended Preparation: Environmental Science (NRE 1000), Earth and Life through Time (GSCI 1050 or 1051)

Professor: [Gary A. Robbins](#), Professor of Natural Resources and Geosciences, Dept. of Natural Resources and the Environment

Office: Online class website on HuskyCT

Email: gary.robbs@uconn.edu (Use my email for communications and not the HuskyCT message board)

Office Hours/Availability: Tuesday 11:30-12:30 pm, Thursday 2 - 3 pm, or by arrangement

Course Materials

Readings and Video: The course uses only online materials (see course module content)

Course Description

Introduction to surface and ground water resource assessment, development and management. Integration of scientific, legal, environmental and human factors that enter into developing and maintaining sustainable water resources. Examines current and future plight of water shortages and water quality issues here and abroad.

The goals of this course are to provide students with a solid background to confidently take more advanced water resource courses and to form a foundation of knowledge to build upon for students whose careers in science, technology, communication, education, law and business relate to water resource management,

Two on campus field trips during the class period will be required for the course.

Course Objectives

By the end of the semester, students should be able to:

1. Describe scientific and technical terms and concepts related to surface and ground water, water quality, water usage, water treatment, sewage treatment and water in context of environmental protection;
2. Be able to analyze and evaluate scientific reports dealing with water related issues;
3. Discuss legal and economic concepts dealing with water resource protection, usage and conflicts;
4. Obtain water data from such sources as the USGS, EPA, FEMA and the scientific literature;
5. Recognize water pollutants and sources of pollutants;

Course Outline (and Calendar if Applicable)

See Course Schedule on HuskyCT

Course Requirements and Grading

Requirements

The lectures each week are reinforced by annotated lecture notes, readings, videos and homework quizzes accessible on the HuskyCT website. With respect to the open book homework quizzes, students are to do their own work. Assisting other students or receiving assistance from another student or anyone else, but the instructor, will constitute a violation of the student code of conduct. Class participation in discussions is also an essential element of the course.

Summary of Course Grading:

The final grade will be determined based on the numerical score calculated using the following:

Final numerical grade = $100 \times \text{total number of points} / 300$

The letter grade will then be based on the chart below.

Course Components	Point Value	% of total score
Homework Quizzes	140	46.67
Virtual Field Trips	20	6.67
Total Two Exams	50	16.67
Final Exam	60	20
Class Participation	30	10
Total	300	100

Quizzes

Lectures within each module have an associated open book review quiz that must be completed within the allotted time scheduled. **See course schedule on the HuskyCT website.**

Virtual Field Trips

For the spring 2021 semester, students will be taking two faculty lead virtual field trips during the class period. Your attendance is mandatory. Following the field trips, students will be required to address a series of questions based on material covered during the field trips.

Exams

Two close book exams will be given using the Lockdown browser. Typically, exams consist of multiple choice questions which may require calculations be performed to derive an answer.

Final Exam

A comprehensive, close book, in class final exam using the Lockdown browser will be given and is required to be taken to pass the class.

Grading Scale:

Grade	Letter Grade	GPA
>90-100	A	4.0
88-89	A-	3.7
86-87	B+	3.3
82-85	B	3.0

Grade	Letter Grade	GPA
80-81	B-	2.7
76-79	C+	2.3
72-75	C	2.0
70-71	C-	1.7
66-69	D+	1.3
62-65	D	1.0
60-61	D-	0.7
<60	F	0.0

Due Dates and Late Policy

The *Course Schedule* area in HuskyCT lists all due dates for the course. Due dates are firm, absent extenuating and unforeseen circumstances or unless alternative arrangements have been made in advance. I encourage you to print a hard copy of the course schedule, and insert the due dates/reminders into your calendars on your smart phone and computers. *The instructor reserves the right to change dates accordingly as the semester progresses. All changes will be communicated in an appropriate manner.*

Late Policy: Students are required to strictly adhere to all deadlines. Any unexcused late quiz or other work will face a 30% deduction in score, if completed within 12 hours of the schedule due date and time. After 12 hours of the due date and time, the quiz or other work will be given a grade of 0%.

Feedback and Grades

I will make every effort to provide feedback and grades within 48 hours. To keep track of your performance in the course, refer to My Grades in HuskyCT. Click on the arrow on the right to review feedback.

Student Responsibilities and Resources

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. This section provides a brief overview to important standards, policies and resources.

Student Code

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. Review these important [standards, policies and resources](#), which include:

- The Student Code
- Academic Integrity
- Resources on Avoiding Cheating and Plagiarism
- Copyrighted Materials
- Netiquette and Communication
- Adding or Dropping a Course
- Academic Calendar
- Policy Against Discrimination, Harassment and Inappropriate Romantic Relationships
- Sexual Assault Reporting Policy

Copyright

Copyrighted materials within the course are only for the use of students enrolled in the course for purposes associated with this course and may not be retained or further disseminated.

Adding or Dropping a Course

If you should decide to add or drop a course, there are official procedures to follow:

- Matriculated students should add or drop a course through the [Student Administration System](#).
- Non-degree students should refer to [Non-Degree Add/Drop Information](#) located on the registrar's website.

You must officially drop a course to avoid receiving an "F" on your permanent transcript. Simply discontinuing class or informing the instructor you want to drop does not constitute an official drop of the course. For more information, refer to the:

- [Undergraduate Catalog](#)
- [Graduate Catalog](#)

Academic Calendar

Find important dates and deadlines for the semester

- [Spring Semester](#)

Academic Support Resources

[Technology and Academic Help](#) provides a guide to technical and academic assistance.

Students with Disabilities

Students needing special accommodations should work with the University's [Center for Students with Disabilities \(CSD\)](#). You may contact CSD by calling (860) 486-2020 or by emailing csd@uconn.edu. If your request for accommodation is approved, CSD will send an accommodation letter directly to your instructor(s) so that special arrangements can be made. (Note: Student requests for accommodation must be filed each semester.)

Blackboard measures and evaluates accessibility using two sets of standards: the WCAG 2.0 standards issued by the World Wide Web Consortium (W3C) and Section 508 of the Rehabilitation Act issued in the United States federal government." (Retrieved March 24, 2013 from [Blackboard's website](#))

Software Requirements and Technical Help

The technical requirements for this course include:

- Word and spreadsheet processing software
- [Adobe Acrobat Reader](#)
- Internet access

This course is completely facilitated online using the learning management platform, [HuskyCT](#). If you have difficulty accessing HuskyCT, students have access to the in person/live person support options available during regular business hours through [HuskyTech](#). Students also have [24x7 Course Support](#) including access to live chat, phone, and support documents.

Minimum Technical Skills

To be successful in this course, you will need the following technical skills:

- Use electronic mail with attachments.
- Save files in commonly used word processing program formats.
- Copy and paste text, graphics, or hyperlinks.
- Use Microsoft Word and Excel.
- Open and access PDF files.

University students are expected to demonstrate competency in Computer Technology. Explore the [Computer Technology Competencies](#) page for more information.

Evaluation of the Course

Students will be provided an opportunity to evaluate instruction in this course using the University's standard procedures, which are administered by the [Office of Institutional Research and Effectiveness](#) (OIRE).

Additional informal formative surveys may also be administered within the course as an optional evaluation tool.

NRE 2215 Spring 2021 Schedule					
Proposed simulator	Lectures	Lecture Dates	Quiz due date (all at 11:59PM)	Field Trip due date (all at 11:59)	Exams
Discharge measurement	1-Historical Perspective on Water Use	1/19	1/21		
	2-Hydrologic Cycle and Water Budgets	1/21	1/23		
Manning's equation	3-Surface Water Hydrology Overview	1/26	1/28		
	4-Reservoir Assessment and Development	1/28	2/2		
Water level measurement in well	5-Ground Water Hydrology Overview	2/2, 2/4	2/9		
	6-Water Quality Overview	2/9,2/11	2/16		
EC measurements for salt pollution	7-Nature of Surface Water and Ground Water Pollution	2/16, 2/18	2/23		
	8-Surface and Ground Water Development and Management, Water Treatment Processes	2/23	2/25		Exam 1 2/25
	9-Water System Case Studies	3/2	3/4		
	10 Irrigation, Desalination and Wastewater Treatment	3/4	3/9	Field Trip 1 (3/9) Assignment Due 3/11	
Environmental justice jury	11-Legal Aspects of Water Resources Development	3/11	11 and 12 combined 3/16		
	12-Water Allocation Law, Federal Law				
	13-Water, Fish and Wildlife	3/16	3/23		
Review of new home water quality report for exceedances	14-Local Water Jurisdiction (state and city level)	3/18	3/30		
	15-Water Use Conflict Resolution,		4/1		
	16-Economics of Water Use	3/23	No quiz for lecture 16		Exam 2 3/25
	Special Guest speaker	3/30	Alessandro Bruno, Florence Italy	Italy's Fascination with Bottled Water	

	17-Emerging Water Issues, Regional, US, World Wide	4/1	No quiz for lecture 17	Field Trip 2 (4/6) Assignment due 4/8	
	Guest Speaker	4/8	Dr. Beth Lawrence, NRE	Wetland Ecosystem Services	
	Video Liquid Assets: Big Business of Water	4/20	TBA Environmental Consultant	Environmental Consulting 101	
	Guest Speaker	4/22	John Hudak South Central CT Regional Water Authority,	Water Policy in Connecticut	
	Guest Speakers	4/27	Dr. Gabriel Eckstein Teas A&M Law School	Transboundary Aquifers	
	Finals week May 3-May 8				