Mary Eberhardt
Sabbatical Proposal Packet
September 13, 2019

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ABSTRACT
CCSU made a commitment to improving sustainability on campus over ten years ago and has had much success in this area, being nationally recognized as a “Green College”. One component of assessing the university’s sustainability program is the course offerings which directly address issues of sustainability. The Department of Chemistry and Biochemistry has no courses which address sustainability. This project aims to incorporate topics of sustainability into four introductory chemistry laboratory courses which annually service over 1100 students at CCSU. Laboratory experiments in CHEM 162, 201, 211 and 213 will be evaluated using the principles of Green Chemistry to reduce hazardous waste, seek renewable sources of raw materials, conserve energy and save money. Green Chemistry principles and the issues of sustainability will be incorporated into the laboratory manuals for the four courses. This project will increase the number of courses that address sustainability at the University and continue CCSU’s efforts toward improving sustainability on campus.
Sabbatical Leave Request and Recommendation Form
BOT/AAUP Contract Article 13.7
BOT/SUOAF-AFSCME Contract Article 24.8

Please Forward To Department Chair or Administrative Officer by September 13, 2019

Name _____________Mary A Eberhardt________________________ Date __September 10, 2019______
Department ___Chemistry and Biochemistry_____ AAUP _________ SUOAF-AFSCME ________X________

Preferred Time of AAUP Sabbatical:  Fall 2020___ Spring 2021___ AY 2020-2021___ (please check one)
Start and End Date of SUOAF-AFSCME Sabbatical: ______March 1, 2021 – August 31, 2021_______

Candidate Must Have Completed At Least Six Years Of Full-Time Service Since Initial Appointment Or Any
Previous CCSU Sabbatical. (Candidates may apply in their sixth year of service; however only tenured members
may take a sabbatical leave.)

Please Indicate Semester and Year of Appointment: __________June 28, 2013____________

Semester and Year of Last Sabbatical: __________NA________________

____Check here if your sabbatical leave is dependent on your receipt of a Fulbright or other fellowship. If, yes,
please be sure to include information and explanation of the fellowship in the narrative below including the
anticipated date of notification of award.

Plan of Study
In preparing the application, please be specific and detailed, while keeping in mind that not all members of the
Sabbatical Leave Committee will share your exact background.

I. Title of Project

Incorporating the Principles of Green Chemistry into 100 and 200 Level Chemistry Laboratory Courses

II. Statement of purpose (or hypothesis) and objective(s)

This project will investigate how the introductory chemistry laboratory courses can be made to
be "more green" and "sustainable". The project will 1) increase my knowledge of Green Chemistry principles, 2) increase my knowledge of sustainability initiatives at academic institutions, 3) explore curriculum resources specific to undergraduate laboratory courses, 4) evaluate modifications to current Chemistry and Biochemistry Department laboratory experiments to improve the sustainability of the process, 5) evaluate the inclusion of novel laboratory experiments which illustrate green chemistry principles.
**Background:**
In Fall 2008 the Faculty Senate passed a resolution calling for all academic departments to take an active role in “promoting sustainability in all aspects of CCSU’s academic life.” The University has been nationally recognized for its efforts toward improving sustainability on campus in the 2009 *Princeton Review’s Guide to Green Colleges*. As the *Princeton Review’s Guide to Green Colleges* notes, “We know that students are increasingly interested in this issue [sustainability] and we are happy to be able to help them make an informed decision. Among more than 10,000 teens and parents who participated in our 2017 College Hopes & Worries Survey, 64% told us that having information about a school’s commitment to the environment would influence their decision to apply to or attend the college.” There are several other studies which point to millennials’ interest in and concern for sustainability ([2017 Cox Sustainability Survey, “Meet the Teenagers Leading the Climate Change Movement”, “Millennials Re-envisioning Environmentalism and Climate Policy”](#)). These millennials are in our classrooms.

The most recent reporting on the University’s sustainability efforts lists 14 courses offered at CCSU which address the topic of sustainability ([2016 Second Nature Report](#)). The Department of Chemistry and Biochemistry has no courses which directly address sustainability.

In the field of chemistry, sustainability is generally called Green Chemistry. Green Chemistry, in very simple terms, is a different way of thinking about how chemistry and chemical engineering can be done. Over the years different principles, such as using renewable feedstocks or preventing waste, have been proposed that can be used when thinking about the design, development and implementation of chemical products and processes. These principles enable scientists and engineers to protect and benefit the economy, people and the planet by finding creative and innovative ways to reduce waste, conserve energy, and discover replacements for hazardous substances.

It’s important to note that the scope of these green chemistry and engineering principles go beyond concerns over hazards from chemical toxicity and include energy conservation, waste reduction, and life cycle considerations such as the use of more sustainable or renewable raw materials and designing for end of life or the final disposition of the product. Many ways to quantify greener processes and products have been proposed. These metrics include ones for mass, energy, hazardous substance reduction or elimination.

The principles of Green Chemistry are presented below in two versions, 1) for chemists, chemical engineers and scientists, and 2) for a general audience.
Green Chemistry
Everyone’s Doing It!

The 12 Principles of Green Chemistry
A framework for designing or improving materials, products, processes and systems.

1. Prevent Waste
2. Atom Economy
3. Less Hazardous Synthesis
4. Design Benign Chemicals
5. Benign Solvents & Auxiliaries
6. Design for Energy Efficiency
7. Use of Renewable Feedstocks
8. Reduce Derivatives
9. Catalysis (vs. Stoichiometric)
10. Design for Degradation
11. Real-Time Analysis for Pollution Prevention
12. Inherently Benign Chemistry for Accident Prevention


www.acs.org/greenchemistry

A New Kind of Chemistry

Green Chemistry uses renewable, biodegradable materials which do not persist in the environment.

Green Chemistry is using catalysis and biocatalysis to improve efficiency and conduct reactions at low or ambient temperatures.

Green Chemistry is a proven systems approach.

Green Chemistry reduces the use and generation of hazardous substances.

Green Chemistry offers a strategic path way to build a sustainable future.

© 2014 ACS Green Chemistry Institute®
To catalyze and enable the implementation of green chemistry and engineering throughout the global chemical enterprise.

Green Chemistry
Everyone’s Doing It!

Green Chemistry — Sustainable Chemistry in Sync With Nature
The design of chemical products and processes that reduce or eliminate the use or generation of hazardous substances.

- Smarter
- Safer
- More Efficient
- Saves Money
- Conserves Energy
- Prevents Pollution
- Designed for Reuse or Recycle
- Polishes Chem’s Public Image

“The best way to predict the future is to invent it.”
- Alan Kay

Green chemistry can create a better future.

www.acs.org/greenchemistry

A New Kind of Chemistry

- Green Chemistry emulates nature by using renewable materials that biodegrade easily in the environment.
- Green Chemistry uses materials more efficiently with less energy.
- Green Chemistry respects the environment, preventing pollution before it can happen.
- Green Chemistry helps build a sustainable future.
- Green Chemistry fosters innovation, creates jobs and inspires the next generation of chemists.

© 2014 ACS Green Chemistry Institute®
To catalyze and enable the implementation of green chemistry and engineering throughout the global chemical enterprise.
In the Department of Chemistry and Biochemistry, the 100 and 200 level laboratory courses service a large number of students who come from all disciplines. CHEM 162 “General Chemistry Laboratory” has an enrollment of approximately 680 students per year. CHEM 201 “Foundations of Analytical Chemistry Laboratory” enrolls approximately 180 students/year. CHEM 211 “Foundations of Organic Chemistry Laboratory” enrolls approximately 216 students/year. CHEM 213 “Introduction to Organic Synthesis Laboratory” enrolls approx. 108 students/year. All told, these four lower level chemistry lab courses touch approximately **1185 students**. This is a large audience that can be introduced to the principles of Green Chemistry and sustainability. The lab manuals for these four courses are written in-house and can be revised to include Green Chemistry principles.

This project is in line with the University’s Mission Statement: “prepares students to be thoughtful, responsible and successful citizens”, and also the University's Vision Statement, to be recognized for “fostering societal improvement through responsive and innovative program, and graduating broadly educated, culturally and globally aware students who will contribute meaningfully to their communities...”.

**Objectives:**
- Evaluate how “green” the current laboratory experiments are in CHEM 162, 201, 211 and 213.
- Introduce the principles of green chemistry into the laboratory manuals for CHEM 162, 201, 211, and 213.
- Increase students’ understanding of safe handling and treatment of laboratory waste for all experiments in these laboratory courses.
- Increase the University’s course offerings that address the issue of sustainability.

III. Description of your existing knowledge and/or work to date related to the project (include citations to the literature as appropriate).

I am a chemist with experience working in both the chemical industry and academic settings. When working in the adhesives industry I was a product development chemist. As EPA rules were changing in the 1990’s to reduce Volatile Organic Compounds (VOC) emitted into the air, I was charged with reformulating a top-selling adhesive used in the automotive industry. I worked to identify a low hazardous air pollutant (low HAP) solvent system for the adhesive, evaluate the performance of the reformulated adhesive, and conduct customer trials with the low HAP adhesive. These adhesives are being used today, CHEMLOK 205LH and CHEMLOK 207LH ([Technical data sheet](#), [CHEMLOK product guide](#)). Although the phrase was not much in use at the time, I was implementing the two principles of “Green Chemistry”: to use benign solvents and prevent (air) pollution.

In my position as Science Technical Specialist for the Department of Chemistry and Biochemistry at CCSU, I work with the Environmental Health and Safety Officer to ensure proper handling, record keeping and disposal of hazardous waste. Chemical waste is often an unavoidable part of laboratory experimentation, but chemists look to reduce the amount of chemical waste generated. In Spring 2014, I worked with Dr. Stephen Watton to identify a way to reduce the waste from one experiment in CHEM 201. We implemented a simple change to the experiment and reduced the waste generated in this experiment, “Spectrophotometric Determination of Manganese in Steel”, from approximately 30 Liters/semester to 0 Liters/semester.
I am keenly interested in this area of Green Chemistry and sustainability. I keep informed about topics in Green Chemistry through American Chemical Society (ACS) Webinars such as “How Sustainable Chemistry is Safer Chemistry” and “How Green Chemistry Processes Make Paper Production and Pulp Recycling Environmentally Effective”. The applications of Green Chemistry principles to industrial scale processes are wide-reaching, from the manufacture of aspirin and generic drugs to cleaning up the dye industry. There are examples of “real life” greener chemistry that touch students’ lives and may interest them.

Since Spring 2015 I have taught laboratory courses, Chem 162 and/or Chem 201 as an adjunct for the Chemistry and Biochemistry Department. The laboratory setting allows the instructor the unique opportunity for extended interactions with the students over the 2.5 hours of a typical class. I’ve seen that the students are hesitant about handling the final chemical products they make. While the laboratory instructors always provide instructions for handling waste properly, the students seem to have little understanding as to why it is sometimes safe to pour their products down the drain or why another experiment requires that their products are packaged for disposal. I see that we chemists have missed the opportunity to educate the lab students about Green Chemistry.

IV. Description of proposed sabbatical activities and/or methodology (include as much detail as possible).

I will attend the Green Chemistry and Engineering (GC&E) annual conference in June 2021. The GC&E Conference, hosted by the American Chemical Society’s Green Chemistry Institute, has been a meeting ground for advancing sustainable science and solutions since 1996. The conference includes industrial experts who are implementing Green Chemistry principles to large scale chemical manufacturing and small scale chemical processes at the product development stage. The conference programs from 2018 and 2019 include several sessions specific to academic attendees: “Green Chemistry in the Classroom”, “Towards Safer Design Strategies: Using Toxicology Tools & Concepts within Chemistry Courses & Programs” and “Moving Towards Green and Sustainable Chemical Education”. The 2021 GC&E would give me exposure to a wide range of professionals who are deeply involved in Green Chemistry. This is also the venue to learn the most up-to-date practices in this field.

I will examine the resources available through the Sustainability Curriculum Consortium (SCC) and the Association for the Advancement of Sustainability in Higher Education (AASHE). I want to understand the connection between Green Chemistry and the broader topic of sustainability, and how sustainability is incorporated into curricula.

I will apply Green Chemistry principles to the existing experiments in CHEM 162, 201, 211, and 213. First, the experiments will be evaluated for the amount and type of chemical waste currently generated. Next, the experiments will be evaluated for ways to reduce chemical waste. Additionally, I will consider and test alternate experiments which teach the same chemical concepts using a more “green chemistry” approach. The specific Green Chemistry principles used to evaluate the laboratory experiments are:

a. Prevent waste
b. Less hazardous synthesis
c. Design benign chemicals
d. (Utilize) benign solvents and auxiliaries  
e. Catalytic vs. stoichiometric reactions  
f. Inherently benign chemistry for accident prevention

I will draft revisions for the laboratory manuals for CHEM 162, 201, 211, 213 to include the concepts of Green Chemistry. This will include introducing the general principles of Green Chemistry and how they have been applied to each experiment included in the course. The laboratory manuals are written in-house by Department faculty.

V. Statement of potential value of your project to the university, to your professional growth, and to your particular field of study or discipline

I have been interested in the field of Green Chemistry for many years. This project would allow me to explore the resources of the Green Chemistry Institute of the American Chemical Society to become better versed and up-to-date with the field of Green Chemistry. This project will also give me the opportunity to make professional contacts with faculty incorporating Green Chemistry into their curricula at other institutions.

The great value to the university is that this project will incorporate Green Chemistry principles into four chemistry laboratory courses. This will give the chemistry department four courses which directly address sustainability. In turn, this will increase the number of courses that address sustainability campus-wide.

VI. Statement of expected outcomes of your project. (Describe the outcomes and relationship, if any, of any previous sabbatical projects to the current one.)

This sabbatical project will incorporate the principles of Green Chemistry to the introductory laboratory courses in the Chemistry and Biochemistry department. This will:

• incorporate the principles of Green Chemistry and chemical waste reduction/treatment into the laboratory courses CHEM 162, 201, 211, and 213.

• produce new instructional materials for CHEM 162, 201, 211, and 213.

• analyze and potentially reduce the amount and type of chemical waste generated by the 100 and 200 level chemistry laboratory courses.

• improve chemical safety in laboratory courses.

• expose over 1100 students/year to the principles of Green Chemistry and sustainability.

• inspire science students to apply Green Chemistry principles to “save the environment” in their research and future jobs.
Department Sabbatical Leave Committee Appraisal:

Recommend:  Yes _____  No _____

Departmental Sabbatical Leave Committee Signatures:

______________________________________________________________________________________________

______________________________________________________________________________________________

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Reviewed By Dean or Administrative Officer ________________________________

Reviewed By Provost ________________________________
Mary A. Eberhardt  
20 Haynes Rd.  
W. Hartford, CT 06117  
(860) 233-1108  
e-mail eberhardtme@ccsu.edu

EDUCATION

University of Pittsburgh, Pittsburgh, PA  September 1990-May 1995, ABD  
Clarkson University, Potsdam, NY  September 1986- May 1990, B.S. Chemistry,  
Concentration in Technical Writing

EXPERIENCE

Central Connecticut State University  June 2013 – present  
Science Technical Specialist, Department of Chemistry and Biochemistry  
Responsible for maintaining the department's laboratories and support facilities.  
Responsible for maintaining an appropriate inventory of supplies and ensuring proper  
maintenance of equipment. Maintains the chemical database for all stored chemicals and  
interacts with the Environmental Health and Safety department for the proper disposal of  
chemical waste. Assists the Chairperson with the hiring, training, and staffing of student  
assistants.

Adjunct Faculty  Spring 2015-present  
Teach CHEM 162 “General Chemistry Laboratory” and CHEM 201 “Foundations of  
Analytical Chemistry Laboratory”. Taught an FYE section of CHEM 162 in Fall 2017.  

Glastonbury High School, Glastonbury, CT  August 2007- June 2013  
Science Teacher  Full-time teaching position, teaching AP Chemistry, honors  
level Chemistry, standard level Chemistry, and Chemistry in the Community classes.

Central Connecticut State University, New Britain CT.  
College Science Partnership Series  Coordinator & Instructor  
Sept. 2002-May 2007  
Teach freshman level chemistry laboratory experiments at CCSU to students from Bulkeley High School Health Professions Academy. The CSPS involves six on-campus laboratory experiments during the academic year. Focus on proper  
laboratory technique and the connection between classroom learning and hands-on  
experimentation.

Biotechnology Institute  University Assistant  September 2002-April 2004  
Administated a newly formed Biotechnology Institute at the University. Prepared and  
submitted a proposal to form the Institute composed of faculty from the Chemistry and  
Biological Sciences departments. Organized Fall and Spring Biotechnology Forums to
showcase faculty and student research at CCSU. Conducted a fundraising campaign for the Institute, including an alumni phonathon and soliciting donations from Biotech companies.

**University of Connecticut Health Center**, Farmington, CT.

**Jumpstart Program Instructor** September 2005-June 2007
The Jumpstart Program is a Saturday academy for college bound students, mostly from the Hartford Public schools. As the chemistry instructor, duties include designing and teaching classroom lessons to complement and enhance their weekday classroom experience in chemistry. Employ novel teaching materials to re-inforce basic principles of chemistry. Develop engaging chemistry experiments appropriate for the students.

**Great Explorations Instructor** January 2005-June 2007
Present a series of four chemistry experiments in an after school science program for middle school students at Kennelly, Naylor and Bellizzi schools.

**University of Connecticut**, Storrs, CT. 

**College Enrichment Program Instructor** Summer 2003-2006
Teach a six week Introduction to Organic Chemistry course for upcoming college sophomores who are pursuing a medical career. Maintain an interactive classroom environment to ensure that all students comprehend the subject. Taught accompanying Organic Laboratory for three summer sessions.

**Consultant** Worked with small chemical firm in product development and test method development. Also directed patent application process for the company, coordinating patent-related work with external attorneys and analytical laboratories.

**Master Trainer and Instructor** Teach a 10 week MCAT review course for students applying to medical school. Specialized in teaching Verbal Reasoning, Essay writing, General Chemistry, Organic Chemistry and Physics. Certified Master Trainer: conduct classes to train and evaluate new instructors for the MCAT review course.

**Blackhawk College**, Moline, IL January -May 1999
**Adjunct Faculty, Natural Sciences Dept.** Taught Introductory Chemistry, including the laboratory class.
Lord Corporation, Erie, PA


PROFESSIONAL ACTIVITIES
American Chemical Society, Connecticut Valley Chapter member.
American Chemical Society, Chemical Education Division member.
Toastmasters International, Competent Toastmaster.

PUBLICATIONS


<table>
<thead>
<tr>
<th>Subject</th>
<th>Course #</th>
<th>Title</th>
<th>Description</th>
<th>Classification</th>
<th>Effort</th>
<th>Justification</th>
<th>Cross-Listed Courses</th>
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<td>ART 303</td>
<td>Studio Topics I</td>
<td>Visual &amp; Performing/Visual Art</td>
<td>Students must take a minimum of four studio courses, one per semester.</td>
<td>SC</td>
<td>SS 101</td>
<td>Consults on the role of visual perspective in the design of contemporary art.</td>
<td>ART 303</td>
</tr>
<tr>
<td>ART 340</td>
<td>Advanced Studio Art</td>
<td>Visual &amp; Performing/Visual Art</td>
<td>Students must take at least six studio courses at one level at one level.</td>
<td>SC</td>
<td>SS 101</td>
<td>Consults the role of visual perspective in the design of contemporary art.</td>
<td>ART 303</td>
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<tr>
<td>BIO 101</td>
<td>Plant and Animal Sciences</td>
<td>N</td>
<td>Plant growth and reproduction, and the external and internal factors that influence plant growth.</td>
<td>CTIS</td>
<td>FB 102</td>
<td>Instructs on the role of plant growth in the design of contemporary art.</td>
<td>ART 303</td>
</tr>
<tr>
<td>BIO 131</td>
<td>Introduction to Evolution</td>
<td>N</td>
<td>Introduction to the fundamental concepts of evolution, including natural selection, genetic variation, and speciation.</td>
<td>CTIS</td>
<td>FB 102, FB 103, FB 104, FB 105, FB 106, FB 107, FB 108</td>
<td>Consults on the role of plant growth in the design of contemporary art.</td>
<td>ART 303</td>
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<tr>
<td>BIO 132</td>
<td>General Zoology</td>
<td>N</td>
<td>Introduction to the fundamental concepts of evolution, including natural selection, genetic variation, and speciation.</td>
<td>CTIS</td>
<td>FB 102, FB 103, FB 104, FB 105, FB 106, FB 107, FB 108</td>
<td>Consults on the role of plant growth in the design of contemporary art.</td>
<td>ART 303</td>
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<tr>
<td>BIO 133</td>
<td>Introduction to Ecosystems</td>
<td>N</td>
<td>Introduction to the fundamental concepts of evolution, including natural selection, genetic variation, and speciation.</td>
<td>CTIS</td>
<td>FB 102, FB 103, FB 104, FB 105, FB 106, FB 107, FB 108</td>
<td>Consults on the role of plant growth in the design of contemporary art.</td>
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<tr>
<td>BIO 200</td>
<td>Advanced Biology</td>
<td>N</td>
<td>Introduction to the fundamental concepts of evolution, including natural selection, genetic variation, and speciation.</td>
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<td>FB 102, FB 103, FB 104, FB 105, FB 106, FB 107, FB 108</td>
<td>Consults on the role of plant growth in the design of contemporary art.</td>
<td>ART 303</td>
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<tr>
<td>BIO 302</td>
<td>Molecular Genetics</td>
<td>N</td>
<td>Introduction to the fundamental concepts of evolution, including natural selection, genetic variation, and speciation.</td>
<td>CTIS</td>
<td>FB 102, FB 103, FB 104, FB 105, FB 106, FB 107, FB 108</td>
<td>Consults on the role of plant growth in the design of contemporary art.</td>
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<tr>
<td>BIO 402</td>
<td>Ecology</td>
<td>N</td>
<td>Introduction to the fundamental concepts of evolution, including natural selection, genetic variation, and speciation.</td>
<td>CTIS</td>
<td>FB 102, FB 103, FB 104, FB 105, FB 106, FB 107, FB 108</td>
<td>Consults on the role of plant growth in the design of contemporary art.</td>
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<td>BIO 403</td>
<td>Environmental Science</td>
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<td>CTIS</td>
<td>FB 102, FB 103, FB 104, FB 105, FB 106, FB 107, FB 108</td>
<td>Consults on the role of plant growth in the design of contemporary art.</td>
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<td>BIO 404</td>
<td>Genetics</td>
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<td>CTIS</td>
<td>FB 102, FB 103, FB 104, FB 105, FB 106, FB 107, FB 108</td>
<td>Consults on the role of plant growth in the design of contemporary art.</td>
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<td>BIO 405</td>
<td>Topics in Biology</td>
<td>N</td>
<td>Introduction to the fundamental concepts of evolution, including natural selection, genetic variation, and speciation.</td>
<td>CTIS</td>
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<td>Consults on the role of plant growth in the design of contemporary art.</td>
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<td>BIO 406</td>
<td>Topics in Advanced Biology</td>
<td>N</td>
<td>Introduction to the fundamental concepts of evolution, including natural selection, genetic variation, and speciation.</td>
<td>CTIS</td>
<td>FB 102, FB 103, FB 104, FB 105, FB 106, FB 107, FB 108</td>
<td>Consults on the role of plant growth in the design of contemporary art.</td>
<td>ART 303</td>
</tr>
</tbody>
</table>
| BM 780 | Microbiology | H | Genotoxic and mutagenic factors affect human health and the environment. Microbes use various means to inhibit or kill off predators, recycle nutrients, and maintain environmental stability. Laboratory exercises involve identification, characterization, and control of microorganisms, and the study of the role of microorganisms in biotechnology and agriculture.

BM 359 | Introduction to Community and Civil Engineering | I | The course focuses on the community and civil engineering aspects of the CE 350 course, providing a platform for students working in groups to carry out a community project.

BM 358 | Projects in Community and Civil Engineering | I | This course explores the professional and ethical responsibilities of engineers in the context of community projects. It emphasizes the engineering design and implementation process, focusing on the development of design concepts and the evaluation of design alternatives.

CM 525 | Sustainable Development | H | Sustainable design and construction practices, including strategies for reducing energy consumption, water use, and waste generation. Students will work in teams to design sustainable buildings that utilize renewable energy systems.

CM 451 | Environmental Conservation | H | Knowledge and principles of environmental conservation are essential for sustainable development. This course covers topics such as sustainable materials, resource management, and environmental policy.

ED 316 | Principles of Learning Elementary Education | H | Principles of learning and teaching in elementary education. Focuses on the development of teaching strategies that are effective for diverse learning environments.

ED 321 | Effective Elementary Teaching | H | Effective teaching practices for elementary schools, including lesson planning, classroom management, and assessment.

EN 415 | Educational Foundations | H | Educational foundations for teaching at the secondary level, including theories of learning, curriculum development, and assessment.

EDR 513 | School and Society | H | The role of schools in society, with a focus on the impact of education on social, economic, and political outcomes.

ED 524 | Association of Contemporary Teaching Theories | H | An exploration of contemporary teaching theories, including constructivism, behaviorism, and social-cognitive theory, and their implications for practice.

EDU 595 | Special Topics in Educational Foundations | H | Special topics in educational foundations, such as critical pedagogy, multicultural education, and equity.

EDP 560 | The Politics of Education | P | An examination of the political and social factors that influence educational policy and practice.

EDP 297 | Education & Teacher Leadership in Urban Learning Environments | K | Focuses on the role of teachers and leaders in urban education, with an emphasis on equity, diversity, and the development of leadership skills.
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Description</th>
<th>Credits</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>ENVS 134</td>
<td>Introduction to Environmental Engineering</td>
<td>An introduction to environmental problems and control techniques unique to areas of the technical, physical, chemical, and geologic sciences, including air pollution, waste management, and water resource planning.</td>
<td>3.00</td>
<td>ENVS 134 is the prerequisite for more advanced environmental engineering courses.</td>
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<tr>
<td>ENVS 151</td>
<td>Introduction to Geology</td>
<td>Basic principles of physical geology and the scientific approach to human and natural systems.</td>
<td>3.00</td>
<td>ENVS 151 is offered in both the fall and spring semesters.</td>
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<tr>
<td>ENVS 241</td>
<td>Introduction to Planning</td>
<td>Principles and practice of planning in various social settings, including community, regional, and environmental contexts.</td>
<td>3.00</td>
<td>ENVS 241 is a required course for all environmental studies majors.</td>
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<tr>
<td>ENVS 368</td>
<td>Introduction to Remote Sensing</td>
<td>Principles and applications of remote sensing in environmental studies, including satellite imagery, air photo interpretation, and GIS applications.</td>
<td>3.00</td>
<td>ENVS 368 is recommended for students interested in environmental monitoring and mapping.</td>
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<tr>
<td>ENVS 411</td>
<td>Oceanography</td>
<td>The physical, chemical, and biological processes that govern the ocean environment.</td>
<td>3.00</td>
<td>ENVS 411 is a core course in the environmental studies major.</td>
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<tr>
<td>ENVS 421</td>
<td>Urban Environmental Engineering</td>
<td>Principles and practices of urban environmental engineering, including water quality, waste management, and environmental policy.</td>
<td>3.00</td>
<td>ENVS 421 is a required course for all environmental studies majors.</td>
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<tr>
<td>ENVS 441</td>
<td>Community &amp; Regional Planning</td>
<td>Principles and practice of community and regional planning, including land use, transportation, and environmental impact analysis.</td>
<td>3.00</td>
<td>ENVS 441 is recommended for students interested in urban and regional planning.</td>
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<tr>
<td>ENVS 459</td>
<td>Energy Systems and Climate Change</td>
<td>An introduction to the principles and applications of renewable energy systems and climate change.</td>
<td>3.00</td>
<td>ENVS 459 is a required course for all environmental studies majors.</td>
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<td>ENVS 481</td>
<td>Topics in Hydrology</td>
<td>Selected topics in hydrology.</td>
<td>3.00</td>
<td>ENVS 481 is a variable course offering.</td>
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<td>ENVS 491</td>
<td>Advanced Topics in Environmental Science</td>
<td>Advanced topics in environmental science, including air pollution, water quality, and environmental policy.</td>
<td>3.00</td>
<td>ENVS 491 is a variable course offering.</td>
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<td>Course Code</td>
<td>Course Title</td>
<td>Description</td>
<td>Credits</td>
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<tr>
<td>HIS 130</td>
<td>Seminar in Public History</td>
<td>N</td>
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<tr>
<td>HIS 155</td>
<td>Themes in Public History</td>
<td>Y (Elaborative Inquiry and Research Based)</td>
<td>4</td>
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<tr>
<td>HON 152</td>
<td>Health &amp; Society I</td>
<td>Y (Course material)</td>
<td>4</td>
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<tr>
<td>JS 570</td>
<td>Asian Social Issues</td>
<td>N</td>
<td>3</td>
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<tr>
<td>MIA 418</td>
<td>Studies in Information</td>
<td>Y (Health &amp; Social Issues)</td>
<td>2</td>
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<tr>
<td>WVE 548</td>
<td>Reading, Writing, and Oral Speaking</td>
<td>N</td>
<td>3</td>
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<tr>
<td>HST 321</td>
<td>International Marketing</td>
<td>N</td>
<td>3</td>
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<tr>
<td>ARM 485</td>
<td>Recreational Vistas and Site</td>
<td>N</td>
<td>3</td>
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<tr>
<td>PHL 240</td>
<td>Critical Problems in Business</td>
<td>H</td>
<td>3</td>
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<tr>
<td>PHL 261</td>
<td>Environmental Ethics</td>
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<td>3</td>
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<tr>
<td>PHL 262</td>
<td>Ethical Problems in Technology</td>
<td>H</td>
<td>3</td>
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<td>PHL 264</td>
<td>Philosophy of Knowledge</td>
<td>H</td>
<td>3</td>
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<tr>
<td>PHL 295</td>
<td>International Relations</td>
<td>M</td>
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<tr>
<td>PSY 102</td>
<td>Environment &amp; Behavior</td>
<td>M</td>
<td>3</td>
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<tr>
<td>PSY 241</td>
<td>Introduction to Health Psychology</td>
<td>M</td>
<td>3</td>
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<tr>
<td>PSY 400</td>
<td>Ecological Relations</td>
<td>N</td>
<td>Course designed to examine the impact of human activities on the environment. Includes an examination of community and social interactions and their effects on the environment. Students are introduced to the basic principles of ecology and the impact of human activities on the environment.</td>
<td>CTE 1</td>
</tr>
<tr>
<td>PSY 345</td>
<td>Health Psychology</td>
<td>N</td>
<td>Students are introduced to the field of health psychology. Topics include the psychological aspects of health, illness, and disease, as well as the role of social support in health outcomes.</td>
<td>CTE 2</td>
</tr>
<tr>
<td>PSY 342</td>
<td>Psychosocial Stress</td>
<td>N</td>
<td>Students are introduced to the psychological aspects of stress and coping. Topics include sources of stress, stress responses, and strategies for coping with stress.</td>
<td>CTE 3</td>
</tr>
<tr>
<td>SUST 140</td>
<td>Introduction to Sustainability</td>
<td>N</td>
<td>Course designed to introduce students to the concept of sustainability. Topics include the natural environment, human activities, and the interaction between them.</td>
<td>SC</td>
</tr>
<tr>
<td>SUST 139</td>
<td>Sustainable Foods &amp; Environment</td>
<td>N</td>
<td>Course designed to introduce students to the concept of sustainable food systems. Topics include the natural environment, human activities, and the interaction between them.</td>
<td>SC</td>
</tr>
<tr>
<td>SUST 141</td>
<td>Sustainable Energy &amp; Climate Change</td>
<td>N</td>
<td>Course designed to introduce students to the concept of sustainable energy systems. Topics include the natural environment, human activities, and the interaction between them.</td>
<td>SC</td>
</tr>
<tr>
<td>SUST 140</td>
<td>Social, Political, and Ethical Dimensions of Global Sustainability</td>
<td>N</td>
<td>Course designed to introduce students to the concept of global sustainability. Topics include the natural environment, human activities, and the interaction between them.</td>
<td>SC</td>
</tr>
<tr>
<td>SUST 141</td>
<td>Contemporary Challenges to Sustainable Development</td>
<td>N</td>
<td>Course designed to introduce students to the concept of sustainable development. Topics include the natural environment, human activities, and the interaction between them.</td>
<td>SC</td>
</tr>
<tr>
<td>SUST 142</td>
<td>Climate for Sustainability</td>
<td>N</td>
<td>Course designed to introduce students to the concept of climate change and sustainability. Topics include the natural environment, human activities, and the interaction between them.</td>
<td>SC</td>
</tr>
<tr>
<td>SW 183</td>
<td>Foundation to Social Work</td>
<td>N</td>
<td>Course designed to introduce students to the field of social work. Topics include the natural environment, human activities, and the interaction between them.</td>
<td>SC</td>
</tr>
<tr>
<td>SW 185</td>
<td>Human Behavior in the Social Environment</td>
<td>N</td>
<td>Course designed to introduce students to the field of human behavior in the social environment. Topics include the natural environment, human activities, and the interaction between them.</td>
<td>SC</td>
</tr>
<tr>
<td>SW 198</td>
<td>Current Topics in Social Work</td>
<td>Y</td>
<td>Course designed to introduce students to the field of current topics in social work. Topics include the natural environment, human activities, and the interaction between them.</td>
<td>SC</td>
</tr>
<tr>
<td>SW 198</td>
<td>Environment, Health and Safety (EHSE)</td>
<td>N</td>
<td>Course designed to introduce students to the field of environment, health and safety. Topics include the natural environment, human activities, and the interaction between them.</td>
<td>SC</td>
</tr>
</tbody>
</table>